

# Northumbria Research Link

Citation: Sun, Huan (2022) Understanding the innovation-driven sustainability of Chinese SMEs from central China: a missing piece of the jigsaw. Doctoral thesis, Northumbria University.

This version was downloaded from Northumbria Research Link:  
<https://nrl.northumbria.ac.uk/id/eprint/51684/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

***Understanding the innovation-driven sustainability of Chinese  
SMEs from central China: A missing piece of the jigsaw***

Huan Sun

A thesis submitted in partial fulfilment of the requirements of  
the University of Northumbria at Newcastle for the degree of  
Doctor of Philosophy

The research was undertaken at Newcastle Business School  
November 2021

## **Abstract**

This research addressed the question “How CSMEs achieve systematic IDS?” and aimed to develop a systematic and comprehensive theoretical understanding in relation to the CSME’s IDS definition, motivation, adoption and measurement. It had become significant that this was under-researched in prior studies. In particular, the prior studies in the innovation and sustainability domain have mainly focused on the antecedents of SMEs’ sustainable behaviours, like barriers and drivers, whereas the process of how innovation-driven behaviours can lead to sustainability for SMEs and the relevant measuring criteria were under-researched. In addition, research has been mainly focused on Western SMEs from Europe and North America (Moon & Shen, 2010), and the mainstream theory has largely focused on large enterprises (Halme & Korpela, 2014); therefore, SMEs’ IDS was less well-understood and documented, particularly in the context of emerging markets and economies, such as China.

The interpretivism philosophy that the researcher held encouraged her to choose an inductive method and conduct qualitative research, followed by choosing a social constructionism epistemological perspective and then adapting the multi-case study method as the research strategy for this study. The semi-structured interview was used to collect qualitative data, whilst secondary data was collected to supplement the primary research. Overall, 54 people were interviewed, and multi-case studies were conducted that cross-analysed 12 SMEs. King and Brooks’ (2017) model was used to guide the process of template analysis.

Based on empirical evidence and template analysis, a systematic and comprehensive understanding in relation CSMEs’ systematic IDS emerged. In detail, several key themes, including CS definition in China’s context, the relationship between innovation and CS, the motives, the actions in each adoption stage and their influencing factors, as well as the measurements, were explored in-depth and analysed.

By applying multi-level analysis and interpreting data from different theoretical perspectives, the findings from this research filled the identified research gaps and expanded the knowledge of SMEs’ IDS. Furthermore, the findings of this study offered practical and systematic methods for practitioners such as SMEs in unfavourable regions to achieve CS towards innovation. And other stakeholders who want to engage in this process in the future actively, such as the Chinese Government or supply chain players, can have a better recognition of their role. In addition, for researchers who will select China as their targeted context, this research, especially the methodology chapter and appendixes, discussed and presented a practical research method to collect and analyse empirical evidence there.

## List of Contents

Abstract .....	2
List of Contents.....	3
Lists of Figures and Tables.....	8
Abbreviations .....	10
Acknowledgement.....	11
Declaration .....	12
1 Introduction.....	13
1.1 Research area and background .....	13
1.2 Research Objectives .....	16
1.3 Thesis Structure .....	16
2 Literature Review .....	18
2.1 Introduction.....	18
2.2 Background and Terminology.....	19
2.2.1 SMEs definition and peculiarities .....	19
2.2.1.1 SMEs' characteristics .....	23
2.2.2 The Organizational-level Concept of IDS .....	25
2.2.2.1 Overview of Corporate Sustainability .....	25
2.2.2.2 The relationship between innovation and sustainability (SOI and IDS).....	25
2.2.2.3 The Process of (eco-) innovation .....	29
2.3 Motivations and drivers of IDS .....	29
2.3.1 The market and customer demands.....	31
2.3.2 Regulation and cost-saving .....	32
2.3.2.1 Regulation and Government Policies.....	32
2.3.2.2 Non-regulation-related cost-saving .....	33
2.3.3 The supply chain and the environmental authorities.....	33
2.3.4 Internal strategic consideration and orientation.....	34
2.3.5 Summary.....	35
2.4 Preferable IDS strategies and activities adopted by SMEs .....	36
2.5 Key influencing elements when crafting IDS strategies.....	42
2.5.1 Strategic orientation (SO) .....	42
2.5.2 Resource and capability (R&C).....	45
2.5.3 Networks .....	45
2.5.4 TFT and TMT .....	46
2.5.5 Firm size.....	47
2.5.6 Summary.....	47
2.6 Key influencing elements when putting IDS strategies into actions.....	48
2.6.1 Industry level .....	49
2.6.1.1 Network cooperation with stakeholders .....	49
2.6.2 Organizational level .....	53
2.6.3 Individual level.....	54
2.6.3.1 Top managers' mindset .....	54

2.6.3.2 Employees' participant .....	55
2.6.4 Influencing elements' significance and their interactions .....	55
2.6.5 Summary .....	56
2.7 Indicators and measuring criteria .....	57
2.8 Underpinned key theories and conceptual gaps .....	58
2.8.1 TBL theory .....	59
2.8.2 Stakeholder theory .....	60
2.8.3 RBV .....	62
2.8.4 Gaps in the current literature .....	63
3 Research methodology .....	68
3.1 Research Philosophy and Paradigm .....	68
3.1.1 Research paradigms .....	68
3.1.2 Constructivism and Social Constructionism .....	72
3.1.3 Scientific reasoning skills-Inductive and deductive approach .....	73
3.2 Research strategy-qualitative multiple case study .....	74
3.2.1 Conduct qualitative research by using case study method .....	74
3.2.2 Benefits and limits to use multiple case study .....	75
3.3 Data collection method .....	76
3.3.1 Non-probability Sampling and Selection Criteria .....	76
3.3.1.1 Rational of the Sample Location .....	76
3.3.1.2 Sample selection criteria .....	79
3.3.2 Primary data .....	87
3.3.2.1 Semi-structured Interviews .....	87
3.3.2.2 Targeted Participants of the Semi-structured Interview .....	88
3.3.2.3 Interview checklists development .....	90
3.3.2.4 Research memos .....	92
3.3.2.5 The number of interview participants in organization research .....	92
3.3.3 Secondary data .....	93
3.3.4 Data Triangulation .....	94
3.4 Data Analysis .....	95
3.4.1 Data Preparation .....	95
3.4.1.1 Storage .....	95
3.4.1.2 Transcribe .....	95
3.4.2 Template analysis .....	95
3.4.2.1 Stages in Template Analysis .....	97
3.4.2.2 On-going developed template .....	103
3.5 Pilot study .....	104
3.5.1 Rational of Pilot Case Location-Jiangxi Province, China .....	104
3.5.2 Rational of pilot case selection—Company ED .....	105
3.6 Ethical Considerations .....	108
3.6.1 For individual .....	108
3.6.2 For organisation .....	109
3.6.3 Further consideration .....	109

3.7 Research Quality.....	110
4 Cross-case findings and analyses.....	115
4.1 Introduction.....	115
4.2 CS definition in the context of Chinese SMEs.....	116
4.2.1 Profitable business performance.....	116
4.2.1.1 Competitive products .....	117
4.2.1.2 Unique (specified) resources and capabilities .....	119
4.2.1.3 Positing the company in promising and attractive industry .....	124
4.2.1.4 Conglomerate diversification.....	125
4.2.2 Business continuity in challenge time.....	125
4.2.3 Social expectations and responsibilities .....	126
4.2.3.1 Develop a responsible supply chain.....	127
4.2.4 Considerations in the China's context .....	129
4.3 The relationship between innovation and CS.....	133
4.3.1 The triangulation structure.....	133
4.3.2 SOI and IDS .....	138
4.4 Drivers and motives of pursuing IDS.....	140
4.4.1. Catering to government policy .....	140
4.4.2 Satisfying customers .....	142
4.4.3 Pursuing economic benefit .....	142
4.4.4. Practicing core values of the organizational culture.....	143
4.4.5 The IDS drivers that emerged .....	145
4.5 CSMEs' IDS actions, strategies and adoption process .....	146
4.5.1 IDS actions .....	146
4.5.2 IDS strategy.....	151
4.5.3 Integrated process of IDS strategy adoption .....	152
4.6 Crafting IDS strategy .....	156
4.6.1 Crafting IDS strategy .....	156
4.6.2 Influencing factors .....	157
4.6.2.1 Firm-level factors .....	157
4.6.2.2 Team-level factors .....	159
4.6.2.3 Individual-level factors.....	162
4.7 Implementing IDS strategy .....	165
4.7.1 Implementing IDS strategy .....	165
4.7.2 Influencing factors .....	166
4.7.2.1 Contextual factors and networks.....	166
4.7.2.2 Organizational factors.....	172
4.7.2.3 Team characteristics .....	174
4.7.2.4 Interactive influencing effects .....	176
4.8 Commercialising IDS strategy .....	178
4.8.1 Commercialising IDS strategy .....	178
4.8.2 Influencing factors .....	179
4.8.2.1 Cost control.....	179
4.8.2.2 (IDS-related) marketing strategy .....	179

4.9 Measuring IDS strategy.....	181
4.9.1 Innovation success.....	182
4.9.2 Corporate sustainability performance.....	186
4.9.2.1 Economic sustainability measurements .....	186
4.9.2.2 Environmental sustainability measurements .....	188
4.9.2.3 Social sustainability measurements.....	188
5 Discussions and Conclusions .....	191
5.1 Introduction.....	191
5.1.1 Definitions of CS in the Chinese SMEs context .....	191
5.1.2 Relationship between innovation and CS.....	192
5.1.3 Sustainability strategies adopted by CSMEs .....	192
5.1.4 Motivation .....	192
5.1.5 Influencing factors in adopting IDS strategy .....	193
5.1.6 Measurement and evaluation of IDS strategy .....	194
5.2 Conceptual model.....	194
5.3 Theoretical contributions and implications .....	197
5.4 Limitations and future recommendations.....	201
5.4.1 Limitations .....	201
5.4.2 Future study.....	202
Appendices .....	204
Appendix A Systematic literature review documents .....	204
Appendix A1 Systematic literature review and its descriptive analysis results .....	204
Appendix A2 Thematic codes and memos of the systematic literature view .....	214
Appendix A3 Research Methodology Summer School Poster .....	232
Appendix B Interview Guides (samples).....	233
Appendix B1 Interview guides for managers.....	233
Appendix B2 Interview guides for employees .....	236
Appendix B3 Interview guides for government.....	238
Appendix C Interviewee Records.....	240
Appendix D Informed Consent Forms and Participant Information Sheets (samples in English) .....	245
Appendix D1 Research Organisation Informed Consent Forms (Company) .....	245
Appendix D2 Research Organisation Informed Consent Forms (Government) .....	247
Appendix D3 PIS (Manager).....	249
Appendix D4 PIS (Employee) .....	250
Appendix D5 PIS (Government).....	251
Appendix D6 Informed Consent Form for research participants (Manager) .....	252
Appendix D7 Informed Consent Form for research participants (Employee) .....	253

Appendix D8 Informed Consent Form for research participants (Government) .....	254
Appendix E Template analysis records .....	255
Appendix E1 Main coding progress .....	255
Appendix E2 Use the function to insert notes & comments properly on MindMaster .....	257
Appendix E3 Main templates (the themes matching across 12 cases).....	258
References .....	265

## **Lists of Figures and Tables**

- Figure 2.1-1 Individual steps of the systematic LR
- Table 2.2.1-1 The different definitions of SME used by prior articles
- Table 2.2.1-2 Classification Standards for SMEs in China
- Table 2.2.1.1-1 The widely acknowledged constraints of SMEs
- Table 2.2.2-1 SOI and IDS: define, compare and contrast
- Table 2.2.2.3-1 The process of (eco-) innovation
- Table 2.4-1 Subthemes of corporate sustainability
- Table 2.4-2 Classifications of green marketing innovations
- Table 2.5.1-1 Strategic orientations in SMEs and potential influence on sustainability-related innovations
- Table 2.6.1.1-1 Networking stakeholders of innovation-driven sustainable SMEs
- Figure 2.8.1-1 the 'TBL' or 'three pillars' interpretation of sustainability
- Table 2.8.2-1 Stakeholders categories and their representative authors
- Table 2.8.2-2 Attributes had been introduced to explore and examine the implications of contentious relationships between stakeholders and organizations
- Table 2.8.4-1 Conceptual gaps and research questions in relation of IDS phenomenon
- Figure 3-1 Flow of Methodology
- Table 3.1.1-1 Typical Research Paradigms
- Figure 3.1.3-1 Scientific reasoning skills-Inductive and deductive approach
- Figure 3.3.1.2-1 Sample selection flow
- Table 3.3.1.2-1 Requirements for Jiangxi S.E.D.I. SMEs
- Table 3.3.1.2-2 Requirements for Henan S.E.D.I. SMEs
- Table 3.3.1.2-3 Different types of innovation of SMEs
- Table 3.3.1.2-4 TBL sustainability criteria
- Table 3.3.1.2-5 Brief background of the 12 cases in manufacturing (and service)
- Table 3.3.2.5-1 Different opinions about the appropriate number of interview participants in organization research
- Figure 3.4.2.1-1 Typical stages in Template Analysis (cited by King & Brooks, 2017)
- Figure 3.4.2.1-2 Final interpretation steps
- Table 3.5.2-1 The profile of Company ED
- Table 3.7-1 The most common measurements to evaluate a qualitative research's quality, and practical methods
- Table 3.7-2 Examples of the researcher's practice to fulfil qualitative research quality assessment criteria
- Figure 4.2-1 CS definition in the context of Chinese SMEs
- Figure 4.2.1.1-1 Mind map: Competitive products (main study)
- Figure 4.2.3-1 Mind map: CSMEs' social expectations and responsibilities
- Table 4.2.3-1 CS in social and environmental perspective and their key stakeholders
- Table 4.2.3.1-1 Representative cases in forming a responsible supply chain
- Table 4.2.4-1 CS and practiced Chinese philosophy and principles
- Figure 4.3.1-1 Relationship between innovation and corporate sustainable development in the pilot case

Table 4.3.1-1 Specific examples related to each connect (the pilot case)

Table 4.4-1 Key themes of IDS motivation (derived from the pilot study)

Table 4.4.4-1 Classifications of the crisis consciousness

Table 4.5.1-1 Actions in achieving both economic, social and environmental sustainability (the pilot case as examples)

Table 4.5.2-1 Interviewees who mentioned at least one integrated strategy

Figure 4.5.2-1 An extended strategic supply chain (strategy b) that contains continuous innovations based on the advanced microbial degumming technology (strategy a)

Figure 4.5.3-1 Integrated process of IDS strategy adoption

Table 4.6.1-1 Representative Actions in crafting

Table 4.6.2.1-1 Key influencing factors for IDS strategy crafting (firm-level)

Table 4.6.2.3-1 Top managers' influence in strategy crafting

Table 4.7.1-1 Representative Actions in implementing

Table 4.7.2.1-1 External factors and networking in influencing IDS implementation

Table 4.7.2.1-2 External factors and networking in influencing IDS implementation

Table 4.7.2.2-1 Firm-level factors in implementing

Figure 4.7.2.2-1 Organizational factors for implementing IDS strategies

Table 4.7.2.3-1 Key team characteristics that can influence the IDS strategy implementation

Figure 4.7.2.4-1 Sub-process 1 and actions: Process innovation (techniques + equipment)

Figure 4.7.2.4-2 Representative example and combined influencing factors

Table 4.8.1 Representative Actions in commercializing

Table 4.8.2.2-1 Strategies in commercializing IDS products (main study)

Table 4.9.1-1 Product innovation measurements

Table 4.9.1-2 Process innovation measurements

Figure 4.9.1-1 measurements to evaluate the outputs of an IDS strategy

Table 4.9.2.1-1 Economic sustainability measurements (pilot study)

Figure 4.9.2.1-1 economic measurements to evaluate the outcome of IDS strategy (main study)

Table 4.9.2.2-1 Environmental sustainability measurements (pilot study)

Figure 4.9.2.2-1 environmental measurements to evaluate the outcome of IDS strategy (main study)

Table 4.9.2.3-1 Social sustainability measurements (pilot study)

Figure 4.9.2.3-1 social measurements to evaluate the outcome of IDS strategy (main study)

Figure 5.2-1 Conceptual model to pursue IDS and its sub-innovations

## Abbreviations

B2C	Business to Client
CS	Corporate sustainability
CSME	Chinese small and medium-sized enterprise
CSR	Corporate social responsibility
EIs	Environmental Innovations
EO	Entrepreneurial orientation
IDS	Innovation-driven sustainability
LR	Literature Review
PfR	Project feasibility report
QMS	Quality Management System
RBV	Resource-based view
R&D	Research and Development
SME	Small and medium-sized enterprise
SO	Strategic orientation
SOI	Sustainability-oriented innovation
TBL	Triple bottom line

## Acknowledgement

I would like to thank my supervision team, Dr Rose Quan, Professor James Cunningham and Professor Wenjin Chen (External), for spending their precious time during this Ph.D. journey. I would like to thank the members of the various oral examinations, Dr Jan Myers, Professor Yu Xiong, Dr Gendao Li, Dr Xiaoqing Li (External) and Professor David Charles, for offering great questions and suggestions. I would like to thank the institutions and interviewees who actively participated in my research for their sincere opinions and patience. I would like to thank the Student Support and Wellbeing Office, the Graduate School, and the Newcastle Business School of Northumbria University for their help and service along the way. I would like to thank my friends and families, especially my mum, Qi Zhao [赵琪], who supports my work with great commitment, who acts as my mentor, guarding angle and my biggest fan whenever I need her.

For those who have supported me, helped me, been patient with me, and shared sincere opinions and experiences with me, I will continue to live up to your trust and satisfaction in the days to come and grow into someone who makes you proud.

Finally, I thank Huan (Eileen) Sun [孙寰, ORCID 0000-0003-1592-5367, Email 18770079653@163.com], myself, for what I have done, am doing and will do, for never losing the courage to speak out, act on and stand up for what I believe, for occasionally forgetting but always re-remembering that I deserve to be genuinely respected and liked for who and what I am, and the way I deal with the world. I genuinely believe and sincerely hope no beautiful, kind, sincere, honest, hard-working soul will be led down or be defeated, and a promising future is always ahead. Best wishes to me.



(Photo: The researcher and her mum at Newcastle Business School)

## **Declaration**

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

Any ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by the Research Ethics Committee of Northumbria University at Newcastle.

I declared that the word count of this thesis is 70,935 words.

Name: Huan Sun

Date: 20.01.2022

# 1 Introduction

## 1.1 Research area and background

According to Brundtland Commission (1987), sustainable development is a development to achieve economic growth that does not deplete renewable resources nor destroy the ecosystems and contributes to reducing social inequalities at the world level. Therefore, it was suggested by Henriques and Catarino (2015) that, in practice, a sustainable company must not only promote economic growth but also guarantee the workers' welfare, reduce production costs, and decrease the negative environmental impact during its production and operation process. As corporate sustainability (CS) might provide better cost-effectiveness for the company, meet customer satisfaction, and create a differentiated brand image (Golinska & Kuebler, 2014), many companies regard CS as an opportunity or source to win the competition and leverage their competitive capabilities (Henriques & Catarino, 2015).

In the last decade, innovation has been utilized as a key strategy in the current dynamic global competitive environment to help companies achieve CS (Yasin, Nawab, Bhatti, & Nazir, 2014). Consequently, practice such as eco-innovation or sustainability-oriented innovation (SOI) has become an increasingly important strategic consideration for companies of any size (Moore & Manring, 2009).

Recent studies show that a growing number of small- and medium-sized enterprises (SMEs) are motivated by sustainability goals rather than just profits or legislative requirements. However, these SMEs lack the necessary knowledge and capabilities to help them achieve these goals through innovation-driven strategies (Crossan & Apaydin, 2010); thus, only a few SMEs actually achieved innovation-driven sustainability (IDS) and perceived the benefits from this particular action. Considering the adoption of IDS strategies demands early investments, for instance, in technology development and employee training; thus, many executives of SMEs fear that these investments become an extra cost burden only, without any financial reward later on (Ki-Hoon, 2009). Thus, research is required to help SMEs know better whether they want to engage in this change and how. Shevchenko, Levesque and Pagell (2016) further claim that if small innovative firms successfully switch to new business models, adopt breakthrough green technologies and act entrepreneurially; then their larger innovative competitors will be forced to follow. Consequently, some scholars have raised their interest in studying IDS-related practices of SMEs (Klewitz & Hansen, 2014).

However, innovation- and sustainability-related research has not been well studied from a theoretical perspective. In detail, by adopting a systematic literature review (LR) through both descriptive and thematic analysis, the researcher concluded that prior documented IDS-related practices had been classified according to either the

three pillars of sustainability (including economic, social and environmental sustainability), the forms of innovation (including product innovation, process innovation, marketing innovation, business model innovation) or the degree of newness (including incremental innovation, radical innovation). Only a few studies truly combine the aspects from both CS and innovation perspectives. Among them, current research is still strong on eco-innovation or corporate social responsibility (CSR) rather than on SOI or IDS, which integrates innovation into a triple bottom line perspective that reflects both economic, social, and environmental dimensions.

More specifically, the prior studies in the SOI domain have mainly focused on the antecedents of SMEs' sustainable behaviours, like barriers and drivers (Hsu & Cheng, 2012; Parker, Redmond & Simpson, 2009), whereas it is assumed that innovation-led behaviours certainly lead to CS for SMEs (Burke & Gaughran, 2007). In other words, prior studies tend to explore actions and why but not so many on the process and how. And few existing studies attempt to discover whether and how these SOIs enhance companies' CS, such as what measuring criteria can be utilized to evaluate the outcomes of innovation-driven activities in relation to SMEs' sustainability (Golinska & Kuebler, 2014). Thus, how SMEs adopt and measure their developed IDS strategies has not been well studied.

Furthermore, the resource-based view, knowledge-based view, organizational learning, and network theory were usually utilized respectively by researchers when interpreting a conducted corporate strategy (Crossan & Apaydin, 2010). The descriptive analysis results of the researcher's systematic LR confirmed this finding. In detail, from a theoretical perspective, by 2016, although 33% of articles unspecified the underpinned theories, the rest applied either SMEs' or top managers' characteristics, resource-based view or dynamic capability, the institutional perspective, network theory, entrepreneurship, organizational learning, environment screening, human resource management, management adaptation and change, or economics, separately. In addition, most of the published innovation and CS studies only applied either macro (including industry and market), organizational or micro (including team and individual) level of analysis; among them, by 2009, only 8% of innovation research applied multilevel analysis (Crossan & Apaydin, 2010). The descriptive analysis results of the researcher's systematic LR confirmed this finding by pointing out that, by 2016, only 4% of innovation- and sustainability-related studies applied multilevel analysis. However, it was argued by Epstein, Buhovac and Yuthas (2010) that these researchers, from a single theoretical perspective or applied single-level analysis, were incapable of explaining a strategy effectively and comprehensively. It is due to, to their best knowledge, resource investments and organization structure enabling a strategic cycle, while external institutional rules and internal focusing draw the boundaries of the activities. Thus, a comprehensive study that applies multilevel analysis and different theories must be conducted to better understand SMEs' practice in IDS. For instance, an institutional theory should be utilized while understanding the institutional determinants of whether and in

what forms SMEs take on social and environmental responsibilities (Bos-Brouwers, 2010; Brammer, Jackson & Matten, 2012) because all sizes of companies are embedded in a broad set of historical, political and economic institutions that affect their behaviours (Campbell, 2007). And to attain a comprehensive understanding of the determinants behind the formulation of IDS strategies and the key influencing elements during the implementation process, organizational resources and capabilities such as the corporation's culture, structure, leadership, and managerial compensation schemes (Hansen, Søndergård & Meredith, 2002), and networks and the involved key stakeholders (Bos-Brouwers, 2010; Hansen et al., 2002; Noci & Verganti, 1999) should be considered.

In addition, amongst the existing innovation or CS research, studies have mainly focused on Western SMEs from Europe and North America (Moon & Shen, 2010); and the mainstream theory is largely focused on large enterprises (Halme & Korpela, 2014). Therefore, SMEs' are less well-understood and documented, particularly in the context of emerging economies and developing countries, such as China.

Although focusing on Chinese SMEs' (CSMEs') IDS practice is valuable and required, only a few quantitative CS or innovation studies focus on the Yangtze River Delta and Zhujiang Delta, which lies the most developed industrial SMEs in China (Jiang & Wong, 2016). Outlying CSMEs have been under-researched, and in-depth interpretive opinions related to underdeveloped areas such as central China, which focus on theory exploration instead of theory testing, are required. Another reason the researcher decided to narrow her sample location to the central zone of China was that it has several unique characteristics in innovation and sustainable development from economic, social, geographical, innovation culture and capacity, and regulatory perspectives. These resources, dynamic capabilities and institutional forces make the central area of China an appropriate region to be targeted for the researcher's Ph.D. project by showing great potential to collect rich and detailed data and even identify critical or extreme cases (Scapens, 2004) for industrial SMEs' IDS study.

Specifically, the researcher targeted Henan and Jiangxi Provinces in this Ph.D. study. Henan is the third largest province of China in population, and in the six provinces of Central China, Henan's GDP and population are both ranked first (China Statistical Yearbook 2016, 2016). Jiangxi province does not have outstanding GDP or population; however, it achieved a 9.1% increase in regional GDP (China Statistical Yearbook 2016, 2016). This indicator has been continuously at over 9.0% in the last five years (China Statistical Yearbook 2016, 2016), showing that Jiangxi has become the fastest-growing province in the central area of China. In conclusion, studying SMEs located in Henan and Jiangxi provinces allowed the researcher not only to compare companies' IDS practices within a similar social context but also to enhance the transferability and credibility of her study.

## 1.2 Research Objectives

In drawing upon the identified research gaps, this researcher aimed to mirror the IDS strategies and their implementation in CSMEs and understand the systematic IDS of SMEs from China. This study's main research question was: How do CSMEs achieve systematic IDS?

To answer this research question, the related sub-questions were:

- Sub-question 1. How do CSME managers and employees interpret the concept of CS, and the relationship between innovation and CS, from the sector leader's perspective?
- Sub-question 2. What are the preferred IDS strategies adopted by CSMEs?
- Sub-question 3. How is CS crafted and implemented towards innovation? Why are these actions taken?
- Sub-question 4. How do they measure the outcomes of IDS strategies, and how to evaluate whether these actions are effective in meeting their CS objectives?

Objectives below were expected to be achieved:

1. Continuously and critically review existing literature in the field of innovation and sustainability studies.
2. Identify preferable IDS strategies adopted by CSMEs.
3. Investigate the motives to adopt IDS practice and key influencing elements when crafting and putting IDS strategies into action.
4. Explore measuring criteria utilized by CSMEs to evaluate the effectiveness of IDS strategies.
5. Develop a systematic and comprehensive understanding in relation CSMEs' systematic IDS.

## 1.3 Thesis Structure

The study was organized in the following structure to present how the comprehensive and systematic study was conducted and what has been learned about CSMEs' systematic IDS.

A systematic review was conducted to help identify research gaps and under-researched areas. The thematic analysis results were presented in Chapter 2, offering a systematic and comprehensive understanding of the prior literature. More specifically, in this chapter, the researcher first specified the terminologies which here result from the intersection of SMEs, sustainability and innovation, including SME's definition and characteristics, the organizational-level concept of sustainability, the relationship between innovation and sustainability (e.g. SOI and IDS), and the process of (eco-) innovation. Based on the results of the thematic analysis of her systematic review, the researcher then interpreted and critically

thought the motivations and drivers of IDS, the preferable IDS strategies and activities adopted by SMEs, the key influencing elements when crafting IDS strategies, the key influencing elements when putting IDS strategies into actions, and the key indicators and measuring criteria. As follows, potential readers in the future could obtain a big picture and the under-researched area about the relevant topic and a detailed overview of the mainstream theories and research gaps.

Chapter 3 concerns research methodology; it was discussed in-depth and designed to help the researcher accomplish the research objectives and answer the sub-questions. First, typical research paradigms were identified and interpreted based on their philosophical dimensions, such as ontology, epistemology and axiology. A social constructionism epistemological perspective was chosen and reflected in this research.

As follows, the research strategy, data collection and data analysis method of this research were identified and discussed in-depth. In detail, a qualitative multiple case study was chosen in considering the researcher's philosophy, the research question and the objectives. Then the benefits and limits of conducting this research strategy and how to avoid or reduce the limits were discussed. Furthermore, in the data collection section, besides presented and discussed the non-probability sampling and selection criteria, secondary data, and data triangulation, the researcher emphasised how to collect primary data, including why the semi-structured interview should be used and how the researcher planned and conducted it. It was fulfilled by focusing on the targeted participants, the interview checklists, the research memos, and the number of interviewed participants.

In addition, the data storage, transcribe and template analysis steps were discussed. Finally, the content related to the pilot study, ethical considerations and research quality were discussed and presented.

Chapter 4 started with an analysis and discussion about the CS definitions in China's context and, as follows, presented the critical findings and analysis related to the relationship between innovation and CS, the motivations to pursue IDS, CSMEs' IDS actions, strategies and adoption process, the influencing factors in adopting IDS strategies, and the measuring criteria. According to these findings and analysis, a systematic and comprehensive understanding of CSMEs' systematic IDS was developed.

Finally, Chapter 5 was dedicated to summarising the key findings and linking them back to prior literature, as follows, theoretical contributions, conceptual model, policy recommendations, limitations and propositions which could be examined by future research were delivered.

## 2 Literature Review

### 2.1 Introduction

Drawing upon the identified research gaps, this literature review (LR) was interested in innovation practice related to corporate sustainability (CS). It aimed to mirror small- and medium-sized enterprises' (SMEs') innovation-sustainability strategy and their adoption in the context of both developed and developing countries and attain a comprehensive and critical understanding of SMEs' innovation-sustainability theories and practices. Accordingly, the main research question is: How do SMEs in developed and developing countries achieve CS towards innovation?

To achieve this goal, the researcher employed the method of a systematic review of 110 key journal articles and book chapters in the 'all years' time frame by 2016. Concerning the timeframe covered, the researcher found out that the earliest publication date starts from 1987, which might be because sustainable development has received prominent attention within the practice and international research since the publication of the Brundtland report *Our Common Future* (WCED, 1987) in 1987 (Klewitz & Hansen, 2014). Therefore, although the researcher searched the publications for all years, this review actually covered academic publications between 1987 and 2016 before the most recent references were added. It is worth noting that, considering the economic sustainability of SMEs, the researcher was interested in SMEs beyond the start-up phase.

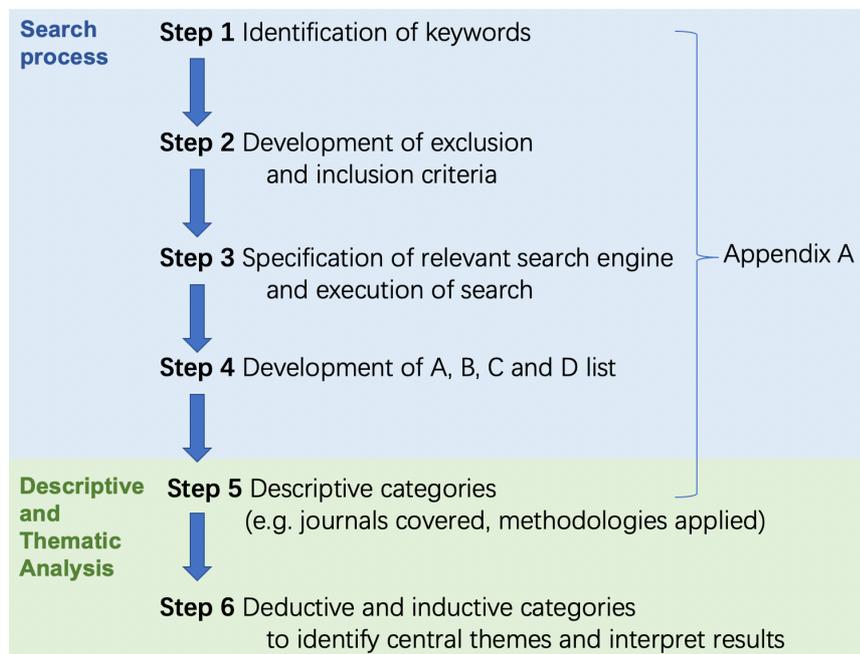


Figure 2.1-1 Individual steps of the systematic LR

The researcher's aim in conducting a systematic review is to structure the research field on innovation and CS in the context of SMEs, identify emergent themes and point out the most important gaps (Tranfield, Denyer & Smart, 2003). With reference to the process used by Fink (2014) and Klewitz and Hansen (2014), the LR consisted of six procedural steps, which can be seen in Figure 2.1-1 briefly. Considering word limits and was recommended by her viva examiners, each step was described in further detail in the appendices along with the key descriptive analysis results, while the key thematic analysis results were presented with updated in-text citations in the rest of this LR chapter. In detail, the remainder of this chapter was structured as follows:

<b>Section 2.1</b>	Introduction
<b>Section 2.2</b>	Background and terminology
<b>Section 2.3</b>	Motivations and drivers
<b>Section 2.4</b>	Preferable innovation-sustainability strategies and activities adopted by SMEs
<b>Section 2.5-2.6</b>	Key influencing elements in crafting and implementing innovation-sustainability strategies
<b>Section 2.7</b>	Indicators and measuring criteria

## 2.2 Background and Terminology

To deduce relevant keywords for the systematic review, it is necessary to specify the terminology that results from the intersection of SMEs, sustainability and innovation.

### 2.2.1 SMEs definition and peculiarities

There is also often a distinction between small enterprises and medium-sized enterprises. Still, the general discussion of companies is usually in terms of large enterprises (LEs) versus small- and medium-sized enterprises (SMEs) (Karlsson & Olsson, 1998). A company is usually defined as LE or SME, from a quantitative perspective, on the basis of its number of employees, fixed assets, annual sales or market share (Frey, Iraldo & Testa, 2013; Mbizi, Hove, Thondhlana & Kakava, 2013; Singh, Garg & Deshmukh, 2008; Thong & Yap, 1995). However, there is no universally accepted definition of SMEs (Karlsson & Olsson, 1998; Thong & Yap, 1995), and the definition varies from country to country.

For example, European Union (2015) defines SME as an enterprise that employs fewer than 250 persons, has an annual turnover not exceeding 50 million euros (and/) or has an annual balance sheet total not exceeding 43 million euros. U.S. Small Business Administration (2016, February 26) applied an upper limit of 500 employees for a typical SME, and, in some industry sectors, such as the Mining or Manufacturing industries, an SME's number of employees may be as high as 1500. The table below briefly shows SME definitions from previous articles that targeted different countries.

Table 2.2.1-1 The different definitions of SME used by prior articles

Country	Definition	Reference
<b>India</b>	A small firm is an enterprise where the investment in plant and machinery is more than INR 25 lakh but does not exceed INR 5 crore.	Ministry of MSME, 2008; Government of India, 2006, as cited in Kumar, 2015
<b>Australia</b>	The majority of SMEs were classed as 'micro businesses' having between 0 and 4 employees; 'small businesses' (between 5 and 19 employees) and 'medium businesses' (between 20 and 200 employees)	McKeiver & Gadenne, 2005
	Service SMEs are defined as firms with fewer than 500 employees.	Prajogo & McDermott, 2014
<b>Cyprus</b>	Micro-businesses (below 10 employees), Small (10-50 employees), Medium (51-100 employees), Large (over 100 employees). Even medium size firms in Cyprus are relatively small by European standards.	Hadjimanolis, 1999; Hadjimanolis, 2000
<b>China and America</b>	a small business is defined (depending upon its attributes, in U.S.\$) to be a business with: <ul style="list-style-type: none"> <li>• 500 or fewer employees for most manufacturing and mining industries (a few industries permit up to 750, 1,000, or 1,500 employees);</li> <li>• 100 or fewer employees for all wholesale trade industries;</li> <li>• \$6 million per year in sales receipts for most retail and service industries (with some exceptions);</li> </ul>	Li & Mitchell, 2009
<b>Sweden</b>	SMEs are enterprises employing less than 500 people.	Karlsson & Olsson, 1998
	Manufacturing SMEs are defined as firms with 175–2,500 employees.	Frishammar & Horte, 2005
<b>Spain/EU</b>	Sample firms employed fewer than 250 employees and had annual sales of less than 50 million euros or total assets of less than 43 million euros.	European Union, 2003; Commission Recommendation 2003/361/EC, as cited in Madrid-Guijarro, Garcia-Perez-de-Lema, & Van Auken, 2013
<b>Cambodia</b>	Any firms whose total employees are between 11 and 50 are classified as small, whereas those whose total employees are between 51 and 100 are classified as medium.	the Ministry of Industry Mining and Energy (MIME) of Cambodia, as cited in Sok, O'Cass & Miles, 2016
<b>Singapore</b>	A small business is one that satisfies at least two of the following criteria:	the Association of Small and Medium Enterprises (ASME)

	<p>the number of employees in the business should not exceed 100; the fixed assets of the business should not exceed S\$12 million (S\$1.00=US\$0.60 approximately); and the annual sales of the business should not exceed S\$15 million.</p>	<p>in Singapore, as cited in Thong &amp; Yap, 1995</p>
--	--	--

Although most targeted countries have clear classifications about the size of companies, some researchers prefer to have their own specific criteria for defining SMEs to allow cross-countries analysis, either in their empirical or reviewing studies. For instance, Prajogo and McDermott (2014) defined Australian service SMEs in their empirical study as companies with fewer than 500 employees to be consistent with the criterion set by the United States Small Business Administration and has been adopted in studies on U.S. firms. For a similar purpose, Brammer, Hojmoser and Marchant (2012) used one of the most widely applied cutoffs and therefore defined small businesses as companies that have fewer than 100 employees (Latham, 2009; Longenecker et al., 2006; Moini, 1998), and medium firms that employ between 100 and 250 employees (Sadowski et al., 2002; Sharma, 2003). In addition, Li and Mitchell (2009) clearly claimed that, for the comparison purpose, a Chinese SME (CSME) was defined as a firm with fewer than 1500 employees in their study to be conformant with the criterion set by the U.S. Small Business Administration (2016, February 26).

Furthermore, the authors' choice to define SMEs by themselves in their studies might reflect the fact that the official company size definitions differ across industries. For instance, according to China's Regulations on the Standards for Classification of Small and Medium-sized Enterprises (PRC Ministry of Industry and Information Technology et al., 2011, June 18), although an SME usually employs up to 300 people, they can employ up to 2000 in the Information Transmission industry, and 1000 in the Manufacturing, Transportation, Postal industry or Property Management industry.

The Chinese authority further defines SMEs based on their annual turnover, also known as operating revenue in Economics. However, an SME could have a maximum annual turnover that varies from 50 million yuan to 2 billion yuan depending on the specific standards for different industries (PRC Ministry of Industry and Information Technology et al., 2011, June 18). In sum, in China, the official definition of an SME is complex, depends on the industry category and is based on the number of employees and the annual turnover (or total assets in specific industries). However, to collect rich data and conduct an in-depth cross-case analysis, the researcher only targeted Chinese manufacturing SMEs in data collection. Thus, the official definition of SME that the Chinese government issued was referenced and used in this research, which is a business with fewer than 1000 employees or with operating revenue of fewer than 400 million yuan. The clear statement of the targeted sector and SME definition can further enhance the transferability and dependability of the study, as Lincoln and Guba (1985) claimed in their research method article.

Table 2.2.1-2 Classification Standards for SMEs in China

Industry	Medium		Small		Mini	
	Number of employee (person)	Operating revenue (million yuan)	Number of employee (person)	Operating revenue (million yuan)	Number of employee (person)	Operating revenue (million yuan)
Agriculture, forestry, livestock, farming, fishery		≥5 <200		≥0.5 <5		<0.5
Secondary (manufacturing) industry	≥300 <1000	≥20 <400	≥20 <300	≥3 <20	<20	<3
Architecture		≥60 <800 Or, Total assets ≥50 <800		≥3 <60 Or, Total assets ≥3 <50		<3 Or, Total assets <3
Wholesale trade	≥20 <200	≥50 <400	≥5 <20	≥10 <50	<5	<10
Retail industry	≥50 <300	≥5 <200	≥10 <50	≥1 <5	<10	<1
Transportation industry	≥300 <1000	≥30 <300	≥20 <300	≥2 <30	<20	<2
Warehousing industry	≥100 <200	≥10 <300	≥20 <100	≥1 <10	<20	<1
Postal industry	≥300 <1000	≥20 <300	≥20 <300	≥1 <20	<20	<1
Accommodation industry	≥100 <300	≥20 <100	≥10 <100	≥1 <20	<10	<1
Restaurant and catering industry	≥100 <300	≥20 <100	≥10 <100	≥1 <20	<10	<1
Information industry	≥100 <2000	≥10 <1000	≥10 <100	≥1 <10	<10	<1
Software and IT service	≥100 <300	≥10 <100	≥10 <100	≥0.5 <10	<10	<0.5
Real estate development industry		≥10 <2000 Or, Total assets ≥50 <100		≥1 <10 Or, Total assets ≥20 <50		<1 Or, Total assets <20
Property management industry	≥300 <1000	≥10 <50	≥100 <300	>5 <10	<100	<5
Tenancy and business services industry	≥100 <300	≥80 <1200	≥10 <100	≥1 <80	<10	<1
Other unlisted industries	≥100 <300		≥10 <100		<10	

Note: information was derived from China's Regulations on the Standards for Classification of Small and Medium-sized Enterprises (PRC Ministry of Industry and Information Technology et

*al., 2011, June 18), and translated from Chinese into English and clustered into the table by the researcher.*

#### *2.2.1.1 SMEs' characteristics*

Prior researchers have recognised the unique characteristics of SMEs. Some of these characteristics have been used to measure SMEs from qualitative perspectives, such as independence, personality and small scale (Nooteboom, 1994). It is worth noting that, while Nooteboom (1994) utilised 'independence' to describe SMEs' ownership, based on a comparative study between Swedish SMEs and LEs, Karlsson and Olsson (1998) claimed that 'dependence' can be used to describe the fact that SMEs are usually locally based and strongly influenced by what happens in their home community.

Some SMEs' characteristics have been linked to strengths that occurred in organizational management. For instance, Brammer, Hoejmosé and Marchant (2012) concluded in their literature review that small businesses have significantly different behavioural characteristics than larger firms regarding environmental management. In general, SMEs have relatively informal organizational structures and are often managed by owners; hence owners' personal choices and attitudes can significantly affect socially responsible behaviours among SMEs (Brammer, Hoejmosé and Marchant, 2012; Moore & Manring, 2009). It has also been suggested that SMEs have greater levels of flexibility than large firms, which in turn allows SMEs to respond more swiftly towards the business environment and competitors' actions (Aragón-Correa et al., 2008; Brammer et al., 2012). Moreover, SMEs also tend to devote more attention to personal relationships and focus on key stakeholders; it allows them access to external funding and business opportunities (Chen & Hambrick, 1995; Brammer et al., 2012). Similarly, based on empirical evidence from Korea, Ki-Hoon (2009) claimed that, in SMEs, lines of communication are generally shorter, organizational structures are less complex, people often perform multiple functions, and access to top management is simpler; all these characteristics can be real advantages over large organizations in ensuring effective green management.

It is worth noticing that although SMEs' simple, flat and informal organizational structure allows them to communicate more directly, effectively and efficiently within the companies or with customers and suppliers (Bhaskaran, 2006; Madsen & Ulhoi, 2016; Nooteboom, 1994), the same structure might make them less attractive for high-tech personnel (Singh et al., 2008).

In prior studies, some other weaknesses of SMEs also have been argued. For example, according to the resource-based view (RBV), Hoerisch, Johnson and Schaltegger (2015) claim that compared to SMEs, large companies possess more financial and human resources that enable them to gather information, develop expertise concerning sustainability management tools and unlock the potential

benefits associated with them. The widely acknowledged constraints of SMEs, in general, can be seen in the table below.

Table 2.2.1.1-1 The widely acknowledged constraints of SMEs

Constraints	Authors
Hard to attract labours with multiple managerial or technological competencies	Francis and Bessant 2005; Knight and Cavusgil 2004; Ray and Ray 2010; Singh et al. 2008; Wynarczyk 2013
Inadequate technologies	Demirbas et al., 2011; Singh et al. 2008
Lack of funds to support product development projects and apply expensive business management software such as Enterprise Resource Planning (ERP) system	Francis and Bessant 2005; Singh et al. 2008
Incapable of collecting marketing information and knowledge and transferring them to production functions	Demirbas et al. 2011; Francis and Bessant 2005; O'Dwyer 2009; Ray and Ray 2010; Singh et al. 2008; Wynarczyk 2013
Lack of managerial capacities to organize innovation processes	Demirbas et al. 2011; O'Dwyer 2009; Wynarczyk 2013
Incapable of receiving external support from customers, suppliers, distributors, competitors, and other organizations such as consulting firms and research centres	Demirbas et al. 2011; Singh et al. 2008

Although the characteristics of SMEs could be described as strengths and weaknesses in general, Nooteboom (1994, p.333) emphasised that, 'We should again emphasise that characteristics or traits by themselves do not explain behaviour. They contribute to the playing of roles or taking of actions for which the need or opportunity occurs depending on the circumstances (contingency perspective). Thus different characteristics may emerge in different circumstances, and a given characteristics may have different effects in different circumstances. Yet they do contribute.' For instance, among SMEs, researchers might find a 'professional bureaucracy' with a 'core' of professionals with standardized skills and mutual adjustment.

The reason why a formal structure can appear is that, 'Notably, as a firm grows the entrepreneur will have to delegate more, bureaucracy grows, additional layers of hierarchy arise or formal procedures for planning, coordination or control are instituted, specialists appear, communication becomes more structured, formal and documented, and knowledge becomes more explicit (less tacit) and formal.' (Nooteboom, 1994, pp.333-334). Therefore, in-depth empirical research, such as multiple case studies, is required to understand the actual management behaviours in innovation-sustainability practice.

## 2.2.2 The Organizational-level Concept of IDS

### 2.2.2.1 *Overview of Corporate Sustainability*

Corporate sustainability (CS) is treated as an integral part of value creation by considering the economic, social, cultural and even personal impacts of sustainability-related changes in the business landscape. Thus, it formulates strategies to build a company that fosters longevity through transparency and proper employee development (Henriques & Catarino, 2015). In addition, from the managers' perspective, CS is also treated as a strategy organizations employ to help them manage or respond to environmental and social resources (Bos-Brouwers, 2010).

The definition and nature of CS could be presented or understood in different ways by reflecting various industrial, organizational and individual characters. However, all these definitions will reflect three pillars of CS: Economy, Society and Environment.

Shortly before the researcher completed her systematic literature review, Shevchenko, Levesque and Pagell (2016) claimed that true sustainability requires firms to eliminate unsustainable practices, such as relying on nonrenewable natural resources, creating significant pollution, or sourcing from countries known for poor safety or human rights practices and a lack of attention to surrounding communities. In their opinion, rankings such as the Global 100 or the Dow Jones Sustainability Index indicate that today's exemplars in sustainability actively are actually engaged in unsustainable activities; however, large firms are able to use image management and sustainability reporting (e.g. ESG disclosure) to cover this reality. In other words, many large firms engage in greenwashing behaviour driven by benefits and pressures. Thus, they argue that SMEs who bear less public attention can achieve true sustainability because most of them conduct changes driven by their inner motivations (Shevchenko, Levesque & Pagell, 2016).

### 2.2.2.2 *The relationship between innovation and sustainability (SOI and IDS)*

Innovation is usually treated as a process to transform existing or new resources like creativity, technology, information or management knowledge into outcomes such as new products, marketing promotion or strategic activities to increase capital or meet the market situation. The most recent research claims that innovation is an important means to contribute to sustainability (Hansen, Grosse-Dunker & Reichwald, 2009; Schaltegger & Wagner, 2011).

In particular, the debate on companies directing their business activities toward sustainability through innovation was initially focused on cleaner technology, eco-efficiency or green innovation from an environmental sustainability perspective, or ethical business practice and social entrepreneurship from the corporate social responsibility (CSR) perspective. However, people gradually began to focus on

sustainability-oriented innovation (SOI), which represents new or enhanced processes, organizational forms and products or technologies that are beneficial to the environment, society or employees (Beise & Rennings, 2005).

It is worth noticing that Hansen et al. (2002) argued that there are two positions when SMEs achieved sustainability towards innovation but should not be treated as cases for SOI. First, when these SMEs' adoption processes are driven by purely strategic business motives; in this case, the environmental benefit is 'random'; no attention was paid to the details or how much it should be appreciated (Hansen et al., 2002). Thus, environmental authorities and other environmental stakeholders do not emerge as key players (Hansen et al., 2002). Second, when the technology is well known both in the industry and enterprises. In the opinion of Hansen et al. (2002), if the adoption is motivated by technological progress and can be understood as simple diffusion, it can be identified as activities driven by economic benefits, and it does not raise new demands on the company's competencies. They excluded these two positions in their studies might due to they want to ensure that the innovations that have been studied are truly sustainability-oriented. However, the mainstream SOI studies do not explore or exclude these two positions in their data collection and analysis stage. For example, most prior studies only classified or selected samples based on whether the firm announced eco-friendly products as innovation outputs or in the commercialisation stage. The argument claimed by Hansen et al. (2002) could give some clues for defining SOI and conducting future relevant studies.

SOI itself and the research stream are usually grouped by different types of innovation. The most recent theory classified innovations based on the sources and outcomes. Thus, SMEs generally apply SOI by adopting the product, process, marketing (and/) or organizational innovations (Gunday, Ulusoy, Kilic & Alpkan, 2011; Mbizi et al., 2013). Additionally, SOIs can be differentiated into radical and incremental innovations, which refer to a general theme in innovation research (Klewitz & Hansen, 2014), and this is defined according to the degree of newness (Harris, McAdam, McCausland & Reid, 2013).

Following this mainstream, in exploring innovation-sustainability relationships, motivations, required resources and capabilities, and adopted strategies, the themes, findings, and references have been derived from existing innovation studies, while the topic of CS remains unnoticed or underestimated. For instance, environmental or social issues were recognised as sources of strategic change and drivers for SOI strategy; however, external and internal factors which drive or support SMEs to solve these sustainability issues are under-researched.

Another research limitation occurred concerning outcomes and measuring criteria, when previous innovation-sustainability research was focused on innovation. In detail, each group of authors were too obsessed with focusing on different types of innovation and generalising different measures of performance, and they showed no

ambition or authority to finalise generally acceptable measuring criteria from the innovation theory perspective (Crossman & Apaydin, 2010). Measuring criteria for assessing outcomes related to sustainable development goals and practices was difficult or impossible to generalise under this circumstance from a sustainability theory aspect.

In addition, because prior studies mainly focused on the innovation aspect and the key questions and findings were mainly categorised, discussed and presented by innovation types, the researcher found that in declaiming the SOI definition or selecting empirical cases, there was no clear and strong argument on whether every dimension of the three pillars of sustainability should be fulfilled. In other words, prior SOI studies indicate that innovation has significant direct and indirect effects on CS from economic, environmental or social perspectives but does not underline that both three pillars of sustainability' simultaneous enhancement are essential.

SOI is driven by values for the creation of social products and services; on the other hand, innovation-driven sustainability (IDS) is driven by value creation in terms of workforce, customer or supply chain (MacGregor, Fontrodona & Hernandez, 2010). Normally, the term 'innovation-driven' was used by researchers before 'enterprise', 'country', or 'growth' to highlight that the essential contribution to economic growth or corporate strategic development is through innovation (González-Pernía, Jung & Peña, 2015), whilst capabilities have been developed or introduced into this innovation-driven strategic process (Craig & Dibrell, 2006). Similar to sustainable behaviours' outcomes, the IDS performance should be categorised by different pillars of sustainability. However, MacGregor et al. (2010) argued that the end result of IDS might not have a solely sustainable rationale, yet the way that the output was developed is more socially or environmentally responsible. Thus, they claimed that SOI is about 'doing the right things', and IDS is about 'doing things right' (MacGregor et al., 2010). Nevertheless, the documented definitions of SOI and IDS are derived from innovation studies and mean sustainability-to-innovation and innovation-to-sustainability processes and their outcomes, respectively.

Table 2.2.2.2-1 SOI and IDS: define, compare and contrast

SOI	IDS
'sustainability-oriented' was used to highlight that the innovations are beneficial to the environment, society or employee (Beise & Rennings, 2005), and in a strict way, not motivated by purely business strategic motives or technological progress (Hansen et al., 2002).	'innovation-driven' was used to highlight that the essential contribution to economic growth or corporate strategic development is through innovation (González-Pernía, Jung & Peña, 2015), whilst capabilities have been developed or introduced into this innovation-driven strategic process (Craig & Dibrell, 2006).
sustainability-to-innovation processes and their outcomes (MacGregor, Fontrodona & Hernandez, 2010)	innovation-to-sustainability processes and their outcomes (MacGregor, Fontrodona & Hernandez, 2010)
driven by values for the creation of social products and services (MacGregor, Fontrodona & Hernandez, 2010).	driven by value creation in terms of workforce, customer or supply chain (MacGregor, Fontrodona & Hernandez, 2010).

doing the right things (MacGregor, Fontrodona & Hernandez, 2010).	doing things right (MacGregor, Fontrodona & Hernandez, 2010).
---	---

Although there are few academic publications on ‘IDS’ in Western countries, the researcher noticed that the Chinese government and universities had used the term since 2009, when the benefits of innovation-driven growth are begun to be recognized by China. Therefore, using IDS in China’s context may be treated as a reflection of Chinese local expression habits. In interpreting how to realize China’s economic transformation and upgrading and ultimately promote the country’s sustainable development in economy and society, innovation and sustainable development at the industry level were described as ‘two sides of the same coin’ (Gao, 2018, February 8th). In detail, on the one hand, sustainable development must rely on innovation-driven; on the other hand, innovation-driven development must be around a sustainable direction. The reason why the Chinese government and universities usually utilize IDS instead of SOI to describe the bi-directional system that integrates sustainability and innovation might be that there is no well-known understanding of the difference between SOI and IDS or because they prefer to define IDS activities as the actions which start because of sustainability and end up with sustainability. Furthermore, it is worth noticing that the Chinese government utilized ‘innovation-driven’ to express activities that led to more radical innovations in their public documents, such as the Five-Year Plan (FYP) 2016-2020 (Financial and Economic Affairs Committee of the NPC & National Development and Reform Commission, 2016) and the FYP 2021-2025 (Financial and Economic Affairs Committee of the NPC & National Development and Reform Commission, 2021). Thus, the definition of IDS and the possible difference between SOI and IDS should be worth exploring in the context of China.

Regardless, no existing research had targeted IDS systemically and comprehensively to the researcher’s best knowledge. Thus, the researcher aimed to understand SMEs’ systematic IDS by in-depth exploring the bi-directional system that integrates sustainability and innovation and considering both sustainability-to-innovation and innovation-to-sustainability processes. To differentiate this IDS system from the traditional SOI studies that lack extreme and clean selection of the sample scope and IDS studies that are significantly under-researched or hard to define, compare and contrast with SOI, and focus on both innovation and sustainability aspects that none actually noticed strategically and comprehensively in the prior studies’ sample selection and data analysis, the researcher consisted of emphasizing IDS in the context of China in her following empirical research. The researcher temporarily defined it as a strategic process that integrates both sustainability-to-innovation and innovation-to-sustainability behaviours, reflects and can be interpreted by both underpinned theories in innovation such as the institutional theory, network theory, resource-based view and dynamic capability and mainstream framework in CS such as the three pillars of corporate sustainability and stakeholder theory.

### 2.2.2.3 The Process of (eco-) innovation

The researcher referenced the Corporate Sustainability Model (Epstein et al., 2010), the Integrated Framework for SOIs Practices of SMEs (Klewitz & Hansen, 2014) and relevant knowledge about the process of (eco-) innovation from prior literature (Table 2.2.2.3-1) to help her understand how SMEs can integrate IDS into their operations and transpose this strategy into specific actions that aim at improving the sustainable performance. Particularly in the LR chapter, the process of (eco-) innovation knowledge was utilized to help the researcher identify and organize the key themes that appeared in prior literature.

Table 2.2.2.3-1 The process of (eco-) innovation

Key authors	Description
Ahlin, Drnovsek & Hisrich, 2014	Innovation outputs and innovation outcomes
Audretsch and Vivarelli, 1996	knowledge creating inputs to innovative outputs
Bradley et al., 2012	business idea generation/ determining the scope of business opportunities available; implement those innovations.
Kesting et al., 2016	idea generation (the generation phase); the commercialisation of innovations (the commercialisation stage)
Hansen, Søndergård & Meredith, 2002	idea generation, search and selection, implementation and operation
Nooteboom, 1994	knowledge (awareness) conviction (interest) decision (evaluation) implementation (trial) confirmation (adoption)

### 2.3 Motivations and drivers of IDS

Bos-Brouwers (2010) claimed that companies' central motivation for innovation is to be competitive and ensure survival in the long run; however, a difference can be found between companies in their sustainability orientation. He claimed this might be because SMEs have different corporate versions and strategic orientations. In detail, the empirical evidence collected by Bos-Brouwers (2010) shows that, on average, SMEs focus on the short term, and prefer to conduct incremental product innovation inspired by current customers' preferences or possibilities presented by new material, technology or market. Thus, innovation might be non-green or purely technological-related (Cuerva, Triguero-Cano & Corcoles, 2014). On the contrary, companies with a long-term focus chose to implement radical green innovations, for instance, replacing (raw) materials with bio-based resources (Bos-Brouwers, 2010).

The main external pressures of an SME no longer simply come from shareholders, the government or the local residents because the number and variety of active stakeholders are increased drastically during recent years (Biondi, Iraldo&Meredith,

2002). Thus, another possible reason why SMEs choose to conduct sustainability-related innovations might be that they have to improve their performance and enhance their image by respecting various stakeholders interested in different environmental or/and corporate social responsibility contexts. Empirical evidence supports this argument that most SMEs invest in environmental innovation because it can enable them to respond to various stakeholders within or beyond the supply chain (Noci & Verganti, 1999; Hansen et al., 2002). For instance, new cleaner technology is usually applied by managers because that would enable the manufacturing SME to save costs related to production and regulation; on the other hand, ink jet printing is willing to be practised by textile SMEs due to it will allow for higher productivity and flexibility (Biondi, Iraldo & Meredith, 2002). However, these new technologies are chosen not only because they can help SMEs satisfy their shareholders and consumers in business operations but also will guarantee better environmental performance to consumers, the government, the local community and even NGOs (Biondi, Iraldo & Meredith, 2002).

Focusing on motivations behind the decision to be sustainable, Bos-Brouwers (2010) claimed several key stakeholders that have to be considered, including customers, suppliers, knowledge institutions, (local) government, trade associations, Design Company, peers consultancy and competitors. This is supported by prior general innovation studies that the context of the market (i.e. competition, concentration) (Damanpour & Schneider, 2006; Demirbas, Hussain & Matlay, 2011), the material possibility (Bos-Brouwers, 2010) and government activities (Morgan & Nauwelaers, 2003) are key driving forces for SMEs to adopt innovations. In other words, most SMEs have a combined consideration of different stakeholders and resources that characterise their sustainable innovation.

Shevchenko, Levesque and Pagell (2016) analysed the secondary data and conducted a formal modelling approach to further explore the internal and external driving forces in detail. Based on their study, they claimed that small innovative firms are less visible and under considerably lower stakeholder pressure; therefore, for small innovative firms, the decision to engage in sustainability largely depends on their readiness to change, an internal factor, and not their ability to offset stakeholder pressure. However, they also noticed that such knowledge alone will not push the firm to stop its unsustainable activities if external stakeholders have not recognised or rewarded efforts that aim at offsetting the harm from current business practices. Thus, in their opinion, SMEs' internal willingness to change is a strong driving force of sustainability-related innovation; however, this willingness might not end with strategy in the real world if external stakeholders accept unsustainable behaviours. This is in line with the view of Pinget, Bocquet and Mothe (2015) that sustainability-related innovation has a complex and systemic nature.

### 2.3.1 The market and customer demands

Bos-Brouwers (2010) claimed that most SMEs innovate from a product point of view. Most of these innovations are inspired by current customer demand or possibilities presented by new markets; however, they are incremental by nature (Bos-Brouwers, 2010). This might be due to most small local manufacturers often promoting new products only on the basis of previous consumer preferences (Wilkinson, 2002, cited by Cuerva, Triguero-Cano & Corcoles, 2014). Similarly, the prior literature claimed that current market demand and customer expectations influence SMEs' sustainability strategies and activities towards innovation. For instance, the research conducted by Biondi, Iraldo and Meredith (2002) indicated that one of the greatest motivators for SMEs to develop a technological or management green innovation is at the request of the customers who require a guarantee of high environmental performance. Cuerva, Triguero-Cano and Corcoles (2014) made a similar statement that the customers' awareness cause increased market demand for green products, which is the main driving force of SMEs' environmental product innovations.

Although market demand and customer expectation have been regarded as typical environmental pressures or defensive motives, SMEs can gain benefits instead of stress by conducting sustainability-related innovations. For instance, nowadays, customers expect SMEs to attain innovative environmental management systems (e.g. Eco-Management and Audit Scheme (EMAS), Eco Labelling, and Voluntary Agreement Schemes). An innovation concerning the environmental management system that was driven by customers' expectations could lead to both economic, environmental and social sustainability of the SME because the certification or accreditation of high-quality environmental performance is often an order-winning criterion which gives the small company a competitive advantage over their rivals (Biondi, Iraldo&Meredith, 2002). However, customer expectations could also force an SME to stop its innovative sustainability strategy. For instance, Hansen et al.(2002) pointed out that a green process innovation was tested but abandoned by their interviewed Italian SMEs because the innovative adoption had jeopardized their ability to meet customer demands in a flexible way.

Although most researches indicate that the key reason why SMEs develop or call off a technological or management sustainable innovation is to respond to customers who require a guarantee of high environmental performance or other satisfaction (Biondi, Iraldo & Meredith, 2002; Bos-Brouwers, 2010; Cuerva, Triguero-Cano & Corcoles, 2014; Hansen et al., 2002). It is worth noting that Pinget, Bocquet and Mothe (2015) agreed with Horbach (2008) that environmental innovation for SMEs is less market-driven than other innovations. In detail, compared with technologically innovative SMEs, they noted that environmentally innovative SMEs have fewer perceived market barriers or demands (Pinget, Bocquet&Mothe, 2015). They interpreted this difference by claiming that environmental innovations have a complex and systemic nature, and the context of market demand remains uncertain

for environmental innovators. For example, in fact, a large percentage of customers is not willing to pay more for environmentally friendly products or services (Gabler, Butler&Adams, 2013; Pinget, Bocquet&Mothe, 2015). Moreover, environmental features are often not easily detectable by end users (De Marchi, 2012; Pinget, Bocquet&Mothe, 2015).

### 2.3.2 Regulation and cost-saving

According to Pinget, Bocquet and Mothe (2015), defensive motives emerge as important motives for green innovations as stimulating growth. In his opinion, decreasing costs and risks or complying with the regulation is the main reason SMEs participate in green innovations.

#### 2.3.2.1 Regulation and Government Policies

The prior research shows that many SMEs are only upgrading their production technologies, environmental policy or even the entire strategic horizon to be in compliance with tightening legislation (Biondi, Iraldo & Meredith, 2002; Hansen et al., 2002). In particular, Bos-Brouwers (2010) argue that SMEs generally have less innovative sustainable behaviours, and their activities are closely related to current legislative requirements compared to large companies. Bos-Brouwers (2010) further describe that, mostly, compliance-oriented SMEs do not feel the urge to excel in sustainability, and they might be observed and realized to have a short-term focus. Hansen et al. (2002) identify those SMEs that tend to focus on reducing costs on compliance activities (e.g. minimum environmental costs) are defensive firms. In other words, those SMEs were reactive and cost-orientated responded. In particular, Pinget, Bocquet and Mothe (2015) confirm that SMEs in polluting sectors tend to introduce more environmental practices and tools designed to reduce environmental costs. Thus, they claim that regulations represent a significant coercive pressure, and this pressure is a crucial lever of SMEs' environmental innovations adoption.

It should be noted that SMEs driven mainly by the regulation could not be simply identified as reactive or short-term-focused firms. They might be regulation-sensitive and cost-oriented but took a longer-term perspective in considering compliance with future regulations. Hansen et al. (2002) describe this position as proactive and offensive. For instance, in the Dutch case, some innovative sustainability behaviours were triggered by the SMEs' wish to be ahead of anticipated stricter regulatory requirements (Hansen et al., 2002). These companies view future regulation as one of the decision-making factors.

In sum, regulations could be a main driving force for SMEs; however, regulations cannot be simply categorized as a defensive motive. Thus, further research can be conducted by focusing on SMEs with different strategic orientations and positions

when exploring and interpreting how particular current and future regulations could influence SMEs to adopt or reject sustainability-related innovations.

#### *2.3.2.2 Non-regulation-related cost-saving*

Besides reducing costs on compliance activities, SMEs might be encouraged to pursue sustainability towards innovation to save non-regulation-related costs. For instance, SMEs who engage in eco-efficiency might target benefits related to reduced costs in energy, materials, storage, human resource or transport (Bos-Brouwers, 2010).

#### 2.3.3 The supply chain and the environmental authorities

Noci and Verganti (1999) stated two direct drivers for green innovation who are mutually and dynamically interacting with each other. First, the product and process environmental regulation; and second, the social awareness and concern for the environment (e.g. pressures resulting from public opinion, customers, local communities, and the other supply-value chain partners such as the suppliers or downstream buyers). They further argued that, although these direct drivers are important, in most cases, any of them is insufficient to trigger 'green innovation'; a joint action of all actors within the entire supply chain is the key driver (Noci & Verganti, 1999). In addition, Hansen et al. (2002) stated that the establishment of strategic alliances within the value chain might force the SME to conduct radical sustainability changes in the production chain. Thus, manufacturing SMEs with identical production systems, but functioning in different production chains and business environments, could experience very different determinants and craft very different sustainability-related innovations (Hansen et al., 2002).

In addition, Biondi, Iraldo and Meredith (2002) identify environmental agencies as an important driver for SMEs to conduct sustainability-related innovation; however, their quantitative research did not offer in-depth evidence or analysis about how this stakeholder is influential in what specific perspectives. From a qualitative aspect, Hansen et al. (2002) provide an empirical case about this finding. In detail, some technologies are well-established but involve complex adaptation processes; therefore, the barriers and dynamics of these adaptation processes vary considerably. Hansen et al. (2002) observe situations where these technologies have developed to a level that allows the environmental authorities to identify them as best practices in achieving CS and then build supporting institutions to promote these technologies. In this way, environmental authorities emerge as active players to encourage SMEs to conduct green innovation.

#### 2.3.4 Internal strategic consideration and orientation

Bos-Brouwers (2010) claim that, on average, as can be seen in the literature overview, SMEs are focused on short-term benefits. However, just as Noci and Verganti (1999) said, the deployment of a re-active 'green' strategy represents a sustainable option in uncertain contexts; an innovation-based strategy allows SMEs to achieve competitive advantages in the long run. Thus, more and more companies are not only considering the defensive motives but also trying to grasp the opportunities presented by conducting sustainability-related innovations (Moore & Manning, 2009).

Among them, most SMEs apply sustainability-related innovation as part of their strategic innovations to sustain financial benefits and competitiveness. In the context of South Korea, the 'win-win' logic that links the natural environment (and/or the society), innovation, and financial benefits and competitiveness was recognized by Ki-Hoon (2009). In detail, once green management responsiveness is viewed as involving the environmental and financial benefits together (e.g. regulatory compliance, costs, and trade-offs with other corporate goals), it is increasingly portrayed as a new business opportunity (Ki-Hoon, 2009). For instance, the empirical evidence shows that making new business contracts and/or increasing sales volume due to superior environmental performance drives employees and the top management team to conduct continuous improvement in green management (Ki-Hoon, 2009). Furthermore, Cuerva, Triguero-Cano and Corcoles (2014) gave a particular example that, in the food and beverage sector, a strategy of product differentiation is a determinant motive of environmental innovation. In the context of developing countries, SMEs also develop green innovations in order to achieve financial benefits and competitive advantage. For instance, Kumar (2015) reported that small Indian firms tend to conduct green marketing innovations to differentiate their products from their competitors when they realize that producing and selling normal green products are inefficient for achieving a competitive advantage.

For companies who have sustainability at the core of their business and have the ambition to integrate sustainability aspects into new products, services and processes, another motivation behind their sustainability-related innovations is their expectation of being an innovative frontrunner in their sector, their desire to lead by example, and their long-term vision in corporate sustainability (Bos-Brouwers, 2010; Hansen et al., 2002). For instance, Hansen et al. (2002) observed that a few SMEs in Denmark had actively adopted the proactive green strategy with the purpose of improving their dynamic capabilities, such as the environmental competencies or innovative capability, and being innovative frontrunners in the sector.

However, Hansen et al. (2002) also argued that using their competencies in environmental design and process control, these Danish enterprises' attempts to create a 'green market' were actually designed to attract customers with high

demands on technical and environmental performance. Biondi, Iraldo and Meredith (2002) offered a detailed discussion about a similar hidden motive. They noticed some SMEs were trying to integrate environmental innovations throughout the whole range of their activities, such as the design of their products and processes and the selection of their raw materials (Biondi, Iraldo & Meredith, 2002). In these cases, the companies are ahead of regulations with all industrial activities to meet emerging environmental issues. However, by analyzing these most advanced SMEs, Biondi, Iraldo and Meredith (2002) found that the in-depth reason why SMEs adopt an innovative environmental management system is to offer certified proof to stakeholders of their high environmental performance, thereby possibly obtaining competitive advantage and financial benefits (Biondi, Iraldo & Meredith, 2002). Thus, the internal strategic consideration, especially the expectation to achieve potential financial benefits, is a key reason a SME is aware of and interested in applying sustainable innovations. Although short-term financial risks or decreases are acceptable, to the researcher's best knowledge, no evidence has been found in prior studies to support the idea that a profit SME is willing to sacrifice its long-term financial benefits to achieve purely environmental or social sustainability.

#### 2.3.5 Summary

According to the prior literature, different kinds of theoretical perspectives have been used over the years to explain why firms engaged or did not engage in sustainability-related practices, such as the positive accounting theory, the agency theory, the information usefulness theory, the legitimacy theory, the institutional theory, the stakeholder theory, or the SO that is a unique configuration of firm capabilities and entrepreneurial orientation (EO) (Bayoud et al., 2012; Etemad, 2019; Fernando & Lawrence, 2014; Gray et al., 1995), but none of them was commonly agreed (Deegan, 2002; Gray et al., 1995; Gray et al. 2010). Furthermore, due to it is always better to get deep insights through more than one single theory in order to obtain a fuller understanding of the practice (Deegan, Rankin, & Voght, 2000), and some researchers such as Deegan (2009) and Fernando and Lawrence (2014) emphasised the fact that a considerable relationship exists between these theories with regard to these sustainability-related practices; thus, some researchers struggled to construct their theoretical framework by integrating different complementary theories in different ways. For instance, Thomson (2007) identified 33 groups of theories used in prior CSR studies as theoretical frameworks. The same goes for innovation studies.

In studies integrating both innovation and sustainability perspectives, the underpinned theories or theoretical frameworks were not relatively enormous compared to CS studies or innovation studies. And most of these studies were designed to test a single theory instead of developing or building one. However, still, different kinds of theories have been employed to explain the motivations. Thus, instead of focusing on a single theory, a single level of analysis, or trying to construct

a theoretical framework, the researcher observed the repeating patterns in the prior literature, found what are the key motivations or drivers that had been identified by the prior researchers, and explored the theoretical gaps that had been emerged when linking these specific motives back to the mainstream theories.

In particular, the key motivations mentioned by prior research are the market and customer demands, regulation and cost-saving, forces from the supply chain and support from environmental authorities, and the internal strategic consideration to achieve potential benefits such as financial benefits, competitive advantage, or expectation to be an innovative frontrunner in their sector, and these findings can link back to the institutional theory, stakeholder theory, and SO theory. The researcher realized that these motives could be broadly classified into 'economic sensitive', which considers mainly financial stakeholders and performances, such as cost-saving or pursuing potential financial benefits, and 'social and political perspective', which considers a wider spectrum of stakeholders. Fernando and Lawrence (2014) held a similar opinion when reviewing underpinned theories in CSR studies and claimed that social and political theories, such as institutional theory and stakeholder theory, have more ability to provide insightful theoretical perspectives on CSR practices than purely economic theories do. However, the forces from relevant stakeholders, such as customers, government, environmental authorities and shareholders, are complex (Pinget, Bocquet & Mothe, 2015); thus, these stakeholders cannot be viewed as having only positive or negative effects on a SME's innovation-related sustainability behaviours. In addition, these perceived forces and the relevant stakeholders can be classified into external and internal dimensions (Brammer, Hojmosse & Marchant, 2012), and some previous literature indicates that these drivers are mutually and dynamically interacting with each other (Gisbert-Lopez, Verdu-Jover & Gomez-Gras, 2014; Shevchenko, Levesque & Pagell, 2016). Thus, a comprehensive research, which explores not only forces but also the interactions between forces, is required in the future.

#### **2.4 Preferable IDS strategies and activities adopted by SMEs**

Compared to corporate social responsibility (CSR) or environmental strategy, sustainability strategy is developed into one with a more holistic view on sustainability by covering both environmental and social dimensions (Klewitz & Hansen, 2014). Thus, according to Bos-Brouwers (2010), a company that adopts sustainability must design and implement a strategic plan not only considering potential environmental effects but also keen to satisfy employees and society.

However, although wide variations in the way that environmental issues were integrated into the organization's strategy emerged (Hansen et al., 2002), and CSR is widely applied by both large and small companies, the innovation- and sustainability-related strategies have not been generalised and classified from sustainability

perspective systematically and comprehensively. Most researchers prefer exploring detailed activities instead of categorising them into groups.

For instance, purely summarised from empirical evidence, Biondi, Iraldo and Meredith (2002) pointed out three detailed innovations to achieve SMEs' sustainability. Firstly, 'integration of environmental innovations in the production process' (Biondi, Iraldo & Meredith, 2002), for instance, implementing technological innovations like cleaner technology or ink jet printing (textile SMEs) that can reduce environmental pollution as well as improve productivity and flexibility. Second, 'saving raw materials, energy, water, or by recycling waste' (Biondi, Iraldo & Meredith, 2002), for instance, applying cleaner technologies resulting in lower water costs (food-processing SMEs), conducting a programme for dye reduction which yielded a considerable saving in the cost of auxiliary materials (textile SMEs), or improving energy management through implement an energy saving plan. Finally, 'the implementation of waste management systems' (Biondi, Iraldo & Meredith, 2002), for example, many SMEs, especially those working with organic substances, re-using their waste for fertilisation or the production of pet-food (Biondi et al., 2002).

It is worth noting that international sustainability indices and initiatives, such as the Global Reporting Initiatives (GRI) and the platform from World Business Council for Sustainable Development (WBCSD), have emerged to help firms organise their sustainable development, accountability and public disclosure. In August 2019, three accounting associations (the Association of Chartered Certified Accountants (ACCA), Chartered Accountants Australia and New Zealand (CA ANZ), and Institute of Chartered Accountants of Scotland (ICAS)) jointly published SDG disclosure recommendations linking various reporting frameworks, including the Global Reporting Initiative (GRI), the International Integrated Reporting Council (IIRC), the Taskforce on Climate-related Financial Disclosures (TCFD) and the UK Financial Reporting Council (FRC) aimed at supporting organizations with their reports on progress towards the achievement of the Sustainable Development Goals (SDGs). As it is emphasised that integrating the 3 pillars of sustainability/Triple Bottom Line (TBL) and the SDGs in the core business reporting process can avoid duplicated efforts and ensure transparency and accessibility of organizations' sustainability performance to various internal and external stakeholders, these indices, initiatives, platforms and frameworks are increasingly used and constantly updated worldwide, and ESG (environmental, social, governance) research, education and service can be predicted to be new prosperous in the near future.

Empirical sustainable innovations could be grouped based on these published sustainability accounting frameworks. A detailed example is the CS subthemes claimed by Bos-Brouwers (2010) (Table 2.4-1). However, prior research results in CS indicate that an important reason why most SMEs do not apply those initiatives is that, from managers' perspective, these frameworks or initiatives cannot help them

categorise their activities in the real business world (Crossan & Apaydin, 2010). This might be because those platforms are summarised based on the advanced sustainability experience and practices of large international firms and Non-profit Organizations (NPOs). Thus, whether SMEs' sustainability-related innovations could be and should be classified based on international sustainability index and initiatives requires further empirical research.

Table 2.4-1 Subthemes of corporate sustainability

<b>Environmental Sustainability</b>	<b>Social Responsibility</b>
<b>Waste</b> (e.g. separation, recycling)	<b>Employee Activities</b> -Training -Satisfaction -Health and safety -Conditions of employment
<b>Environmental policy</b>	<b>Ethics and transparency activities:</b> -Code of conduct -'Useful products' (e.g. no disposables) -High level of transparency in communication with stakeholders -Ethics in business decisions regarding 2nd and 3rd world countries -Selection of suppliers on good conduct
<b>Energy</b> (e.g. energy saving, green energy)	<b>Social Activities:</b> -Sponsoring -Active in (public) debate -Active in trade association -Share information with stakeholders (report on social and environmental performance) -Inclusion of stakeholder concerns in business decisions -In house social workshop -Active in business club -Member of regional committee of stakeholders -Company philosophy to build social infrastructure in local environment -Social and societal engagement is central -'Open company' days -Product development specifically for developing countries
<b>Materials</b> (e.g. reduce, recycled resources, environmentally alternatives)	
<b>Emissions to air, water and soil</b>	
<b>Transport</b>	
<b>Biodiversity</b>	
<b>Miscellaneous</b>	

However, from an innovation perspective, innovative sustainability strategies are normally grouped by different innovation types. For instance, the sample from the research of Halme and Korpela (2014) consists of responsible innovations that were either technological, design or business model innovations. On the other hand, Cuerva, Triguero-Cano and Corcoles (2014) classified the practices the eco-innovators conducted into the green process and green product innovations. Based on their quantitative data, Cuerva et al. (2014) further claim that the most applied innovative sustainability practices of green SMEs are related to 'End of pipe pollution technologies' (Recycling of waste or waste disposal), 'Development of ecological

products', 'Energy efficiency' and 'Sustainable use of natural resources and environmental technologies'.

Although they claim literature related to corporate social responsibility (CSR) are more related to incremental diffusion instead radical innovation and should not be included in sustainability-oriented innovation (SOI) studies, by analysing 84 key journal articles from innovation or sustainability perspectives bibliographically and thematically, Klewitz and Hansen (2014) were able to conclude three different categories of sustainability-related innovations and subthemes.

- Product innovations; include Eco-design/design for the environment, Life-cycle-analysis, Ecolabel, Life-cycle-costing, Materials, Packaging, Fair-trade and organic products.
- Process innovations; include Cleaner production, Eco-efficiency, Logistics.
- Organizational innovations; include EMS, Innovation process, Supply chain management, Stakeholder management, Organizational structures, Sustainability vision, Employee development and training, Code of Conduct, Employee engagement in sustainability/CSR activities, Health and safety.

Additionally, innovative sustainability behaviours can be differentiated into radical and incremental innovations, which refer to a general theme in innovation research (Klewitz & Hansen, 2014). This is defined according to the degree of newness (Harris, McAdam, McCausland & Reid, 2013).

For instance, Hansen et al. (2002) claim four types of sustainability-related innovations of SMEs, including: 'radical innovation to the industry', 'radical innovation to the enterprises', 'incremental innovation to industry and enterprise', and 'mature technology to industry but incremental innovation to enterprise'. The researchers categorise the activities based on the newness degree of applied technology; however, they did not identify which are the preferable ones adopted by SMEs. On the contrary, Bos-Brouwers (2010) explicitly states that SMEs' sustainable innovations are not as radical as they ought to be but are part of a step-by-step process of incremental innovations.

Triguero, Moreno-Mondejar and Davia (2015) only targeted one specific incremental green innovation (EOP/recycling) and one specific radical green innovation (cleaner technologies) in their comparative study, and these different types of eco-innovation activities are shown to be interconnected. In detail, they confirm the existence of complementarities across both types of eco-innovation, as firms with a high likelihood of incremental eco-innovation (EOP) are also more likely to implement radical eco-innovation (cleaner technologies).

Amongst the existing sustainability- and innovation-related SME studies, research has mainly focused on Western SMEs from Europe and North America. However, the

author is able to cover two qualitative research (targeted India and South Korea separately) by applying the systematic method. Emerged subthemes of green innovation are recognised.

First, Kumar (2015) recognised several green marketing innovations which have yet to be noticed or emphasised by prior researchers targeting the Western countries' context. These innovations were further classified depending on the motivations of SMEs.

Table 2.4-2 Classifications of green marketing innovations

Categories	Examples and benefits
Marketing compliance	<ol style="list-style-type: none"> <li>1. Environmental innovation disclosure: Keep utilizing internal and external audits, and their reports to disclosure their performance in their operations related to procurement, manufacturing and logistics. Communicating compliance strategies of firms.</li> <li>2. Complying with greenhouse gas emission regulations, ISO 14001 legal requirements and other voluntary or government published standards relevant to chemical substances in products, recycling and disposal of used products, energy consumption and efficiency.</li> <li>3. Developing and updating their indices, or follow the relevant indices to provide comparable environmental information that indicates the connections with corporate strategy and explains capability of environmental information to improve corporate performance.</li> <li>4. Establishing specific product response policies by obtaining the latest news on environmental laws and regulations from the region of operation and exchanging information with other firms in the same industry.</li> <li>5. Improving their overall environmental audit capability: monitoring regulatory developments, anticipating appropriate responses to meet environmental obligations and developing an understanding of the latest environmental policies and guidance.</li> </ol>
Strategic partnership (environmental stewardship)	<ol style="list-style-type: none"> <li>1. They collaborate with design companies to learn about sustainable design and related regulations, and their environmental, social and economic benefits.</li> <li>2. Collaborations to recycle or dispose of waste help them reduce their carbon footprint. This way, they develop solutions to streamline and replace resource-intensive processes.</li> <li>3. They collaborate with leading players in the industry to initiate and implement environmental projects that improve their visibility in the market.</li> <li>4. They also become members of the industrial societies and networking groups dedicated to engage industrial players, customers and academicians for developing creative solutions to improve business environmental performance.</li> </ol>

Environmental commitment	<p>Developing corporate strategic plan:</p> <ol style="list-style-type: none"> <li>1. Establishing medium- and long-term environmental vision, and environmental goals and targets.</li> <li>2. Including several environmental principles such as prominence of environmental protection to achieve contemporary business objectives, exemplary actions of managers with responsibility, effective communication of environmental procedures and audit activities across the organization and adopting latest technological standards in introducing new procedures to achieve continuous improvements for environmental protection.</li> <li>3. Achieving the goals of reducing environmental impact of their products: such as meeting safety and regulatory requirements, designing energy-efficient and recyclable products, and incorporating operations waste minimization, energy conservation and recycling programmes.</li> </ol>
Marketing green team	<p>Their green teams voluntarily come together to educate, inspire and empower employees around sustainability and thus to implement specific solutions to operate in environmentally friendly ways.</p>
Marketing benchmarking	<p>Comparing environmental, social and economic performance of small firms to that of industry standards and best practices, and assessing and improving them quantitatively.</p> <ol style="list-style-type: none"> <li>1. Performing competitive analyses, and developing an understanding of industry trends and best practices within the industry.</li> <li>2. Placing operational results against similar operations to identify areas in which an operation can improve performance or exceeds the industry norms.</li> <li>3. Developing product standards with regard to sustainability, and to meet product and packaging goals as well as operational goals (recycling and sourcing, etc.).</li> </ol>
Marketing (environmental) ethical behavior	<ol style="list-style-type: none"> <li>1. Innovations cover how environmental code of conduct, and the measures for employee compliance and accountability guide employees' decision making and actions.</li> <li>2. Innovations elaborate how policies adopted by them ensure continuous improvement in ethical programmes and their effectiveness. Also, they highlight ethics-related innovations that have improved their environmental performance and serve as success stories to strengthen their position in the market.</li> </ol>

Ki-Hoon (2009) summarised three green management activities in Korea. First, the installation of a wastewater treatment facility. Second, organizing the task force team (TFT) in charge of leading the ISO 14001 process and certification, moreover, carrying out the initial environmental impact assessment to identify any improvement opportunities over the production process. It is worth noticing that most members of the TFT are from the quality management team. Third, conducting changes in organizational structure. Ki-Hoon (2009) offered a specific case that attempted to redesign the organizational structure in order to establish the environmental management system. In detail, the SME asked the managing director to control the functional units of research and development (R&D), quality assurance and production directly; these units worked together to solve the environmental problems in their products and production lines subsequently.

As prior research in Eastern countries shows, green innovations are more relevant to administrative activities instead of technological changes. Therefore, a comparative quantitative study could be conducted to explore whether there are differences between these green innovations' forms and preferred newness degree, and the reason behind these particular preferences. In addition, research targeting SMEs in Eastern countries indicates the same fact that most SMEs do not have an independent R&D department or any department with a similar function to deal with innovation and sustainability opportunities and challenges. Instead, most advanced innovative green SMEs chose to establish a task team, with employees from different departments. However, this finding remains under-researched. For instance, there are questions such as whether a TFT is common and necessary for SMEs to achieve corporate sustainability towards innovation in Eastern countries, and what capabilities are required for the TFT members to manage innovation-driven sustainability effectively and efficiently. Therefore, more high-quality studies are required in the context of Eastern countries, and individual-level analysis should be conducted.

## **2.5 Key influencing elements when crafting IDS strategies**

Normally, small companies operate outside the main flow of information and, with little time or money to track the latest technological developments, are in a poor position to make the 'right' decision (Biondi, Iraldo & Meredith, 2002). However, besides obstacles, there are some widely acknowledged resources and capabilities to help SMEs conduct innovation related to sustainability.

### **2.5.1 Strategic orientation (SO)**

According to prior studies, a SME's strategic orientation (SO) not only influences whether the company wants to engage in sustainability towards innovation but also influences why they craft different types and degrees of sustainability-related innovations. In other words, the decision to adopt, and the mode of adoption, are related closely to the enterprise's overall business strategy (Hansen et al., 2002). For instance, driven by a 'command and control' regime and the need for compliance, SMEs are seldom willing to take a long-term view of investment, and often opt for the apparently easy, quick, end-of-pipe solutions to their environmental problems (Biondi, Iraldo & Meredith, 2002). Besides the general competitive strategic position, SMEs' specific environmental strategic orientation potentially influences their innovative sustainability strategies. This is supported by Pinget, Bocquet and Mothe (2015)' finding that those SMEs that are the most mature in their environmental strategy have the highest probability of introducing environmental innovations. The categories of strategic orientations in SMEs, and their potential influence on innovative sustainability strategies, can be seen as follows.

Table 2.5.1-1 Strategic orientations in SMEs and potential influence on sustainability-related innovations

<b>Sustainability concept in SMEs</b>	<b>Author</b>	<b>Strategy Taxonomy</b>	<b>Strategic Behaviours and Profit Function</b>
Sustainability-oriented Innovation (SOI) (systematic reviewing paper which combines knowledge from innovation and sustainability literature)	Klewitz and Hansen (2014)	Strategic orientation: <ul style="list-style-type: none"> <li>- Resistant</li> <li>- Reactive</li> <li>- Anticipatory</li> <li>- Innovation-based</li> <li>- Sustainability-rooted (sustainable/ecological strategy)</li> </ul>	Resistant SME ignore environmental/social issues beyond compliance. Reactive SME notice environmental/social factors cause costs, conducts innovation related to compliance and limited process improvements. Anticipatory SME consider environmental/social factors can reduce costs, conducts incremental process and organizational innovation to ahead of compliance and tangible cost. Innovation-based SME consider environmental/social factors contribute to market success, prefer to conduct incremental (and limited radical) product innovations to achieve differentiation. Sustainability-rooted SME try to integrate economic, environmental, and social aspects to define core business, conducts radical business model innovation to pursue market transformation.
Corporate sustainability and Innovation	Bos-Brouwers (2010)	Company focus: <ul style="list-style-type: none"> <li>- Short-term</li> <li>- Long-term</li> </ul>	Short-term focused SMEs conduct incremental product innovation inspired by current customers' preference or possibility presented by new material, technology or market. Long-term focused SMEs implement radical green innovations; for instance, replace (raw) materials with bio-based resources.
Environmental Innovations (EIs)	Hansen, Søndergård and Meredith (2002)	1. Competitive strategy: <ul style="list-style-type: none"> <li>- Cost oriented strategy</li> <li>- Differentiate Strategy;</li> </ul>	Strategic positioning on a cost reduction basis: the firm's rationality, searching processes and evaluation of different technology adoption alternatives, were influenced by whether the technology

		<p>2. The SMEs' environmental strategic orientation and their perception of environment:</p> <ul style="list-style-type: none"> <li>- environmentally positive (proactive and offensive);</li> <li>- environmentally neutral</li> <li>- environmentally negative (defensive)</li> </ul> <p>(27 International comparisons suggest that most SMEs group in the second and third of these categories).</p>	<p>adopted was likely to reduce costs on a short-term or long-term basis. Strategic positioning in order to differentiate: the firm interested in the (environmental) technology that its adoption supported the firm's ability to provide unique or superior (environmental) products/services (value) to its customers.</p> <p>Negative strategic behavior is linked to minor search efforts and is limited to reducing costs and achieving compliance with regulation. Positive strategic behavior is linked to proactive search strategies for environmental information aiming at competitive advantage through environmental performance and green premiums.</p>
'Green' product innovation	Noci and Verganti (1999)	<p>Strategic orientation</p> <ul style="list-style-type: none"> <li>- Reactive</li> <li>- Anticipatory</li> <li>- Innovation-based</li> </ul>	<p>Reactive SMEs only respond to external stimuli, for example, environmental regulations. Their innovation behavior cannot be expected to be go beyond incremental innovation. Anticipatory SMEs are capable to identify environmental and social issues as sources of future competitive advantage. Innovation-based SMEs identify environmental and social issues as a source of innovation themselves and base their entire business model on SOI.</p>

As the prior literature shows, few studies explore strategic orientations in SMEs and their potential influence on sustainability-related innovations. Among them, all empirical research targeted environmental or 'green' innovations and developed countries. Thus, further theoretical and empirical studies should be conducted to explore strategic orientations in SMEs and their potential influence on designing truly sustainability-related innovations, especially in developing countries.

### 2.5.2 Resource and capability (R&C)

According to Hansen et al. (2002), the internal capabilities (/competencies), such as information management and technological capabilities (e.g. the core technical capabilities such as the knowledge and skills of employees, physical system, organizational routines and values), can be seen as the lenses through which the enterprise observes both its environment and technological options. For instance, Hansen et al. (2002) reported that in a few cases (i.e. case study of The Netherlands), actively requesting and analysing environmental information was an important method to ensuring rational and long-sighted environmental investments. Conversely, bound by historically produced competencies, SMEs are often created and closed in the same trajectory of technology; this does not prevent adoptions, but may result in narrow search strategies (Hansen et al., 2002).

Cuerva, Triguero-Cano and Corcoles (2014) claim three other factors that could influence the crafting. Firstly, although financial constraints do not influence the probability of choosing conventional innovation, they negatively affect the probability of developing green innovation. Based on their study, the fact of having important financial restrictions reduces the probability of doing green innovation by more than 16%. Secondly, the share of employees with a university degree also increases the probability of innovating by 0.6%. Thirdly, having a QMS increases the probability of green innovation by around 32-34%. In addition, Bos-Brouwers (2010) mentioned that green innovation could be inspired by possibilities presented by new materials, especially bio-based resources.

### 2.5.3 Networks

From a developed countries' perspective, three different kinds of networks, along with the stakeholders involved, are identified as influencing elements to craft sustainability through innovation. These networks are the business networks (also known as the value system, value chain or supply chain), the regulatory network and the knowledge network (Hansen et al., 2002; Noci & Verganti, 1999). Key stakeholders include customers, suppliers, knowledge institutions, (local) government, trade associations, Design Company, peers consultancy and competitors (Bos-Brouwers, 2010).

Information collected from the network could be analysed by SMEs to make specific choices of different innovative sustainability strategies. For instance, in the product development phase, collaboration with customers or other respective stakeholder groups makes it possible for scarcely-resourced SMEs to acquire new ideas regarding their product or service (Halme & Korpela, 2014). Similarly, Hansen et al. (2002) claimed that idea generation and initial searches for new technological options most often take place within the framework of established relations. In detail, cooperation with suppliers and the well-developed national knowledge networks of regulators, consultants and knowledge centres provide important support for the adaptation of the new green technologies (Hansen et al., 2002). However, their case studies also indicated that accessible knowledge within the enterprise's network or in the national (branch) network is not sufficient. In other words, SMEs cannot access enough technology and knowledge through the current knowledge network. Although Hansen et al. (2002) were aware that the networks surrounding SMEs influence their knowledge management and innovative capability, they also indicate that it is the network, in combination with competencies and overall business strategy, which determines the level of ability to exploit available network resources in the environmental innovations' adoption.

It is worth noting that each network communicates information in a different way and from a different perspective, and this affects how messages are received and understood by the enterprises; therefore, different perceptions and strategies may emanate from the business, the regulatory and the knowledge network, causing confusion and hampering development and diffusion of sustainability-related innovations (Hansen et al., 2002).

#### 2.5.4 TFT and TMT

According to Ki-Hoon (2009), in the context of developing countries, most SMEs have not established clearly independent teams or departments (e.g. R&D Department) to run environmental initiatives efficiently. To overcome the potential disadvantage of that, some experienced SMEs would choose to organize a task force team (TFT) of different departmental personnel and arrange for TFT meetings on a regular basis (Ki-Hoon, 2009). The main purpose of building this specific team is to encourage TFT members and employees at different departments to submit any ideas or proposals regarding green management. Besides the TFT team, the role of the top management team (TMT) is also significant to establish the organizational climate to bring employees' attention and interest in green management in a flexible manner. The importance of the TMT in a small company was emphasised in Etemad (2019)'s research "In smaller entrepreneurial firms, strategic orientation reflects the entrepreneurial and strategic orientation of their entrepreneur-founders, or small number of decision makers in the firm's top management team (TMT). In turn, the thinking of the firm's managers, or their entrepreneurial orientation (Covin et al.2006; Lumpkin and Dess 1996, 2001; Miller 1983, 2011), based on their state of

information and forecast of potential opportunities and threats at the time, influences their approach and the path of their strategy formulation(s) over time for attaining their objectives and deflecting competitive attacks or impediments at the same time.” (p282).

#### 2.5.5 Firm size

In the SME context, Triguero, Moreno-Mondejar and Davia (2015) further explore the interaction between firm size and preferred innovative sustainable strategies in detail by conducting a comparative study between small firms and medium-sized firms, recycling practices (incremental innovation) and cleaner technologies (radical innovation). Empirical evidence shows that small firms which positively assess the relevance of technological and managerial capabilities are more prone to perform eco-innovation; however, most medium-sized firms do not require higher technological or managerial capabilities to conduct their incremental eco-innovations. Network involvement is also closely related to both incremental and radical eco-innovation in small firms, but the same does not hold true for mid-sized firms. Triguero et al. (2015) interpret this result by stating that mid-size firms are provided with the resources to obtain the knowledge and capabilities they need to perform all types of eco-innovation on their own independently; thus, networking is relatively unimportant. Furthermore, their empirical evidence indicates that market-based instruments (taxes and subsidies) are important only for small firms, especially for the adoption of radical eco-innovation, but not for mid-sized ones. This result makes sense as subsidies and public aids significantly contribute to increasing the limited financial resources of small firms. In addition, command and control instruments (technology and performance standards) also have a different influence across the size. While the adoption of radical innovation is explained by existing regulations in medium-sized firms, these environmental standards are not going to explain a higher probability of adopting eco-innovation in the group of small firms. In conclusion, smaller firms are more inclined to introduce only incremental eco-innovation, such as recycling, than medium firms; radical eco-innovative practices are more frequent in medium-sized firms (Triguero et al., 2015). However, whether the differences in choosing and practising sustainable innovation between medium-sized and small businesses are that significant and whether the factors behind these differences truly have such significant impacts require more empirical evidence to explore and test.

#### 2.5.6 Summary

The researcher makes great efforts to identify several influencing elements when crafting innovation- and sustainability-related strategies from the strategy adoption sections of prior research by targeting keywords such as ‘decision-making’, ‘knowledge’, ‘design’, and ‘strategy’. In detail, they are strategic orientation, competencies and resources, network, TFT and TMT, and firm size. The key

underpinned theories in this theme were the resource-based view (RBV), dynamic capabilities, networks, and SMEs' characteristics. However, other theories, such as the project management or organizational structure theory, were also observed based on the analysis of the prior studies' presented data. Overall, there is not much research exploring the influencing elements when owners/managers craft their innovation-sustainability strategies; further in-depth qualitative studies targeting the strategy development stage in particular are required.

## **2.6 Key influencing elements when putting IDS strategies into actions**

According to Pinget, Bocquet and Mothe (2015), because of the complexity of environmental innovations, SMEs engaged in EIs believe that they face more barriers than other SMEs (i.e. those that pursue "dirty" technology innovation and non-innovators). Furthermore, their CEOs perceive that only the intensities of financial and market-related barriers do not differ between environmentally innovative and "dirty" technologically innovative SMEs; environmentally innovative SMEs' other barriers are more intense than "dirty" technologically innovative SMEs' and non-innovators'.

While analysing key influencing elements in sustainability-related innovative SMEs' implementation stage, prior researchers prefer to utilise institutional theory, network theory, the resource-based view (RBV) or corporate capabilities as the theoretical framework; a few utilise multiple theoretical perspectives.

Halme and Korpela (2014) applied multiple theoretical perspectives by using several resource categories in their research: Financial capital (Equity, Liabilities), Capabilities (Industry Knowledge, Intellectual property rights), Social capital (Networks, R&D cooperation) and Reputational assets (Reputation). Throughout their sample of 13 Nordic SMEs across food, textile and manufacturing substitutes, the most common resource combination comprised equity, industry knowledge, networks, R&D cooperation and reputation.

In the context of developing countries, Weng and Lin (2011) prefer to categorise determinants of green innovation adoption into technological, organizational and environmental factors based on their understanding of technical innovation adoption. Their quantitative results indicate that the adoption of green innovations for Chinese SMEs is significantly influenced by the quality of human resources, organizational support, governmental support, customer pressure and regulatory pressure, but the influences of environmental uncertainty on SMEs' green behaviour are not significant.

However, some researchers believe that the empirical study should focus on exploring emerging resources and capabilities, but it is meaningless to identify what the most important factors for SMEs are if targeted cases function in different

production chains. For instance, Hansen et al. (2002) claimed that they are not able to decide which factors are decisive because producers with identical production systems but functioning in different production chains and business environments may experience very different obstacles in the implementation of EIs.

## 2.6.1 Industry level

### 2.6.1.1 Network cooperation with stakeholders

Due to SMEs usually suffer barriers and constraints such as lack of technical, human and financial resources, it was found that the efforts of SMEs in the field of environmental innovation are strongly supported by the network in which they are involved (Biondi, Iraldo & Meredith, 2002; Bos-Brouwers, 2010). The econometric analysis of Frey, Iraldo and Testa (2013) has, in fact, shown a similar conclusion that ‘small size’ has a negative impact on innovation capabilities and must be supported by networking. The cases studied by Hansen et al. (2002) support this argument that an SME’s networks strongly influence their adoption capability. Moreover, data from Hansen et al.’ research (2002) demonstrated that adoptions frequently require the build-up of new relations or changes within the existing network.

Generally, in developed countries or regions like the European Union (EU), there are three different types of networks which reflect different relations between the SME (so-called ‘focal company’) and its different stakeholders. Firstly the Business Network (e.g. with customers, suppliers, consumers, financial institutions like banks or insurance companies); secondly the Regulatory Network (e.g. with EU directives, local and regional authorities, environmental agencies); and thirdly the Knowledge Network (e.g. with suppliers, customers, technology service centres, environmental agencies, research institutes, universities, trade associations) (Biondi, Iraldo & Meredith, 2002; Hansen et al., 2002). Based on prior studies, the most frequently mentioned stakeholders and networks in the implementation stage of innovation-driven sustainability studies are shown in the below table.

Table 2.6.1.1-1 Networking stakeholders of innovation-driven sustainable SMEs

Stakeholders	Networks	Activities and Influences	References
Customers	Not specified	Cooperate with their customers; ranging from customer specified modifications of existing products to co-development of new products or processes.	(Bos-Brouwers, 2010)
Suppliers	Not specified	Seek cooperation with suppliers; they can offer new materials or technologies that can enhance the sustainability performance of the company.	(Bos-Brouwers, 2010)
	Business network and knowledge network	For companies in the electroplating sector in Italy, Portugal and the UK, exchanges of information and development of the technology took place, rather than a simple supply and installation process.	(Biondi, Iraldo & Meredith, 2002)

Knowledge institutions and Sustainability experts	Not specified	Actively seek cooperation with knowledge networks, wherein combined forces of knowledge institutions and sustainability experts open up a vast amount of sustainability and innovation knowledge, previously undisclosed.	(Bos-Brouwers, 2010)
	Knowledge network	The support by research centres and universities is effective and useful because they frequently have experience and knowledge of the specific sector and networking, and are considered by SMEs as 'reliable' partners. In many cases professional associations have developed a relevant know-how in environmental management and technological innovation and can provide adequate resources to train SME personnel and provide them with updated information.	(Biondi, Iraldo & Meredith, 2002; Frey, Iraldo & Testa, 2013)
Governments	Not specified	Seek cooperation with (local) governments to profit from good relations and facilitation. This usually is within multi-party projects, or public-private partnerships.	(Bos-Brouwers, 2010)
	Not specified	Local, national and supranational government funding can be directed toward innovative causes. In this way governments can help to combat lack of funding which is often mentioned as an obstacle for developing responsible/sustainable innovations (Diefendorf, 2000).	(Halme & Korpela, 2014)
Design companies	Not specified	Cooperate with design companies, acting on their desire to have a design oriented innovation process.	(Bos-Brouwers, 2010)
Consultancy bureaus	Not specified	Advice from consultancy bureaus is sought by two companies.	(Bos-Brouwers, 2010)
Competitors/ Peers (e.g. coopetition)	Not specified	Join forces with peers in their innovation process. Here, trust plays a vital role in successful completion of the project. Even one company states explicitly that they have formed a joint venture with several international peer companies abroad.	(Bos-Brouwers, 2010)
	Knowledge network	Most SMEs do not have a structured internal R&D department, so SMEs similar in size, skills and expertise, process technology and organizational structure collaborate by testing or developing technological environmental innovations to be applied to similar production processes and products, as well as by defining management and organizational tools suitable for a common production cycle (e.g. share technological resources (experimental plants, laboratories) to test environmental innovation; sharing financial resources to buy a pilot-plant for testing	(Biondi, Iraldo & Meredith, 2002)

		innovative production processes of an industrial R&G project; collecting information regarding the innovation in contexts such the industrial districts).	
	Not specified	Moreover, experience shows that forms of co-operation between SMEs allow for considerable synergies and cost reductions (e.g. SMEs, which are located in the same area, operating in the ceramic tile industry often utilise a common equipment for recycling their waste (broken tiles) in order to recover the used material. This equipment would be too expensive for a single SME, but proves to be an economic investment for a consortium).	(Biondi, Iraldo & Meredith, 2002)
	Knowledge network	when the SME is able to involve a large enterprise (be it a supplier or a customer) in the network, it gives SMEs the opportunity of reaching their goals in respect to environmental performance whilst at the same time, gaining effective support in terms of technical resources and expertise.	(Biondi, Iraldo & Meredith, 2002)
	Not specified	Cooperation can discourage innovative performance substantially, especially between SMEs, in industries characterized by homogenous products and high rates of spillovers (as happens in the Food and Beverage sector).	(Cuerva, Triguero-Cano & Corcoles, 2014).
Local communities	Not specified	For SMEs, involving the local community in a network may provide significant benefits such as obtaining support and enhancing the social acceptability of their activities (e.g. Local institutions are the most significant actors when it comes to planning and implementing the environmental infrastructures that SMEs need for developing innovations. In some industrial districts, in order to enable SMEs to implement technological innovation for water recycling, it is sometimes crucial that local institutions guarantee an effective and upgraded public water purification and distribution system. In these cases, local agencies, voluntary consortia and centres of excellence are useful tools for removing	(Biondi, Iraldo & Meredith, 2002)

		the barriers to the diffusion of environmental technologies and promoting cleaner technologies).	
--	--	--	--

Although SMEs cooperate with stakeholders in various settings to compensate for their resource shortcomings (e.g. institutional information, technical and financial resources), and, in some cases, more activities and more cooperation partners mean a significant increase in the number and impact of sustainable innovations (Biondi, Iraldo & Meredith, 2002; Bos-Brouwers, 2010; Pinget, Bocquet & Mothe, 2015); not all companies engage in multi-stakeholder cooperation. For instance, in Bos-Brouwers's study, nine of 26 companies only cooperate with customers, and three cooperate exclusively with customers and suppliers (2010).

For the SME involved in a multi-stakeholder relationship, to understand the influence of stakeholders and networks in the SME's implementation stage of sustainable innovations, the researcher should not only target every different stakeholder but also explore the comprehensive view of the interconnections between stakeholders within each particular network. For instance, merging opportunities in an integrated supply chain should be supported by focusing both on the supply side, carrying out an overview of existing capabilities, and on the demand side, providing information on the strategic outlooks of main market actors at local and international level (Frey, Iraldo & Testa, 2013). In addition, in Halme and Korpela's study (2014), two enterprises of the 13 did not engage in R&D cooperation, which indicates that when multiple resources are available, other resources can compensate for R&D cooperation. Thus, only understanding each stakeholder instead of paying extra attention to the interconnections between them cannot help researchers fully understand the implementation.

Bos-Brouwers (2010) and Halme and Korpela (2014) conclude that, by offering facilities and funds, governments have a positive influence on environmental innovation implementation. However, quantitative results from Cuerva, Triguero-Cano and Corcoles (2014) indicate that public subsidies are not relevant for explaining green product innovation. Therefore, by comparing their findings with a few previous EU research, they emphasise that the effects of regulation on product innovation remain disputed. Contrary to most previous literature, Cuerva et al. (2014) also found that using data from European companies cannot confirm a significant positive relationship between networking and environmental innovation performance; however, no further confirmation or explanations can be found. More quantitative evidence from both developed and developing countries should be collected, and in-depth explanations should be achieved by conducting followed qualitative research.

Based on two prior Eastern countries' studies, business partners are recognized as the most important stakeholders in implementation. In detail, Kumar (2015) states that working closely with business partners creates better facilities management, generates savings, increases productivity and improves environmental performance.

For instance, partnerships for databases enable them to record, track and report on their environmental performance in a detailed manner that their internal and external auditors can easily access. In addition, strategic partnership has offered them leadership and power support for innovations that maintain a balance between economic growth and environmental sustainability. Furthermore, Ki-Hoon (2009) claim that companies identified as lacking technological know-how to manage pollution control sought technological inputs from large companies among their business partners to help them take technological green innovations.

### 2.6.2 Organizational level

At the organizational level, prior researchers identify several influencing elements. Firstly, the strategic orientation. According to Hansen et al. (2002), the proactive firms who tried to improve their competitive position could built-up better systemic competencies and corporate learning capabilities for environmental innovation implementation, compared to the reactive firms that took no self-motivated action.

Second is the organization's flexibility (or the SME's structure/internal network). One widely acknowledged advantage of SMEs is their flexibility of the organization. Based on Bos-Brouwers's study (2010), for all SMEs in the sample, but foremost in the smaller ones, little bureaucracy and informal communication lead to efficiency, effectiveness and responsiveness to changes in the (commercial) environment sustainable innovation project teams.

Third, technology, and the core technical capabilities, such as the knowledge and skills of employees, physical system, organizational routines and values. In detail, Hansen et al. (2002) identify that both scientific-based technologies and environmental technologies could influence SMEs to implement innovative sustainable strategies. For instance, subcontractors whose production is based on practical experience but lack technical, scientific-based competencies makes it difficult to adapt production to the use of ion exchange; in contrast, subcontractors that had access to internal science-based technical competencies, enabling them to engage in interactive learning with advanced suppliers and to carry through internal adaptation processes.

Furthermore, financial capital. Halme and Korpela (2014) claim that financial capital in the form of equity appears to be a necessary resource for the development of responsible innovation, but it is not a sufficient condition for the creation of such innovation. Pinget, Bocquet and Mothe (2015) explain this situation by claiming that the number of financial barriers is critical for SMEs. In detail, without a consistent, predictable policy framework, uncertainties in eco-investment profitability might increase, with new financial risks (Ghisetti et al., 2015); on the other hand, systems failures (Foxon & Pearson, 2008), such as in infrastructure provision and investment, technological transition, lock-in, and restriction of financial credit for SMEs'

environmental innovation, may contribute to affecting environmentally innovative SMEs' perceptions of financial burdens. Therefore, for SMEs, financial capital needs to be coupled at least with social capital (R&D cooperation) for innovation to result (Halme & Korpela, 2014).

In addition, knowledge and interactive learning skills. According to Pinget, Bocquet and Mothe (2015), environmental innovation is knowledge- and information-intensive but often relies on knowledge and competencies that are not core to firms; thus, CEOs of SMEs may lack knowledge and expertise about subjects related to environmental innovation. In addition, Hansen et al. (2002) claim that to achieve SOI, knowledge via networks is not enough; the SME should establish interactive learning relationships with actors who provide information on environmental technologies. Besides the capability to obtain technological knowledge, the capability to obtain industry knowledge also matters. According to Halme and Korpela (2014), SMEs wanting to address a sustainability problem with an environmental technology innovation need to possess industry knowledge. It is due to industry knowledge being necessary for acquiring other resources such as more financial capital (venture capital investments or subsidies), networks or reputational assets, without which technological (environmental) innovations are unlikely to progress into commercial offerings (Halme & Korpela, 2014).

### 2.6.3 Individual level

#### 2.6.3.1 *Top managers' mindset*

Based on the research conducted by Bos-Brouwers (2010), the sustainability orientation of the owner (/manager) appears to be of great significance in the number and impact of sustainable innovation activities. For instance, although most respondents have an eco-efficiency orientation, the ones with a value creation sustainability orientation tend to have more activities and activities with more impact on the triple sustainability performance (Bos-Brouwers, 2010). It is due to their dynamic, entrepreneurial and long-term oriented leadership style favours their company's innovative action (Bos-Brouwers, 2010). In contrast, the owners (/managers) with a compliance-oriented mindset do have sustainable activities, but these activities are driven by compliance instead of innovation (Bos-Brouwers, 2010). It clearly shows that the role of the owner (/manager) also can lead to disadvantages with regard to compliance orientation, weaker managerial skills in planning and short-term focus, contrasting the long-term focus of sustainability (Bos-Brouwers, 2010). Thus, it seems that the effort and ambitions of the owner (/manager) are better indicators of the number and success of sustainable innovation activities.

Particularly in emerging markets such as India and South Korea, most SMEs have not established clearly independent teams or departments to run environmental and social initiatives efficiently, and studies indicated that top management support and

involvement are crucial for achieving green management practices (Ki-Hoon, 2009; Lee & Ball, 2003).

There is not enough innovation-sustainability research focus on top managers' mindsets. However, by reviewing prior innovation and SME literature, the reason why top managers' mindset is important might be due to, for SMEs who are simple-structured, the top managers or owners are the most powerful people in the whole company, and the SMEs' strategy is mainly developed by them (Etemad, 2019; Freel, 2005; Prajogo & McDermott, 2014).

#### *2.6.3.2 Employees' participant*

In the context of developed countries, Bos-Brouwers (2010) represent the importance of employees' participation by claiming that the time and support employees receive to elaborate on innovative ideas are better indicators of the number and success of sustainable innovation activities. This suggestion is derived from prior innovation studies with no further empirical evidence.

However, in the context of the Eastern economy, Kumar (2015) claims that the senior management in a firm is accountable for the delivery of environmental policy, and the team of employees is responsible for initiating, participating and assessing a range of environmental projects. According to Ki-Hoon (2009), most environmental staff at SMEs has additional duties such as production or quality management. Thus, it would be more acceptable to employees and staff when the green management-related goals and incentives are clearly identified and delivered. This study offers additional support for the work of Callenbach et al. (1993), in that employees are one of the critical factors needed for the successful implementation of green management. The researchers state that it is important to involve people in designing and implementing green management to help ensure that environmental management is realistic, practical, and adds value (Hutchinson, 1992; Lee & Ball, 2003). However, internal resistance against green management was observed in one empirical case from South Korea. Employees in the organization viewed green management as an extra burden or an 'add-on' to their current roles. Thus, both studies from developing countries treat employees' degree of involvement as one important influencing factor in implementing sustainable innovation.

#### *2.6.4 Influencing elements' significance and their interactions*

By critically analysing the prior empirical studies, the researcher figured out that, in different stages, the networks and the interplay between them could have different impacts, and these influences could act in different levels of significance. For instance, Biondi, Iraldo and Meredith (2002) claim that the combination and overlapping of networks are important in helping the SME orientate itself to its markets, understand its legal obligations, and obtain information about new

technologies or technological options. In addition, they claim that networks are important at the beginning of an innovation adoption process when a company is searching for information on which to make decisions; the implementation stage, especially where new technologies are concerned, the more radical an innovation, the greater the need will be for the support of experts; and in the consolidation and continual efficient use of the innovation (Biondi et al., 2002). Particularly in the implementation stage, Halme and Korpela (2014) find that if a responsible innovation is implemented with only a few resources, equity and R&D cooperation appear to be the necessary ones. This is consistent with the findings of Bos-Brouwers (2010) that some SMEs engaging in sustainable innovation compensate for the lack of resources by cooperating with external partners. In addition, Halme and Korpela (2014) state that when multiple resources are available, other resources can compensate for R&D cooperation to develop innovative sustainable products. Thus, influencing elements influence the importance of each other in the implementation stage. Therefore, more in-depth systematic and comprehensive research should be conducted by targeting influencing elements in each stage of the sustainability-related innovation adoption process.

The interplay exists not only within influencing elements, such as networks, but also between influencing elements. For instance, Hansen et al. (2002) stated that the strategic orientation decides what the SME is ready to accept, the internal capabilities dictate what the SME is able to understand, and the network dictates what part of the selection environment is accessible to the SME; thus, how the interplay between these three dimensions of strategic orientation, competencies and networks shaped the course of the environmental innovation. In other words, the environmentally innovative capability is conceived as the result of an interplay between the strategic orientation, the network relations, and the competencies of the company. By reviewing prior literature, the author noticed that the influencing elements in each adoption stage are not limited to these three factors that Hansen et al. claimed; therefore, researchers should pay explicit attention to sustainability-related innovation management in a systemised way in the future.

#### 2.6.5 Summary

Because there was not enough empirical research on the innovation management and practice of corporate sustainability, the knowledge from innovation studies was obtained for the researcher to understand the categories of the influencing elements and their interactions. In detail, the implementation of innovation was mainly influenced by environmental, organizational, and top managers' characteristics (Damanpour & Schneider, 2006); and the influences of these macro and micro environmental factors, organizational capabilities, as well as top managers' characteristics appeared to be critical and complex. In addition, some of these influencing elements were more important than others, and may reinforce or offset one another (Vega, Brown & Chiasson, 2012). To summarise, key influencing

elements identified by prior researchers include industry knowledge and network cooperation with stakeholders at the industry level, the strategic orientation, flexibility of the organization, technology and core technical capabilities, financial capital, and knowledge and interactive learning skills at the organizational level, as well as top managers' value, and employees' participant at the individual level. The key theories underpinned were environment screening, networks, RBV and dynamic capability, entrepreneurship, and stakeholder theory.

## **2.7 Indicators and measuring criteria**

By reviewing prior literature, there is not enough or in-depth exploration of the measuring criteria being utilized by SMEs; among them, two objectives emerged.

First, in order to ensure the quantity and quality of sustainable innovation activities, although the management of innovation processes differs across the companies, Bos-Brouwers (2010) summarised some common indicators, including the presence of an R&D department, the time and support employees receive to elaborate on innovative ideas, the effort and ambitions of the owner/manager. Furthermore, Kumar (2015) suggests that SMEs should set several environmental performance goals for a responsible approach to achieving environmental goals; however, no detailed example is given.

Second, a few researchers intend to summarise measuring criteria targeting the outcomes of innovative sustainable strategies and try to link them to SMEs' commercialization and sustainability performance. However, there are no widely accepted standards, in terms of either specific technological solutions or measures, to evaluate the environmental performance of products and processes (De Marchi, 2012, cited by Pinget, Bocquet & Mothe, 2015). Biondi, Iraldo and Meredith (2002) identified five key potential outcomes based on their empirical results, including higher productivity and flexibility, reduced water consumption, a considerable saving in the cost of auxiliary materials, saving energy for heating water in plants and equipment, and achieving high cost savings through reduced use of raw materials, energy, water, waste reduction, and reduced payment for environmental permits and inspection. These outcomes are summarised from their environmental innovation research; thus, social outcomes are not covered. In addition, they claim that, where waste management systems have been installed, benefits accruing to the SMEs are calculated, and direct economic savings derived from the adoption of this environmental innovation are identified; however, these economic benefits connected with environmental innovation are not emerging in all sectors and countries (Biondi et al., 2002). Therefore, it is hard to evaluate the outcomes of innovative sustainable strategies by utilizing only quantitative financial indicators.

By reviewing prior publications, the researcher found it was clear that SMEs do not have common indicators or measuring criteria to evaluate the innovation outputs or

the strategy's outcomes. However, prior literature also gives a clue that researchers could design them from both sustainability and innovation perspectives.

## **2.8 Underpinned key theories and conceptual gaps**

Gray, Owen, and Adams (2010) argued, "Theory is, at its simplest, a conception of the relationship between things. It refers to a mental state or framework and, as a result, determines, inter alia, how we look at things, how we perceive things, what things we see as being joined to other things and what we see as 'good' and what we see as 'bad'" (p. 6). On the other hand, a combination of interrelated concepts is simply defined as a theoretical framework which may consist of a single theory or a collection of several theories (Collis & Hussey, 2009; Fernando & Lawrence, 2014).

Although all the theories or theoretical frameworks used in SME, innovation, or CS study could contribute to constructing an understanding of the IDS, these are not fully capable of explaining this social phenomenon. And researchers tend to assume that the theory itself is always incomplete in the social sciences (Fernando & Lawrence, 2014), thus requires to be tested, developed, and extended (Saunders et al., 2012; Wahyuni, 2012; Woodside, 2010; Yin, 2012) in the future study. However, the importance of theorizing IDS-related practice, or even less relevant practice, was highlighted in this study, particularly in this chapter and Appendix A. This is because, as Fernando and Lawrence (2014) emphasised, even incomplete theoretical lenses can be employed to check the extent to which these theories help to explain the relevant social phenomenon. And "careful choice of theory can help us to consider current and potential practice and policy in a more thoughtful and coherent manner" (Gray et al., 2010, p3). Thus, by exploring, integrating, and employing commonly used theories in prior research, the researcher attempted to obtain deep insights into the IDS phenomenon itself and the theoretical gaps through more than one single theory or a single level analysis.

There were several bodies of literature in the development of the researcher's recognition and understanding of IDS, including strategic management, organisation theory, CSR, sustainable entrepreneurship and others. However, in particular, the underpinned key theories or theoretical frameworks in this research were TBL theory, stakeholder theory, and RBV. Furthermore, although the thematic results of the systematic review indicated other commonly used theoretical frameworks such as the legitimacy theory, institutional theory, networks, RBV, dynamic capability, SO, SMEs' characteristics, competitor analysis, value chain analysis, industry analysis, environment screening, entrepreneurship, knowledge-based view, but in most articles, innovation-sustainability practices were interpreted from either innovation or sustainability perspective without an inductive, systematic, multilevel and comprehensive view. This gap was agreed upon and emphasised by Epstein, Buhovac and Yuthas (2010).

### 2.8.1 TBL theory

The first employed theory was the triple bottom line (TBL) theory, which was usually utilized in sustainability research such as social enterprise, social entrepreneurs or sustainable manufacturing studies. TBL is an accounting framework that expands the traditional reporting framework to take into account social and environmental performance in addition to financial performance (Elkington, 1997; Garvare & Isaksson, 2001). Spreckley (1981) articulated the triple bottom line by arguing that enterprises should measure and report on financial performance, social wealth creation, and environmental responsibility. Moreover, John Elkington claims to have coined the phrase 'triple bottom line' in 1994, which mainstreams the idea of sustainability as including 'people, planet, and profit' (3Ps) (Elkington, 1997; Elkington, 2018, June 25th; The Economist, 2009, November 17th). The concept has evolved into one often described as three overlapping circles or nested circles (3 Pillars of Sustainability in Business, Figure 2.8.1-1). It helped companies and researchers to understand the goal of sustainability in a business concept and demanded that a company's responsibility lies with stakeholders rather than shareholders. In detail, it helped clarify that the long-term sustainability of an organization required more than just financial equity, but it did not mean they had to give up the notion of financial success. However, only advanced studies intend to fully tackle all TBL sustainability-related challenges in running the company, particularly in underdeveloped or developing countries (Boons & Lüdeke-Freund, 2013; Yunus, Moingeon & Lehmann-Ortega, 2010).

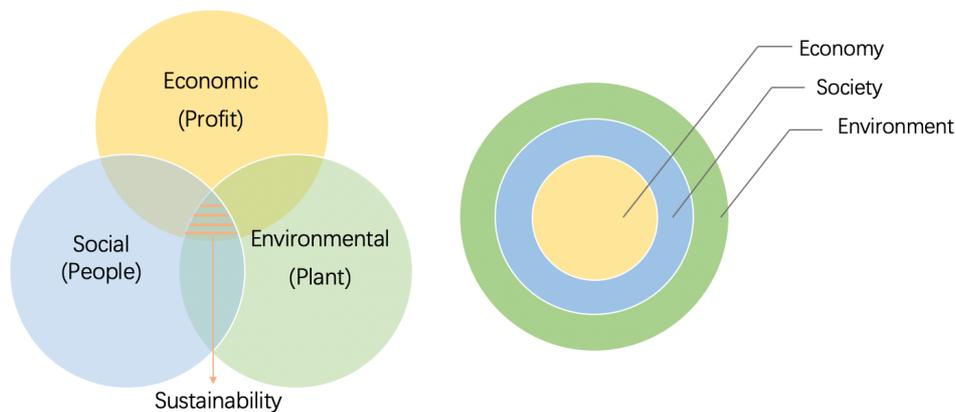


Figure 2.8.1-1 the 'TBL' or 'three pillars' interpretation of sustainability

*Notes: Based on Brundtland Commission's (1987) 'sustainable development', this TBL model was developed and then further adapted according to Elkington (1997), Dubey and Gunasekaran (2015), Henriques and Catarino (2015) and Purvis, Mao and Robinson (2019).*

## 2.8.2 Stakeholder theory

Stakeholder theory was also employed as a key theory for explaining IDS practices. In the mainstream, stakeholder theory is classified and interpreted as a theory of organizational management (positive) or business ethics (moral or normative) that accounts for multiple groups or individuals who can affect or are affected by the achievement of the company's objectives, such as employees, suppliers, local communities, creditors (Deegan, 2009; Freeman, 1984; Gray et al., 2010). Although prior researchers categorized stakeholders in different ways (Table 2.8.2-1), a similar finding was that there are various stakeholder groups with different and sometimes conflicting expectations (Fernando & Lawrence, 2014).

Table 2.8.2-1 Stakeholders categories and their representative authors

Stakeholders categories	Representative literature
Strategic and moral stakeholders	Goodpaster 1991
External and internal stakeholders	Pearce 1982; Carroll 1989
Latent, expectant, and definitive stakeholders	Mitchell et al. 1997
Subgroups of stakeholders such as shareholders, employees, and customers	Preston & Sapienza 1990
Single issue, and multiple issues stakeholders	Wood 1994
Supportive, marginal, nonsupportive, mixed blessing stakeholders	Savage et al. 1991
Voluntary and involuntary stakeholders	Clarkson 1994
Primary and secondary stakeholders	Clarkson 1995
Normatively legitimate stakeholders and derivatively legitimate stakeholders	Phillips, 1997
Dormant, discretionary, demanding, dominant, dangerous, dependent, definitive stakeholder and non stakeholder	Mitchell, Agle & Wood, 1997

*Notes: this table was derived from Phillips (1997), Mitchell, Agle & Wood (1997) and Fernando and Lawrence (2014)'s literature.*

The stakeholder theory argues that the business entity should be used as a vehicle for coordinating stakeholder interests, instead of maximising shareholder or owner profit as suggested in traditional shareholder theories (Fernando & Lawrence, 2014). Stakeholder theory suggests that the management of an organization is expected to perform its accountability towards its stakeholders by undertaking activities deemed important by its stakeholders, and by reporting and disclosing information (Fernando & Lawrence, 2014; Smith, 2008).

From the ethical perspective, 'the organization owes an accountability to all its stakeholders' rather than only to more powerful or financial stakeholders (Gray et al., 2010, p. 25). The main limitation of the ethical perspective is the managers' challenge to treat all stakeholders fairly, especially when the stakeholders have different and contradictory interests. However, Hasnas (1998) suggests that when these interests conflict, the business should manage 'to attain the optimal balance among them' (p. 32). According to Gray et al. (2010), the ethical perspective of

stakeholder theory or normative approach to accountability has limited descriptive or explanatory power in a social accounting context.

On the other hand, the managerial (positive) perspective of stakeholder theory asserts that an organization is expected to be accountable to its stakeholders who control the critical resources required by the organization (Mitchell, Agle, and Wood, 1997; Deegan, 2009; Gray et al., 1996). The main challenge is the task relating to how organizations should decide to whom they are responsible, and to what extent that responsibility extends (O’Riordan & Fairbrass, 2008). Thus, the managerial perspective of stakeholder theory focuses mainly on identifying and managing the relationship between an organization and its critical stakeholders. And a related field of research examines the concept of stakeholders and stakeholder salience (Table 2.8.2-2), or the importance of various stakeholder groups to a specific firm. Unlike the ethical perspective, the organisation-centred managerial perspective of stakeholder theory can be, and frequently is, tested by empirical studies (Deegan, 2009). Thus, stakeholder theory has been widely used as one of the frameworks in project management and CSR methods. For example, stakeholder analysis was involved in ISO 26000 and GRI (Global Reporting Initiative) (Duckworth & Moore, 2010). It is worth to be noticed that, although, in a sense, the stakeholder view of strategy integrates an RBV and a market-based view, and adds a socio-political level, researchers such as Mansell (2013) have criticised that, by applying the political concept of a ‘social contract’ to the company, stakeholder theory undermines the principles on which a market economy is based.

Table 2.8.2-2 Attributes had been introduced to explore and examine the implications of contentious relationships between stakeholders and organizations

Attributes	Representative literature
Stage 1: Power or Legitimacy e.g. normatively legitimate stakeholders (those to whom an organization holds a moral obligation) and derivatively legitimate stakeholders (those whose stakeholder status is derived from their ability to affect the organization or its normatively legitimate stakeholders)	Freeman (1984) Donaldson and Preston (1995) Phillips (1997)
Stage 2: Stakeholder Salience (Latent, Expectant or High): power (the extent a party has means to impose its will in a relationship), legitimacy (socially accepted and expected structures or behaviors), and urgency (time sensitivity or criticality of the stakeholder's claims)	Mitchell, Agle & Wood (1997)
Stage 3: Additional attributes e.g. compatible/incompatible interests and necessary/contingent connections	Friedman & Miles (2002)

### 2.8.3 RBV

In addition, the resource-based view (RBV) was employed in this research because it had made important contributions in the rapidly growing area of strategic innovation and sustainability studies, whether or not the prior researchers emphasised its existence and importance. The RBV emphasises an organization's internal resources in formulating strategy (Barney, 1991, 2001). In other words, it targeted the unique cluster of assets, capabilities and competencies that each organization possesses (Henry, 2008; Collis & Montgomery, 1995; Stalk et al., 1992). By integrating with the market-based view (MBV) (Bea & Haas, 2005; Makhija, 2003; McGahan & Porter, 1997; Hungenberg, 2011) or Porter's industry analysis (Porter, 1979, 1980; Halawi L. A., Aronson J. E, and McCarthy R. V., 2005), which focusing on the company's external competitive environment and how they position themselves against that structure, these frameworks essentially perceived the primary role of strategy in attaining a sustainable competitive advantage (SCA) in markets and industries (Bamberger & Wrona, 1996; Henry, 2008; Hax A. C. and Wilde II D. L., 2003; Knecht, 2014). In particular, RBV assumed that resources are diverse and immobile (Barney, 1991, 2001; Mata et al., 1995), and by using a company's VRIO resources, the company can deliver value to customers in an approach that rivals find it difficult to imitate, thus empowered it to attain CA (Barney, 1991; Barney, 2001; Peteraf, 1993; Thompson et al., 2010). Therefore, the RBV tends to focus on the types of resources and the characteristics of these resources that make them strategically important.

According to Barney, Wright and Ketchen (2001), besides being utilised as a framework for understanding strategic management, RBV can also be used to help ethics and CSR researchers 'identify if and when a firm's approach to social responsibility influences its bottom line (McWilliams & Siegel, 2001)' (p.635). For instance, from RBV, valuable research focusing on how a firm's ethical and CS stances shape and are shaped by the firm's culture, or what are the factors make a uniquely ethical culture translate into economic sustainability, can be conducted (Barney, Wright & Ketchen, 2001).

#### 2.8.4 Gaps in the current literature

The aim for the researcher to conduct a systematic review was to structure the research field on innovation and sustainability in the context of SMEs, identify emergent themes and point out the most important gaps. However, by reviewing the highly relevant publications, two main limitations or challenges related to existing theories or theoretical frameworks were acknowledged. First, in constructing a theoretical framework and identifying research gaps, the primary concern was given to high quality publications that targeted at least two clouds of the keywords (sustainability, innovation and SMEs) and their findings. Although this makes the theory or framework more specific, it narrows down the scope. Second, CSR practice is a very complex phenomenon to explain through a single theory (Gray et al., 1995), not to mention the IDS practices in SMEs. Thus, researchers should obtain deep insights through more than one single theory or single level analysis to understand and interpret the practice. However, no theoretical framework can include all relevant theories, although 'all of the theoretical lenses used' should 'have some kinds of advantages to offer' (Fernando & Lawrence, 2014, p151). Thus, an inductive or even abductive approach, and a comprehensive and systematic research focus on not only motivation but also definition, adoption and evaluation should be conducted. The detailed gaps and how they can be filled by conducting what specific methods as well as asking what specific questions were presented as follows.

Table 2.8.4-1 Conceptual gaps and research questions in relation of IDS phenomenon

Themes	Underpinned key theories	Representative articles	Main gaps to be filled	Linked Methodology	Linked Research Questions
Definition	3 pillars of CS (TBL theory)	Bos-Brouwers, 2010; Henriques & Catarino, 2015; Shev-chenko, Levesque & Pagell, 2016	<p>➤ Main study targeted LEs, but SMEs who bear less public attention and driven by their inner motivations are achieving true sustainability but under-researched.</p> <p>➤ Only a few studies are actually combining the aspects from both CS and innovation perspectives. Among them, current research is still strong on environmental or social perspective, separately. There was no clear and strong argument on whether every dimension of the three pillars of sustainability should be fulfilled. The definition of IDS and the possible difference between SOI and IDS should be worth to explore, especially in the context of China</p> <p>➤ Prior studies have mainly focused on the antecedents of SMEs' innovation-sustainability behaviours but not so many on the adoption process, stages, and influencing elements. And what happened in commercialization stage was largely ignored.</p>	SMEs should be targeted	How CSMEs achieve systematic IDS? (Main Q of the study)
	The relationship between innovation and sustainability (SOI and IDS)	Beise & Rennings, 2005; Craig & Dibrell, 2006; Financial and Economic Affairs Committee of the NPC & National Development and Reform Commission, 2016, 2021; Gao, 2018, February 8th; González-Pernía, Jung & Peña, 2015; Hansen, Sondergård & Meredith, 2002; MacGregor, Fontrodona & Hernandez, 2010;		In the researcher's opinion, in sample selection and data analysis, a true IDS research has to integrate innovation into a triple bottom line perspective that reflect both economic, social, and environmental dimensions.	How CSME managers and employees interpretive the concept of corporate sustainability (CS) and the relationship between innovation and corporate sustainability from the sector leader's perspectives? (Sub-Q 1)
	(Eco-) Innovation process theory	Ahlin, Dmrovsek & Hisrich, 2014; Epstein et al., 2010; Hansen, Sondergård & Meredith, 2002; Kesting et al., 2016; Klewitz & Hansen, 2014	In interview checklist design and the following analysis, adoption process, stages and influencing factors in each stage should be explored, including commercialization stage.	How sustainability is crafted and implemented towards innovation? (Sub-Q3)	

Motivation	The institutional theory	Biondi, Iraldo and Meredith, 2002; Bos-Brouwers, 2010; Hansen, Søndergård and Meredith, 2002; Pinget, Bocquet and Mothe, 2015	<p>➤ In studies integrating both innovation and sustainability perspectives, the underpinned theories or theoretical frameworks were not relatively enormous, compare to CS study or innovation study. And most of these studies were designed to test a single theory instead to develop or build one.</p> <p>➤ The forces from relevant stakeholders, such as customer, government, environmental authorities and shareholders, are complex, and some previous literature indicate that these drivers are mutually and dynamically interacting each other</p>	Multi-level analysis has to be conducted	A comprehensive research, which explore not only forces but also the interactions between forces, is required in future.	Why these actions are taken? (Sub-Q3)
	Stakeholder theory	Biondi, Iraldo and Meredith, 2002; Bos-Brouwers, 2010; Cuerva, Triguero-Cano and Corcoles, 2014; Hansen, Søndergård and Meredith, 2002; Pinget, Bocquet and Mothe, 2015; Noci and Verganti, 1999				
Preferable strategies and practices	Strategic orientation theory	Cuerva, Triguero-Cano and Corcoles, 2014; Biondi, Iraldo and Meredith, 2002; Bos-Brouwers, 2010; Cuerva, Triguero-Cano and Corcoles, 2014; Hansen, Søndergård and Meredith, 2002; Ki-Hoon, 2009; Kumar, 2015	<p>➤ Researches have been mainly focused on western SMEs from Europe and North America.</p> <p>➤ The research targeted SMEs in Eastern countries notice the same fact that most advanced innovative green SMEs chose to</p>	More high-quality studies are required in the context of Eastern countries.	What are the preferred sustainability/DS strategies adapted by CSMES? (Sub-Q 2)	How sustainability is crafted and implemented
	Purley based on empirical evidence	Biondi, Iraldo and Meredith (2002) and Kumar (2015)				
	Classified from sustainability perspective (TBL theory)	Bos-Brouwers (2010) and Ki-Hoon (2009)				

	Classified from innovation perspective	Klewitz and Hansen (2014) and Hansen, Søndergård and Meredith (2002)	establish a task team instead an independent department to deal with innovation and sustainability opportunities and challenges. However, this finding remains under-researched.	Team or individual level analysis should be conducted.	towards innovation? (Sub-Q3)
Influencing elements in crafting	RBV	Hansen, Søndergård and Meredith, 2002	➤ There are not so many researches explore the specific influencing elements in crafting.	Further in-depth qualitative studies targeted the strategy development in particular are required.	How sustainability is crafted and implemented towards innovation? (Sub-Q3)
	Network theory	Bos-Brouwers, 2010; Halme & Korpela, 2014; Hansen, Søndergård and Meredith, 2002; Noci and Verganti, 1999	➤ The prior research cluster influencing factors into barriers and advantages, or external and internal dimensions. However, multi-level analysis is required.	Multi theories should be applied to interpret.	
	SMEs' characteristics	Ki-Hoon, 2009; Triguero, Moreno-Mondejar and Davia, 2015;			
Influencing elements in implementing	Network and stakeholder theory	Biondi, Iraldo & Meredith, 2002; Bos-Brouwers, 2010; Cuerva, Triguero-Cano & Corcoles, 2014; Frey, Iraldo & Testa, 2013; Halme & Korpela, 2014	➤ There were not enough empirical studies for the researcher to understand the influencing elements in implementing and the interaction between them. ➤ The prior research cluster influencing factors into barriers and advantages, or external and internal dimensions. However, multi-level analysis is required.	Further in-depth qualitative studies targeted the strategy implementation in particular are required.	How sustainability is crafted and implemented towards innovation? (Sub-Q3)
	RBV	Bos-Brouwers, 2010; Halme & Korpela, 2014; Hansen, Søndergård and Meredith, 2002; Pinget, Bocquet and Mothe, 2015	➤ For SMEs, managers' and employees' support and involvement are crucial for achieving green management practices. However, not enough research has focused on top managers' value and employees' participant.	Multi-level analysis and multi theories should be applied to interpret.	
	Managers and employees' characteristics	Lee and Ball, 2003; Ki-Hoon, 2009; Kumar, 2015		Employees and managers should be interviewed.	

Indicators and measuring criteria	Indicators or self-reported feedback to evaluate the innovation outputs or the strategy outcomes	Biondi, Iraldo & Meredith, 2002; Bos-Brouwers, 2010; Kumar, 2015; Pinget, Bocquet and Mothe, 2015	➤ SMEs do not have widely-accepted indicators or measuring criteria to evaluate the innovation outputs or the strategy outcomes efficiently. However, prior literature gives a clue that researchers could design them in both sustainability and innovation perspectives.	Specialized innovation-sustainability tools and techniques should be designed to be more practical by considering SMEs' real situation. The researcher should focus on not only indicators but also self-reported feedback.	How to measure the outcomes of IDS strategies and how to evaluate whether these actions are effective in meeting their sustainability objectives? (Sub-Q4)
-----------------------------------	--	---	--	---	--

### 3 Research methodology

In this chapter, the research paradigm, research strategy, data collection and data analysis method were identified and discussed in-depth. A methodology flow can be seen below. Then the content related to the pilot study, ethical considerations and research quality were discussed and presented.

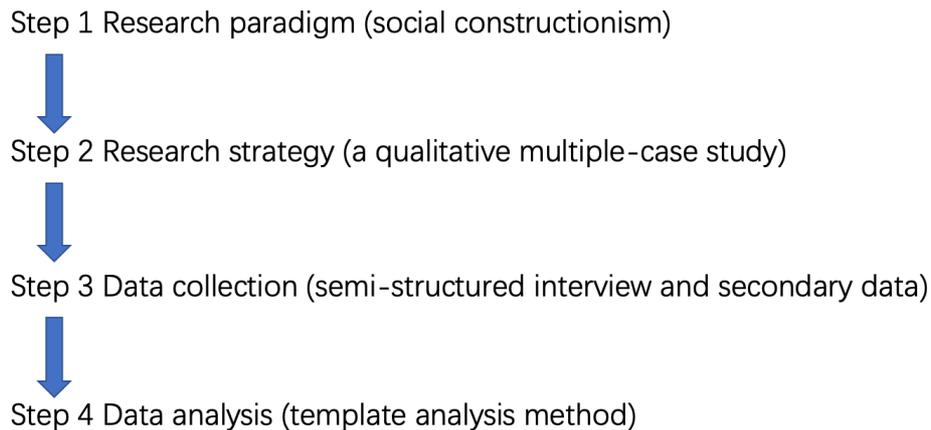


Figure 3-1 Flow of Methodology

#### 3.1 Research Philosophy and Paradigm

The research paradigm, or philosophy, reflects the researcher's basic assumptions in social reality; these assumptions are the basis of the research strategy and link knowledge to the research data collection process (Saunders, Lewis & Thornhill, 2012) because it substantially influences how the researcher undertakes a social study from the way of framing and understanding social phenomena (Neuman, 2010; Saunders, Lewis & Thornhill, 2009). In other words, a research paradigm is a set of fundamental beliefs as to how the world is organized, identified and interpreted by the researcher, then it can potentially serve as a thinking framework that guides the behaviour of the researcher (Jonker & Pennink, 2010; Wahyuni, 2012). Therefore, various research paradigms were discussed in this section in order to enable the researcher to justify the theoretical assumptions and fundamental beliefs underpinning her Ph.D. research.

##### 3.1.1 Research paradigms

For researchers who believe in objective and independent reality, the remarkable difference between positivist and post-positivist is that, those who hold the positivism philosophy believe observing the same factual problem will generate a similar result by applying a similar research process; however, although those who hold post-positivism philosophy believe in generalization and external reality, they

admit that social reality should be understood in a certain context of relevant law, culture or dynamic social structures (Saunders, Lewis & Thornhill, 2012). One of the most common forms of post-positivism is a philosophy called critical realism. A critical realist believes that there is a reality independent of our thinking about it that science can study. However, unlike a positivist (also known as a realist), a post-positivism critical realist recognizes that all observation is fallible, has errors, and all theory is revisable. In other words, the critical realist is critical of our ability to know reality with certainty (Guba & Lincoln, 2005).

Researchers holding interpretivism philosophy think individuals with their own varied backgrounds, assumptions and experiences, on-going construct reality (King & Brooks, 2017; Saunders, Lewis & Thornhill, 2012). Because human perspectives and experiences are subjective, so social reality may change and can have multiple perspectives (Hennink, Hutter & Bailey, 2011; King & Brooks, 2017). Unlike positivist and post-positivist, the researcher is seen not as a potential source of bias but as playing an active role in data generation and data analysis (King & Brooks, 2017).

Instead of questioning ontology and epistemology as the first step, researchers holding pragmatism philosophy start off with the research question to determine their research framework (Guba & Lincoln, 2005; Saunders, Lewis & Thornhill, 2012). For these researchers, objectivist and subjectivist perspectives are not mutually exclusive; what works best to address the research problem should be used.

To explore the philosophy the researcher holds during the research, the researcher questioned her understanding of reality and how people can understand reality in-depth. The researcher found that she holds an interpretivism philosophy because she takes a subjective stance towards both ontology and epistemology. In detail, the researcher believed that reality is socially and produced, and is constructed by individuals with their own varied backgrounds, assumptions and experiences. And because human perspectives and experiences are subjective, reality may change and can have multiple truths. Based on this ontology, the researcher preferred to target the detailed situation and the social reality behind these details in studying the social phenomena, and she values human interpretations in understanding society.

The interpretivism philosophy the researcher held encouraged her to choose an inductive method and conduct qualitative research, and further drove her to interact with participants and see herself not as a potential source of bias but as an active participant in data generation and data analysis.

Table 3.1.1-1 Typical Research Paradigms

Philosophical Dimensions	Positivism (positivists)	Post-positivism (post-positivist)	Interpretivism (constructivism and social constructionism)	Pragmatism (pragmatist)
Ontology (how the world/social reality looks like?)	<ul style="list-style-type: none"> <li>✓ External objective reality.</li> <li>✓ Exist independently of human beliefs.</li> <li>✓ The world and the universe were deterministic; they operated by laws of cause and effect, so they can be predicted and controlled.</li> <li>✓ Absolute truth.</li> </ul>	<ul style="list-style-type: none"> <li>✓ External Objective reality.</li> <li>✓ Exist independently of human beliefs, BUT is interpreted through social conditioning.</li> <li>✓ Single truth</li> </ul>	<ul style="list-style-type: none"> <li>✓ Subjective reality.</li> <li>✓ Reality is socially and produced and is constructed through language, especially in social interaction</li> <li>✓ May change.</li> <li>✓ Multiple truth.</li> <li>✓ Human beings actively create society and culture based on their understandings of society.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Multiple truth.</li> <li>✓ Serve for researcher to best get answer to the question.</li> </ul>
Epistemology (how can we understand the world?)	<ul style="list-style-type: none"> <li>✓ Observable phenomena.</li> <li>✓ Value-free.</li> <li>✓ Law-like/universal generalisations.</li> <li>✓ The goal of science was to uncover the truth.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Observable phenomena.</li> <li>✓ Explain phenomena within contexts.</li> <li>✓ The goal of science is to hold steadfastly to the goal of getting it right about reality, even though we can only approach but never achieve that goal.</li> <li>✓ Imperfect constructions.</li> <li>✓ Multiple measures and observations are important, but each of which may possess different types of error.</li> <li>✓ Use triangulation across the multiple errorful sources to</li> </ul>	<ul style="list-style-type: none"> <li>✓ Subjective meanings and social phenomena.</li> <li>✓ Targeted the detailed situation, the reality behind these details, subjective meanings and motivating actions (why and how).</li> <li>✓ Human interpretations become critically important in understanding history and society.</li> <li>✓ Knowledge is co-produced between researcher and research participants.</li> <li>✓ Knowledge is seen as being historically and culturally located.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Observable phenomena or subjective meanings can provide acceptable knowledge depend on the research question.</li> <li>✓ Integrating different perspectives to help interpret the data.</li> </ul>

		<ul style="list-style-type: none"> <li>✓ try to achieve objectivity and get a better bead on what's happening in reality.</li> <li>✓ Some post-positivists are constructivists who believe that we each construct our view of the world based on our perceptions of it.</li> </ul>		
Axiology (the role of value in research, and our stance as a researcher)	<ul style="list-style-type: none"> <li>✓ Researcher is independent of the data</li> <li>✓ Maintains an objective stance</li> <li>✓ Scientists are responsible for putting aside their biases and beliefs.</li> </ul>	<ul style="list-style-type: none"> <li>✓ The researcher is inherently biased by their world views, cultural experiences and so on.</li> <li>✓ We are all biased and all of our observations are affected (theory-laden).</li> </ul>	<ul style="list-style-type: none"> <li>✓ Researcher is part of the research.</li> <li>✓ Subjective</li> <li>✓ Prefer to interact with participants</li> <li>✓ Value of participants and researcher influence research methods.</li> <li>✓ The researcher is seen not as a potential source of bias but as playing an active role in data generation and data analysis.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Both objective and subjective points of view</li> </ul>
Research Methodology (a domain or map behind research process, including the specific and practical methods we can use)	<ul style="list-style-type: none"> <li>✓ Quantitative (statistical tests)</li> </ul>	<ul style="list-style-type: none"> <li>✓ Quantitative or qualitative (nomothetic approach)</li> </ul>	<ul style="list-style-type: none"> <li>✓ Qualitative, provide rich descriptions of social constructs</li> </ul>	<ul style="list-style-type: none"> <li>✓ Quantitative and qualitative (mixed or multi-methods)</li> </ul>

*Note: This table is clustered and summarised according to Crotty (2003); Guba & Lincoln, (2005); Hughes & Sharrock (1997); King & Brooks (2017); Neuman, (2010); Saunders, Lewis & Thornhill, (2009); Saunders, Lewis & Thornhill, (2012); Wahyuni, (2012).*

### 3.1.2 Constructivism and Social Constructionism

Citing Crotty (2003, p.42), constructionism/constructivism 'is the view that all knowledge, therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context.' For instance, money, nation, language and self-identity are socially constructed, because these truths and meanings' existence are dependent on our acceptance of their reality, if we had lived in a different society, different area or different time period, these 'realities', even in relation to the same phenomenon, may be constructed in different ways or never have existed (Gray, 2013). Therefore, for researchers in this type, knowledge could best be captured through a constructivism epistemology with ontological groundings in process and movement. Because the researcher believe the knowledge and recognition should be gathered from personal or other individuals' experience, and these recognitions are construed and negotiated by individuals all the time, therefore, the researcher tends to have a subjective belief (Burrell & Morgan, 2006) and a subjective epistemological paradigm (Saunders, Lewis & Thornhill, 2012).

However, there are two typical constructivist epistemological perspectives: social constructivism and social constructionism. The distinction of constructivism and constructivist is explained in Schwandt (1994) and Crotty (2003). In detail, social constructivism is a constructionist/constructivist position that understands meanings in the context of individuals but generally is not concerned with an emancipatory or critical agenda (Crotty, 2003). Social constructionism on the contrary believes that understandings which will be gathered from people may generate from their collective experience (Crotty, 2003). In other words, while social constructivism focuses on an individual's learning that takes place because of his or her interactions in a group, social constructionism focuses on the artefacts that are created through the social interactions of a group.

A social constructionism epistemological perspective was chosen and reflected in this research. For instance, because the researcher believed that understandings may generate from people' collective experience and their social interactions, the targeted research participants were targeted and selected intentionally. In detail, this research targeted both employees, managers and owners who aware, participate or even make decisions about their company's innovation and sustainability practices to better understand CSMEs' IDS practices and the motives and influencing factors behind them. And these targeted participants were Chinese who share similar cultural, historical and political realities. In addition, the researcher noticed that although she generated knowledge individually, but the participants very probably generated meanings collectively.

### 3.1.3 Scientific reasoning skills-Inductive and deductive approach

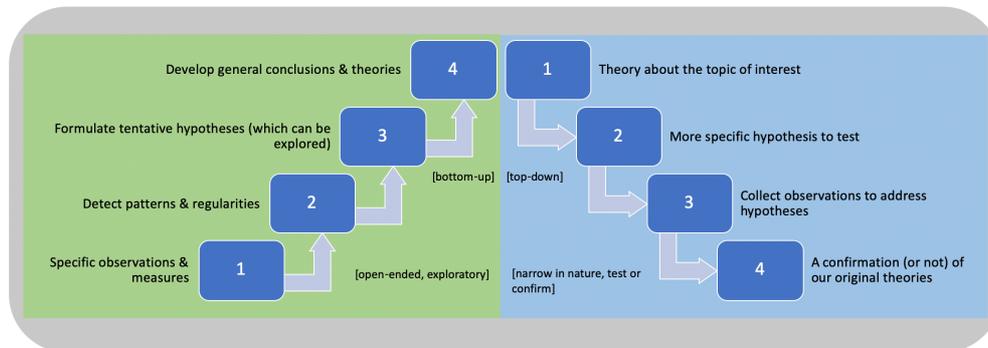


Figure 3.1.3-1 Scientific reasoning skills-Inductive and deductive approach

The broad methods of reasoning include the deductive and inductive approaches. The figure above compares and summarises the main differences between these two reasoning approaches. In practice, the deductive approach uses frameworks from the literature to analyse text and code themes (Bradley, Curry & Devers, 2007; Burnard et al., 2008). ‘The framework, often referred to as a start list (Miles & Huberman, 1994), is applied in the analysis in anticipation that certain core concepts are in the data (Bradley et al., 2007; Thomas, 2006)’ (Azungah, 2018, p. 391). The findings of a deductive approach arise from testing specific hypotheses (Schüssler, Rülting & Wittneben, 2014), such as a prior expectation or model (Thomas, 2006). Thus, a deductive approach limits researchers’ ability to learn from their data.

The inductive approach, on the other hand, is exploratory and open-ended; it focuses on developing general conclusions and theories from specific observations. ‘although the findings are influenced by the evaluation objectives or questions outlined by the researcher, the findings arise directly from the analysis of the raw data’ (Thomas, 2006, p.239). In inductive analysis, the researcher usually goes through the raw data line by line thoroughly and assigns codes to paragraphs or segments of texts that are relevant to the research questions (Bradley et al., 2007; Curry, Nembhard & Bradley, 2009; Thomas, 2006) in order to derive concepts and themes (Thomas, 2006). It requires moving back and forth between data analysis (and the literature, if the grounded theory was not employed) to make meaning out of emerging concepts (Neeley & Dumas, 2016; Azungah, 2018). Thus, according to Schüssler et al. (2014), an inductive approach was used to capture ‘the most empirically grounded and theoretically interesting factors’ (p.147). However, challenges in conducting inductive analysis were also noticed. For instance, it is hard to decide how many or a few categories should be assigned, evaluate whether the data being grouped is meaningful, and assess whether the analysis is explicit and consistent (Bryman, 2016; Flick, 2014; O’Reilly et al., 2012).

Given the nature of the researcher and the research questions, the inductive approach was chosen as a broad reasoning method. And the inductive analysis skill was employed in data analysis. In detail, the researcher identified units and developed categories based on raw data collected, and the findings arise from raw data analysis, and the (in)consistency between data and prior literature. The detailed analysis process and steps were presented and discussed in Section 3.4.2.

### **3.2 Research strategy-qualitative multiple case study**

#### **3.2.1 Conduct qualitative research by using case study method**

Research strategy explains how the researcher plans to answer his/her research question (Saunders et al., 2012). It considers the researcher's philosophy and then provides a clue for the optional data collecting and analysis methods (Saunders et al., 2012). According to Yin (2009), the most general classifications of research strategy are History, Survey, Case Study, Grounded Theory, Experiment and Archival Research. Saunders et al. (2012) removed History but added Ethnography, Action Research, and Narrative Inquiry as commonly used research strategies.

In this research, the research purpose and questions were the starting points to develop the research design, because, according to Saunders et al. (2009) and Yin (2012), they could provide important clues about the substance that a researcher is aiming to address. Given the nature of the researcher and the research questions, a social constructionism epistemological perspective (Crotty, 2003) was chosen, followed by adapting the qualitative case study method (Yin, 2009) as the research strategy for this study. Maxwell (2013, p. 30) explained that 'a major strength of qualitative research is in getting at the processes that led to the outcomes, processes that experimental and survey research are often poor at identifying'. With qualitative methods, the researcher was able to probe in-depth for explanations about how IDS practices are adopted and the reasons for doing so from the perspectives of people who had experienced the phenomena. In particular, using the qualitative case study method allowed the researcher to explore the research question in a real social environment (Woodside, 2010; Yin, 2012), with the expectation to explain the theory rather than test it (Eisenhardt & Graebner, 2007; Saunders et al., 2012). It answers 'why' and 'how' and focuses on contemporary events and emerging phenomena (Saunders et al., 2012), which helped the researcher to understand CSMEs' IDS process and motives better. In particular, Yin (2009) argued that there are two case study strategies based upon the number of cases: a single case study and a multi-case study; and a multi-case study was conducted in this research.

### 3.2.2 Benefits and limits to use multiple case study

There were two main reasons for choosing a multi-case study as the research strategy for this study. First, the case study strategy contributes to a detailed understanding of the research context and the research process being experienced (Eisenhardt & Graebner, 2007). And compared to utilising a single case study, a multi-case study enables comparisons between the observed practices, it helps the researcher to obtain a more comprehensive understanding of these practices (Saunders et al., 2012). For this research, employing a qualitative multi-case study strategy helped the researcher to collect more contextualised information and to gain a comprehensive understanding of the IDS of Chinese SMEs. Second, a qualitative multi-case study helps the researcher explore the existing theory, challenging it and developing a new search area by discovering new and rich insights (Azungah, 2018; Saunders et al., 2012).

A research method consists of a set of specific procedures, tools and techniques to gather and analyse data (Wahyuni, 2012). Multi-case study as a practical method has some limits. First, a multi-case study normally requires multiple sources of primary and secondary data (Saunders et al., 2012), which is challenging and time-consuming. Yin (1994) defined a case study as empirical enquiry; the researcher who conducts a case study should not only investigate a contemporary phenomenon within its real-life context but also use multiple sources of evidence—for instance, collecting data from different units of analysis, cases and contexts. Saunders et al. (2012) support Yin's opinion that a multi-case study normally requires multiple sources of primary and secondary data, and more than one data collection technique is used during the process. They also emphasised that, although qualitative analysis procedures have been designed, a multi-case study still requires the researcher to collect both qualitative and quantitative data (Saunders et al., 2012). The researchers, who employed multiple or mixed-method(s) to analyse the collected data, also used a multiple case study design and stated that multi-sites should be involved and studied, such as Wahyuni (2012). It can be seen clearly that a multi-case research method has been used in different research methodologies and by researchers who held different paradigms. However, it was certain that a multi-case study usually involves a wide range of relevant data for or from the case organizations to help the researcher triangulate data and answer the research questions. Therefore, for the researcher, the investigation time was increased, and more managerial capabilities were demanded. Second, a multi-case study may be influenced by various cognitive and normative biases of the researcher (Rosenbusch et al., 2011). However, this limitation is unavoidable.

### 3.3 Data collection method

As a researcher adapting the social constructionism paradigm, interviews and observations will be used during the research to collect qualitative data, whilst secondary data research will be conducted as a supportive method.

#### 3.3.1 Non-probability Sampling and Selection Criteria

Unlike positivist research that uses frequencies and statistical generalisation to relate its findings to a larger population, an interpretive case study focuses on analytical generalisation to develop and extend theory; therefore, the selection process should be driven by the research question as it provides the characteristics of the cases to be studied (Wahyuni, 2012). In this research, to specifically pick information-rich cases and answer the research questions being asked, non-probability sampling was used (Bloor & Wood, 2006), and sample selection criteria were designed accordingly.

The non-probability sampling has advantages such as lower cost and is suitable for in-depth qualitative research in which the focus is often to understand complex social phenomena (Bloor & Wood, 2006). However, some disadvantages were noticed. First, non-probability sampling, or purposive sampling, can hardly be used to infer from the sample to the general population (Lucas, 2014b; Small, 2009); therefore, if one is interested only in specific case studies, this sampling is used. To overcome this limit, the case background and the research questions related to new theories have to be detailed (Bloor & Wood, 2006). Second, gaining approval from targeted firms to join as participants in a case study research can be a challenging task for the researcher; however, this can be overcome by obtaining a studied subject via a referral system, in other words, by using snowballing nor networking method (Wahyuni, 2012). Bryman (2012) also suggests that if the researcher selects a sample purposefully, it should follow by using the snowballing technique to obtain studied subjects.

##### 3.3.1.1 Rational of the Sample Location

Especially in China, how to attain SMEs' IDS has become a matter of urgency for forward-thinking SMEs, the government and academics (Blowfield & Murray, 2008). In detail, since the early 1980s, Chinese SMEs have been a significant engine of China's economic transition. For example, according to He, Zhang, Mol, Wang and Lu (2014), Chinese SMEs together are responsible for 58.5% of the national GDP and nearly 80% of the job opportunities in cities and towns. Particularly in the industry sector, the latest statistics from the National Bureau of Statistics of China (2016) present that, by the end of 2015, there were 373,515 numbers of SMEs in China; these SMEs account for 97.48% of the overall numbers of industrial enterprises, and contribute to 62.01% of the overall industrial revenue from the principal business.

Therefore, SMEs' sustainability practices and performance are crucially important for the country and society, especially in the industry sector. However, in the current context of the Chinese economy, the increased labour costs and decreased export force Chinese industrial SMEs to enhance their innovative capabilities to survive (Xin & Bao, 2013), and these emerging but persistent challenges are widely believed as being suffered by Chinese industrial SMEs in the on-going period of economic transformation. Thus, using innovation to insecure the SMEs' long-term survival and sustainability became common sense. This was supported by the fact that, after encouraging years about corporate sustainability and national sustainable development, the new Five-Year Plan (FYP) released by the Chinese central authority in 2015 emphasises innovation as the top priority and main driven force for China's future development over the next five years (Xinhua, 2015, November 9th). And these two key themes were prioritized again in China's 14th FYP (2021-2025) (Cooper, 2021, April 1st).

Although focusing on the IDS in the context of Chinese industrial SMEs is valuable and required, there are few quantitative corporate sustainability or innovation researches, which focus on the Yangtze River Delta and Zhujiang Delta that lies the most developed industrial SMEs in China (Jiang & Wong, 2016). Thus, outlying CSMEs have been under-researched, and in-depth interpretive opinions related to underdeveloped areas such as central China, which focus on theory exploration instead of theory testing, are required.

Another reason the researcher decided to narrow her sample location to the central zone of China is that it has several unique characteristics in innovation and sustainable development from economic, social, geographical, innovation culture and capacity, and regulation perspectives. These resources, dynamic capabilities and institutional forces make the central area of China an appropriate region to be targeted for the researcher's Ph.D. project, to identify potential cases and collect rich, deep and detailed data for industrial SMEs' IDS study.

From a quantitative view, the land resource, population, economy and innovation statistics indicated a similar opinion that the development of the central area of China plays an important role and can have great influences on the sustainable development of the whole country. In detail, these six central provinces have a total area of about 1.03 million square kilometres, accounting for about 10.7% of the total land area of the country (China Statistical Yearbook 2016, 2016). In 2015, the total population at the year-end of the central area of China was 364.89 million, accounting for about 26.54% of the country's total population (China Statistical Yearbook 2016, 2016). And by the end of 2015, the central areas' regional GDP reached 14.70 trillion yuan, covering around 21.44% of the GDP of China (China Statistical Yearbook 2016, 2016). In addition, by the end of the same year, the central six provinces had made 214 thousand patent applications, maintained an average 19.4% growth of application numbers for the last two years, and the

proportion increased to 13.4% of the overall patent applications of the country (Lei, 2016, December 28th), the proportion and growth rate show that the innovative culture and capabilities of this particular area are remarkably improved. Therefore, exploring how SMEs in this area have achieved their corporate sustainability through innovation, and have contributed to the sustainable development of this area and then the sustainable development of China, has great value and the potential to fill in the research gaps and offer empirical evidence.

From a qualitative aspect, the unique geographical advantage of the central area further supports that Central China is important for the whole country and worth to be studied. In detail, the six central provinces link East and West, North and South of China (National Development and Reform Commission [2016] 2664, 2016), so the SMEs located there can get easy access to other regions' resources and markets (e.g. funds and technology from Zhejiang and Shanghai, cheap labour and potential market from Guangxi and Gansu, etc.). In addition, compared to other regions of China, the central region is rich in land, water, mineral, and human resources. Thus, it has acted as the country's food production base, the energy raw material base and the modern equipment manufacturing base in a long term (National Development and Reform Commission [2016] 2664, 2016). On the other hand, because the central region's development is heavily dependent on resources, labour and investment, the region and its local companies have suffered and will suffer more obstacles and challenges to obtain innovation-driven sustainable development in the economic transformation period (National Development and Reform Commission [2016] 2664, 2016). Finally, by witnessing the economic, environmental and social issues that occurred since the reform and opening up, the central government expects Central China could explore a new sustainable development framework to obtain both economic, social and environmental benefits (National Development and Reform Commission [2016] 2664, 2016). According to institution theory, 'To Promote the Rise of Central China "13th Five-Year" Plan' (National Development and Reform Commission [2016] 2664, 2016) and relevant national and local innovation and sustainability regulations and policies might force or encourage SMEs, which are located in or aimed at the central area of China, to pursuit IDS reactively or proactively.

More specifically, the researcher planned to target Henan and Jiangxi Provinces. Henan is the third largest province of China in population, and in the six provinces of Central China, Henan's GDP and population are both ranked first (China Statistical Yearbook 2016, 2016). Jiangxi province does not have outstanding GDP or population; however, it achieved a 9.1% increase in regional GDP (China Statistical Yearbook 2016, 2016). This indicator is continuously over 9.0% in the last five years (China Statistical Yearbook 2016, 2016), showing that Jiangxi has become the fastest-growing province in the central area of China. In conclusion, studying SMEs located in Henan and Jiangxi provinces allowed the researcher not only to compare firms'

IDS practices within a similar social context but also to enhance the transferability and credibility of her study.

### 3.3.1.2 Sample selection criteria

The following criteria were used to identify the appropriate cases for the research.

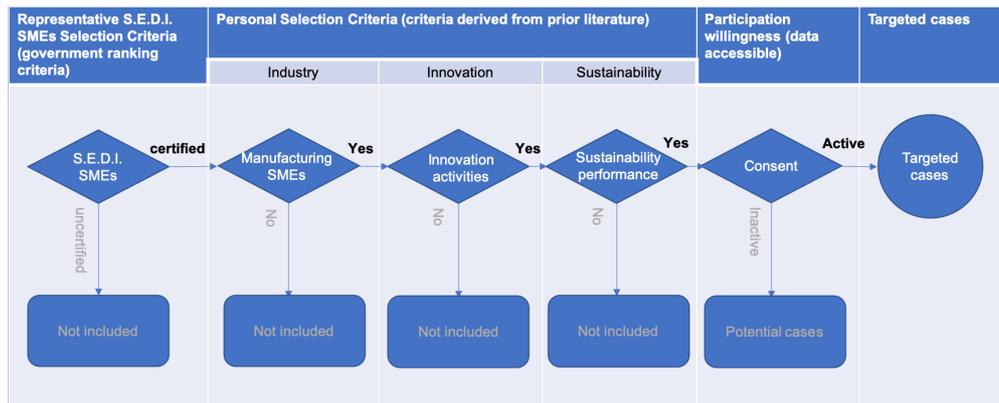


Figure 3.3.1.2-1 Sample selection flow

First, the case has to match the selection criteria which has been used for ranking Excellent Jiangxi or Henan Small and Medium-sized Enterprises (SMEs) that position themselves in a specialised, excellent, differentiated and innovative way (‘专、精、特、新’) (S.E.D.I.), and has to be selected and verified by the Commission of Industry and Information Technology of Jiangxi/Henan Province as the representative enterprise on their official website and relevant database.

In detail, in order to implement the Guiding Opinions of the Ministry of Industry and Information Technology on Promoting the Development of S.E.D.I. SMEs (Ministry of Industry and Information Technology [2013]264), and to better encourage the establishment, innovation, transformation, as well as quality and efficiency upgrades of SMEs (Commission of Industry and Information Technology of Jiangxi Province [2016]288; Commission of Industry and Information Technology of Henan Province [2017]20), more and more provinces in China have annually selected and updated a group of representative S.E.D.I. SMEs. The enterprises on that S.E.D.I. list represent the most innovative and sustainable SMEs in this province, and normally are the ‘hidden champions’ of the niche markets of their industries (Commission of Industry and Information Technology of Jiangxi Province [2016]288; Commission of Industry and Information Technology of Henan Province [2017]20).

The representative value of these enterprises can be verified by analysing the S.E.D.I. selection criteria and process. For instance, the Commission of Industry and

Information Technology of Jiangxi Province (2016) mentioned several basic and optional requirements, shown in Table 3.3.1.2-1. Based on these requirements, an specific internet system will automatically mark each SME based on their supportive documents, including Corporate Annual Report in the past two years, clearance certificates, patent certificates and other relevant certificates or copies which are submitted as evidence for application (Commission of Industry and Information Technology of Jiangxi Province [2016]288). The requirements for Henan S.E.D.I. can also be seen in Table 3.3.1.2-2.

SMEs certified by this S.E.D.I. programme will enjoy several particular supports from the government; thus, selecting cases based on this selection criteria can allow a comparative multi-case study in the same political context. Furthermore, the requirements to apply for S.E.D.I. SMEs can help the researcher select particular Jiangxi and Henan SMEs who have achieved innovation as well as economic, environmental and social sustainability over two years.

Table 3.3.1.2-1 Requirements for Jiangxi S.E.D.I. SMEs

Basic Requirements	Optional Requirements
<p>1. The SME is registered and established in Jiangxi province; has an independent corporate legal person status; and matches the <i>Notice on Printing and Distributing the Stipulation Standards for Small and Medium-sized Enterprises</i> (Ministry of Industry and Information Technology [2011]300). <b>[SME]</b></p> <p>2. The SME has an annual revenue over 10 million yuan, has been solidly profitable in the past two years, the SME's revenue and taxation has to maintain at least 10% growth (except for the policy of exempt enterprises). <b>[SME &amp; Economic sustainability]</b></p> <p>3. The SME's manager or owner has a strategic vision and innovative thinking; he or she can respond to the market demand effectively; he or she is good at using modern operation and management theory; he or she focuses on create and sustain corporate culture. <b>[SME&amp; Innovation &amp; Corporate sustainability in management and culture]</b></p> <p>4. The SME has to certified by Quality Management System (QMS) such as ISO9001; the SME has good bank credit, tax credit and social credit. <b>[SME&amp; TBL sustainability]</b></p>	<p>1. A strategic-oriented SME who is actively embedded in the supply chain, or in the leading position of a specific market.</p> <p>2. The SME focuses on niche markets, service and design concepts and high-end, high-quality products; has a high revenue and production per employee, is eco-efficiency; has high equipment coverage beyond the average level of the industry.</p> <p>3. The SME conducts a differentiation strategy, and have unique technology, design or resources.</p> <p>4. Conducting technological, administrative or business model innovation; SME with independent intellectual property rights; SME has at least one patent/software copyrights or has a specific technology which has been certified at the provincial level, SME has built a R &amp; D centre, or the SME's innovation and application capacities are beyond the industry average.</p>

Note: This table is translated and derived from Commission of Industry and Information Technology of Jiangxi Province [2016]288.

Table 3.3.1.2-2 Requirements for Henan S.E.D.I. SMEs

Basic Requirements	Ranking Classifications	(forbidden/removal/elimination/exclusion?) Rules
<p>1. The SME is registered and established in Henan province; has an independent corporate legal person status; and matches the <i>Notice on Printing and Distributing the Stipulation Standards for Small and Medium-sized Enterprises</i> (Ministry of Industry and Information Technology [2011]300). <b>[SME]</b></p>	<p>1. Leading enterprises in the industry: The annual operating income is more than 100 million yuan, and the annual profit is more than 10 million yuan. <b>[Economic sustainability]</b></p> <p>2. High-growth enterprises: The annual operating income is more than 50 million yuan. The average growth rate of operating income in the past two years is above 15%. The average growth rate of</p>	<p>Enterprises that have one of the following conditions are not included in the screening:</p> <p>1. Provide false information during the application process;</p> <p>2. In the past three years, there have been major safety and quality accidents;</p>

<p>2. The SME matches the <u>national industrial policy</u>: it is an enterprise encouraged by the <i>Catalogue of Industrial Structure Adjustment Guidance (2011)</i>. [SME &amp; Corporate sustainability in industrial development trend]</p> <p>3. The tax payment and business operation of the SME are obeying the law. [SME &amp; Corporate sustainability in regulation obey]</p> <p>4. In the past two years, the SME's <u>R&amp;D investment</u> accounted for more than 3% of sales revenue, has good basic conditions for innovation, has good <u>talent team</u>. [SME &amp; Innovation]</p>	<p><u>total profit</u> in the past two years is above 20%. For those enterprises that fill the gaps in the industrial layout of our province, have <u>core patent technologies</u> in key industries, and have good <u>product market prospects</u>, the <u>development scale and financial indicators</u> may not meet the above conditions temporarily. When voluntary declaration, the above conditions may be appropriately relaxed. [Economic sustainability &amp; Innovation]</p> <p>3. Entrepreneurial and innovative enterprises: <u>continuous business</u> for more than three years, with <u>independent brands</u>, "four new" enterprises have significant characteristics, <u>annual operating income</u> of more than 5 million yuan, the <u>average growth rate of operating income and total profit</u> in the past two years is more than 20%. For those enterprises that fill the gaps in the industrial layout of our province, have <u>core patent technologies</u> in key industries, and have <u>good product market prospects</u>, the <u>development scale and financial indicators</u> may not meet the above conditions temporarily. When voluntary declaration, the above conditions may be appropriately relaxed. [Economic sustainability &amp; Corporate sustainability in business continuity &amp; Innovation]</p>	<p>3. In the past three years, he has been punished by the taxation department for tax evasion, tax evasion and other violations of laws and regulations;</p> <p>4. The company is included in the list of people who have been untrustworthy;</p> <p>5. Environmental protection is not up to standard or environmental pollution accidents have occurred in the past three years.</p>
---	---	---

Note: This table is translated and derived from the Commission of Industry and Information Technology of Henan Province [2017]20: Announcement of the Henan Provincial Industry and Information Technology Commission Office on Establishing a Quality Small and Medium Enterprise Database in Henan Province.

Second, manufacturing SMEs in each specific sector or niche market were selected from the ranking lists (including Jiangxi S.E.D.I. SMEs, 2014, 2015, 2016; Henan S.E.D.I. SMEs, 2017). Before and during the period while the researcher contacted and gained approval from potential participants, Jiangxi had done three years annually S.E.D.I. selection, and had marked that every SME in these Top S.E.D.I. lists could remain awarded and enjoy benefits for three years before re-application (Jiangxi S.E.D.I. SMEs, 2014, 2015, 2016). And the new list had yet to be released. Thus, in Jiangxi, the ranking lists between 2014 and 2016 were targeted. However, in the same period, Henan only published a brand-new database with 532 S.E.D.I. SMEs on 4th September 2017 which matches their updated selection criteria (Henan S.E.D.I. SMEs, 2017). Thus, in Henan, the 2017 list was targeted.

Producers with identical production systems but functioning in different production chains and business environments may experience very different obstacles in the implementation of the innovation (Hansen et al., 2002). Thus, these manufacturing SMEs' background information, such as their position in the supply chain, their industry structure and their competition environment, were collected and reviewed. The researcher double-checked whether the SME had conducted innovation (i.e. product, process, marketing or organizational innovation) in this period, instead of relying solely on the S.E.D.I. SMEs lists that the governments announced.

Table 3.3.1.2-3 Different types of innovation of SMEs

Innovation Types	Definitions and Practices
Product Innovation	Product innovations are improvements of existing products or creation of completely new products, which requires support from technology (Mbizi et al. 2013).
Process Innovation	<ul style="list-style-type: none"> <li>➤ Process innovation focus on re-engineering the production process or delivery methods (Gunday et al., 2011). For example, utilise new techniques, invest in equipment and apply new software (Gunday et al., 2011).</li> <li>➤ Administrative activities like improved training or process mapping can also be utilised as process innovation to save unnecessary waste (Francis &amp; Bessant, 2005).</li> </ul>
Marketing innovation	<p>Marketing innovation is under the Integrated Marketing and incorporates all SME marketing activities (O'Dwyer et al., 2009), such as</p> <ul style="list-style-type: none"> <li>➤ New marketing activities under the 4Ps Marketing (Gunday et al., 2011).</li> <li>➤ Unique or new images through adopting better promotional media, also known as positional innovation (Francis &amp; Bessant, 2005).</li> <li>➤ New activities in product enhancement, alternative distribution channels, enter into new markets, the Marketing Mix (O'Dwyer et al., 2009).</li> </ul>
Organizational innovation/ Strategic	<ul style="list-style-type: none"> <li>➤ Continually revolutionizing the basic administrative strategy to ensure organizational success was defined as strategic or organizational innovation (Gunday et al., 2011).</li> </ul>

innovation/  
innovation in  
paradigm

- An inner-direct organizational innovation targets organizational culture, organizational power structure, administrative systems (Baregheh et al., 2009; Francis & Bessant, 2005).
- An out-direct innovation, or innovation in business models, are acquisitions, mergers, joint ventures or alliances (Demirbas et al., 2011; Luo & Chang, 2011).

Third, the author critically utilized existing sustainability reporting tools and criteria that are derived from relevant empirical studies of innovation or sustainability to identify the potential targeted cases. According to Bos-Brouwers (2010), the long-term focus and transformative nature of sustainable innovations can be found within SMEs that include more sustainability themes, have more sustainable innovation activities and create per activity more sustainable value. In other words, SMEs who consider more sustainability themes, conduct more sustainable innovations and create sustainable value more productively could offer representative samples of long-term and drastic sustainability innovations; therefore, in this study, in order to enrich representative cases and empirical evidence, only SMEs that can match at least one of each pillar of the corporate sustainability (the following sustainability themes) were considered as potential targeted cases. In other words, only the SME seeking a TBL was targeted.

Table 3.3.1.2-4 TBL sustainability criteria

<b>Economic Sustainability</b>	<b>Environmental Sustainability</b>	<b>Social Responsibility</b>
Revenue Ownership	Waste (e.g. separation, recycling)	Employee: Training Satisfaction Health and safety Conditions of employment
	Environmental policy	Ethics and transparency activities: Code of conduct 'Useful products' (e.g. no disposables) Product quality Stakeholder communication and reporting Ethical decision making Selection of suppliers on good conduct
	Energy (e.g. energy saving, green energy)	Social: Sponsoring Active in trade association Reputation Stakeholder engagement
	Materials (e.g. reduce, recycled resources, environmentally alternatives)	
	Emissions to air, water and soil	
	Transport	
	Biodiversity	
Miscellaneous		

With brief examples of activities on each sustainability theme, the sustainability performance of each SME was measured by the researcher according to their published corporate annual report, newsletters or other information on their official website. A snowball strategy was also used by asking government participants and the interviewed SMEs to recommend potential target SMEs which have played demonstration and leading roles in achieving innovation-driven sustainability in the targeted region and industry.

The selection criteria combined both third-party ranking criteria and criteria derived from prior literature. It ensured that the CSMEs who had launched remarkable innovation-driven sustainable practices in the last two years were targeted. Participation willingness (both for individuals and institutions) was asked through telephone, E-mail or face-to-face conversations in advance. Those who responded positively were selected. Finally, 12 SMEs were interviewed (*Table 3.3.1.2-5*).

Table 3.3.1-2-5 Brief background of the 12 cases in manufacturing (and service)

Case	Institution Code	Year		Main business	Representative innovation and patent (national or international)	registered capital (Yuan)	Size (person)	Location
		founded	reformed					
1	ED	1998		Ramie textile	Bacterial degumming technology	70 million	300-399	Fenyi, Jiangxi
2	HD	1970	2009	Electrical machinery and equipment manufacturing	Explosion-proof 3-phase HV asynchronous motor technology	56 million	100-199	Fenyi, Jiangxi
				Integrated environmental protection (equipment manufacturing and) service	MBR (Membrane Biological Reactor) integrated sewage treatment equipment	30 million	50-99	Fenyi, Jiangxi
3	SY	2011		Integrated environmental protection (equipment manufacturing and) service	MBR (Membrane Biological Reactor) integrated sewage treatment equipment	30 million	50-99	Fenyi, Jiangxi
4	JDZG	2006		Forging and metallurgical products manufacturing	A technology for manufacturing cold-rolled reinforcing non- quenched steel for automobile	31.16 million	50-99	Fenyi, Jiangxi
5	QDQ	1957	2003	Drive axle, gearbox and their components manufacturing	Wet multiple brake, ASR Technology	10 million	100-199	Fenyi, Jiangxi
6	GY	2008		rubber reclamation and regeneration	Clean integrated technology in manufacturing high strength recycled adhesive	22.67 million	50-99	Fenyi, Jiangxi
7	RN	2007		Power equipment R&D, leasing and technical consulting	Intelligent monitoring, diagnosis, and management IoT system	20 million	<50	Zhengzhou, Henan
8	HJ-WZ	2004	2011	Artificial diamond powder manufacturing and processing	Application, equipment and technology of processing artificial diamond	50 million	50-99	Zhengzhou, Henan
			2011	Micron diamond wire and equipment manufacturing		340 million	<50	Zhengzhou, Henan
9	XDF	1994		Integrated services for special construction equipment, such as bridge erecting machine	Electromechanical integration in heavy industry machinery	104.22 million	200-299	Zhengzhou, Henan
10	SNT	2010		R&D and production of tumor pathology diagnostic instruments and reagents	Fluorescence in situ hybridization	55 million	100-199	Zhengzhou, Henan
11	HC	2007		semi-conduct refrigerator components manufacturing	Semiconductor refrigerator technology	30 million	<50	Changge, Henan
12	ZX	2008		R&D and integrated service for livestock ecosystem, such as Pig farm smart equipment production and combined operation	Livestock ecosystem, environmental protecting smart pig farm system	84 million	500-599	Xinyu, Jiangxi

### 3.3.2 Primary data

#### 3.3.2.1 *Semi-structured Interviews*

Parker (2003) said qualitative researchers should get involved in communication with the practitioners to understand the current state of real-world practices better, and interviews are a practical method to enable this communication between researchers and practitioners. In detail, the interviewees share their perspectives, stories and experience regarding particular social phenomena being observed by the interviewer (Parker, 2003). Boeije (2010) held a similar opinion that participants, who are practitioners in their field, will pass on their knowledge to the researcher through the conversations held during the interview process. Therefore, interviews have always been selected to collect empirical data on the relevant practice (Wahyuni, 2012).

For this study, in particular, semi-structured interviews have been adopted instead of structured or unstructured interviews.

The reason was that a structured interview would be difficult to enable the researcher to probe in-depth details of the relatively new phenomena (Easterby-Smith & Lowe, 2002) or enable the interviewee to talk freely about any unexpected topic raised during the interview (Rubin & Rubin, 2005; Saunders et al., 2009), because it only offers the merit of using a list of predetermined themes and questions (Saunders et al., 2009). In contrast, the unstructured interview is complex and hard to control; interviewees may talk freely about their experiences without focusing on the research topic (Bryman, 2001). Thus, semi-structured interviews are more appropriate, particularly for a relatively inexperienced qualitative researcher.

In addition, the semi-structured interview is an appropriate format for case study research because in-depth questions cannot be answered briefly. The researcher would need to ask for examples or more explanation on the answer given to gain a deep understanding of the questions and issues (Saunders et al., 2009).

There were a number of experienced SMEs in Jiangxi Province, and the researcher had multiple contacts with some of these top managers in person in this specific region. They were highly interested in the research's progress and willing to participate. Therefore, access to investigate these SMEs had been easy to acquire. Besides that, SMEs in other central-zone provinces, such as Henan, were targeted if they launched innovation-driven sustainable practices within three years based on information from their official website and annual reports. In practice, the researcher contacted her external supervisor, a professor in Henan, and was introduced to the director of the Henan Intelligence HR department. They offered suggestions about the innovative and sustainable SMEs in this region and gave the researcher the contact information she needed. Permission had been asked for

through telephone, E-mail or face-to-face, and those organizations that responded positively were selected as cases. The researcher always contacted top managers of the targeted SMEs and got their promises and support before any actual research was taken.

The researcher developed an interview guide which covered the key questions; after that, in particular interviews, the researcher was allowed to omit some questions, give specific organizational contexts that are related to the research topic, change the order of the questions depending on the conversations flow as well as ask participants additional questions to collect their detailed personal perspective on specific organizational behaviours further, same as what Saunder et al., (2012) had recommended in conducting the semi-structured interview.

Interviews were conducted in Chinese to ensure participants could fully understand interview questions and discuss them in great detail. Each interview was recorded as audio. After each interview, full information was transcribed into a word-processed format in Chinese. As follows, each interview transcript was sent to the participant for confirmation. After that, these confirmed transcripts were analysed, and the codes and representative quotes were translated into English. These activities make sure that the confirmed data are fair representations of the interviews.

In addition, to aid probing, participate observation was used as a supportive method during the interview (Quinlan, 2011). For example, additional information about the participants' performance (e.g. communication, body language, expressions etc.) and the interview environment was written down (as the research field notes) during and after each interview.

In sum, for primary data, individual semi-structured interviews were employed by using a carefully designed interview guide (Saunder et al., 2012). And to aid probing, participate observation was used as a supportive method during the interview (Quinlan, 2011).

### *3.3.2.2 Targeted Participants of the Semi-structured Interview*

Involving different levels of participants in the researcher's multiple case studies should be more rational to enrich the data as well as to make the data triangulation not only include the primary and secondary data but also include the information from different stakeholders. In detail, three stakeholders were chosen to be involved in this research.

First, owners and managers of the SMEs. This is due to the fact that individuals who hold managerial positions are more familiar with the strategic and operational decisions made with regard to innovation in their firms (Pfirrmann, 1994; Prajogo & McDermott, 2014). Also, these people are the ones who assess the business

environment surrounding their firms; indeed, scholars have argued that the business environment is filtered through the managers' perceptions rather than discerned through objective measurement (Freel, 2005; Pfirrmann, 1994).

Second, the employees of the company. This research aimed to achieve a comprehensive understanding of the innovation-driven sustainability of the Chinese SMEs; thus, the implementation of the innovation-driven sustainability should be an important adoption stage requiring more in-depth exploration (Hansen et al., 2002). To achieve that, not only managers, but also employees, were interviewed. This is because the employees' involvement in idea generation and innovation implementation was noticed by some scholars (e.g. Bos-Brouwers, 2010; Ki-Hoon, 2009; Kumar, 2015). After managers were interviewed from different departments, a snowballing method was used to help the researcher decide who could be the potential participants of this research.

Third, the policy maker and practitioners. The researcher targeted the innovation-driven sustainability of the Chinese SMEs; thus, the SMEs' relationships and performances related to social and environmental sustainability were explored. According to the institutional theory, the government always acts as an important observer, participant or even a commentator in this area (Brammer, Jackson & Matten, 2012). Furthermore, interviewing government employees allows the researcher to understand the specific policies for innovation and sustainable development for Jiangxi and Henan SMEs. This information was also achieved by reading the rules, regulations and other secondary data. In addition, the researcher should not only allow the participants from SMEs to talk about their personal understanding and feelings about the relationship between government regulations or supports and the SMEs' innovation-driven sustainability. Government employees might offer a similar or different view based on their experience and their positions, and it is worth exploring their opinions and the reasons behind those views.

In conclusion, the targeted semi-structured interview participants not only included managers and organizational owners, which were mainly specified by prior research, but also involved company employees and policy makers and practitioners to triangulate data and answer the research questions.

The interviewees' details and occupations at the time of the research participation can be seen in Appendix C.

### *3.3.2.3 Interview checklists development*

As a researcher who holds interpretive research philosophy, 'responsive interviewing' (Rubin & Rubin, 2005, p.20) was insisted on during the process of interviews. In detail, the researcher kept flexibility and adaptability in study design and questioning to facilitate the emergence of new information or adapt to an unexpected direction (Rubin & Rubin, 2005). In practice, the interview questions are structured to include open-ended main questions, follow-up questions and probes (Rubin & Rubin, 2005).

First, initially, the main questions were carefully developed based on the research objectives and sub-questions (Saunders et al., 2009) to cover the whole research problem (Rubin & Rubin, 2005). For example, 'What is your understanding of the relationship between innovation and corporate sustainability?' was designed to explore 'sub question 1: How CSME managers interpretive the concept of IDS and IDS strategies from the industry leaders' perspectives?'. And 'Are there different types of IDS strategies? Could you give me some examples? What types of IDS strategy are commonly used by your firm in last three years, and why?' were designed to explore 'objective2: Identify preferable IDS strategies adopted by CSMEs.' and 'sub question 2: What are the preferred sustainability strategies adopted by CSMEs?' Furthermore, relevant articles, online publications and industrial research were explored to gather ideas about relevant practices to be included in the interview questions (Rubin & Rubin, 2005). For instance, according to the literature review, the process of innovation-driven sustainability was under-researched; thus, to allow interviewees to talk freely in order to facilitate new information and better understand what happened in the real business world, instead of separate main questions for each stage of the process first, the researcher used descriptive questions such as 'How did it happen? Could you give me the detailed milestones that you can remember?' to encourage her interviewees to describe the true stories and their actual experiences with examples and avoid potential and unintentional implies from the interviewer.

Second, probes were asked to ensure that unclear answers were explained and questions were fully answered (Rubin & Rubin, 2005). This can further help manage the conversation to ensure the researcher gets the depth, detail, and evidence that she needs without unduly interrupting the flow of what the interviewee is saying and elicits the information she needs to put together the pieces of a puzzle from separate interviews (Rubin & Rubin, 2005). In practice, interviewees tend to speak in abbreviated ways, assuming the researcher knows what they mean. To keep the discussion flowing and clarify some discussion points, the researcher assumed she did not know what they meant and asked for more details and examples of what had been said to force or encourage interviewees to say more. For example, any time the researcher paraphrases what she thinks her interviewee said, she needs to be sure; thus, she asks them if her paraphrase accurately captures what they meant. For that

purpose, probes such as 'It sounds like you are saying ..... Is that a fair summary?' and 'When you say, [term or phrase], what are you actually doing?' were asked. In addition, interviewees gave abbreviated summaries of things, and the researcher found that she needed to ask for more details. In that circumstance, probes like 'any example?' were asked.

Third, follow-up questions were developed to explore the particular themes, concepts, ideas and unexpected thoughts provided by the interviewees (Rubin & Rubin, 2005). Asking well-developed follow-up questions ensures that missing or implied information is tracked down, that contradictions are addressed if not resolved, that alternative explanations are examined, and that the researcher learns about all sides of an argument and different perspectives on an event (Rubin & Rubin, 2005). For example, an interviewee mentioned Chinese traditional culture and philosophy as a fundamental basis of the IDS awareness and motivations, which is a new and interesting idea that requires in-depth descriptions and examples; therefore, the follow-up question 'what specific Chinese traditional culture and philosophy were reflected significantly?' was asked. Additionally, to get interviewees' feelings, thoughts and rationale, the main questions, such as 'what is the most impressive successful IDS strategy of your company that you can remember?', usually follow brief questions, like 'why does that stand out in your memory?' Furthermore, a few follow-up questions were asked to clarify interviewees' views by testing their ideas a counterfactual, which means to bring up an opposite situation. For instance, when a manager said he thought 'making environmental contributions' was the most important motivation for him to formulate and practice IDS strategies 'because.....', the researcher wants to know what he would think about another motivation mentioned most frequently and repeatedly. Thus, she asked questions, like 'Last week I interviewed a manager from a different SME who said he thought gaining economic benefits is the top priority and the most important motivation of IDS .....What do you think about that idea?' Another example of using follow-up questions is learning if their responses differ in different circumstances. For instance, 'At what stage did you become involved with this strategy' is followed by 'What have you done since then, and, from your point of view, how have your roles changed over time?'

Once the initial questions had been determined, the researcher's supervision team, who has considerable experience conducting semi-structured interviews, were asked to check them to ensure no wording questions might lead to predetermined answers (Rubin & Rubin, 2005). Considering the language used during the interviews, the researcher's principal supervisor confirmed any design and updates of the English version, and the Chinese version's design and updates were confirmed by both the principal and external supervisors, who are bilingual researchers. In addition, referring to Rubin and Rubin's (2005) advice, mock interviews were conducted with the researcher's friends in the academy and industry to fine-tune the research

design and make the questions clearer. A pilot study was also conducted and followed which the interview questions were modified.

The details of Interview Guides (Example questions for managers), Interview Guides (Example questions for employees) and Interview Guides (Example questions for government) can be seen in Appendix B.

#### *3.3.2.4 Research memos*

During and after interviews, the researcher wrote three types of memos (Schatzman & Strauss, 1973). First, the observational memos were used to describe the situation during interviews. For instance, whether the researcher found the person to be open or guarded, how well the researcher felt they understood the aims of the research, or aspects of their physical presentation (King & Brooks, 2017). Second, methodological memos were used to record any issue or concern regarding the methods used. Third, the theoretical memos were used to identify what themes and findings emerged from the interview process. For instance, the methodical process of applying and modifying the researcher's template was documented so as to record her emerging thinking through the analysis process. The researcher kept a record of how the template was developed and numbered and dated each version of her template. The researcher also made some accompanying notes to document any major changes she has made to successive versions of her template and explain her reasons for these changes.

The researcher found that this technic can help her follow the discussions, ask unexpected probes and follow-up questions, better understand and remember the talking environments and interview situation, and do reflective thinking after each interview about improving her research skills and amending interview questions and orders.

#### *3.3.2.5 The number of interview participants in organization research*

Jack and Anderson (2002, p.473) state that "small-scale, qualitative studies in the interpretivist tradition do not allow for generalizability; their strength lies in their capacity to provide insights, rich details and thick descriptions." Therefore, only where the purpose is to establish if something is possible or to provide a rich account, a single qualitative interview or case is argued to be appropriate (Becker, 2012; Patton, 2015). Otherwise, a larger number is likely to be needed to establish commonalities or allow comparison (Barker & Edwards, 2012; Crouch & McKenzie, 2006). However, too large will make in-depth analysis difficult (Onwuegbuzie & Leech, 2005). Therefore, a balance should be reached which is able to show that the data collected are of sufficient depth to provide salient information in relation to the research purpose and of sufficient breath to allow coverage within the responses

(Saunders & Townsend, 2016); and the number of interviews cannot be resolved definitively until data collection is under way (Safman & Sobal, 2004).

Table 3.3.2.5-1 Different opinions about the appropriate number of interview participants in organization research

Opinions		Authors
The number should be increased until saturation is reached.	Data collection should be continue until saturation or informal redundancy is reached.	Lincoln and Guba, 1985
	As an empirically justified guidance, to reach saturation, 15-30 participants should be interviewed.	Onwuegbuzie and Leech, 2005
	Where saturation is not reached, it means only that the phenomenon has yet to be fully explored rather than that the findings are invalid.	O'Reilly and Parker, 2013
The number depends on what can be achieved within available time and resources.		Patton, 2015
The number depend on the researcher's epistemological and ontological assumptions, and the participants' characteristics.		Saunders & Townsend, 2016

In this Ph.D. research, the prior experts' opinions were considered, and the primary data collection had not been stopped until similar answers occurred repeatedly. Twelve cases and fifty-four interviews have been conducted.

### 3.3.3 Secondary data

The secondary data can present and reflect the historical, cultural, economic and political backgrounds of the selected cases in the targeted research area. Furthermore, secondary data collected from the different cases can be used by the researcher to supplement the primary research.

For these Chinese cases, secondary data were mainly collected from online newsletters, released or printed government documents, companies' official websites, official WeChat and Weibo Accounts, patent application forms, R&D memos and application forms, companies' product leaflets and annual reports, as well as the companies' posters in their exhibition rooms. The researcher was keen to ensure that no data was misrepresented after translation.

### 3.3.4 Data Triangulation

According to Patton (2002), collecting data from multiple sources can collect more comprehensive information relevant to the research; it also enables the researcher to cross-check their consistency to enhance the robustness of findings. In this research, two triangulations were conducted.

First, the data triangulation between primary data was conducted. This was conducted by comparing the collected information from different stakeholders, including managers, employees and the government. For example, when talking about the influencing factors in IDS strategy formulation, the managers and the government directors both mentioned government supports. In particular, the managers tend to believe fund-related supports are the most effective, which encourages not only their strategy formulation but also implementation. However, the government prefers to talk beyond funds and emphasise the 'supportive ecosystem' they are trying to establish. Training sessions from governments and the third-parties, such as large and experienced companies and universities, were highly praised. Thus, although they both mentioned training and training programmes organised and even funded by the government, they have different ideas about whether this influencing element is important, significant and positive in the real business world. A data triangulation between primary data from these different interviewees within the company, between companies, and between companies and the government can not only verify what has happened exactly in this particular region but can also rich the story and develop more critical and comprehensive findings.

Second, the data triangulation between primary data and secondary data was conducted. For instance, when talking about the detailed IDS project milestone that the interviewee can remember, they prefer to describe these milestones in a timeline which can help them to organise their expression and the researcher to follow their story easier; however, few years and participants which were mentioned in these interviews were inaccurate after compared to the secondary data such as the companies' product leaflets or their patent documents. Besides, when mentioning about outcomes of a specific IDS project, the interviewees tend to mention the most significant and direct outcomes which remain in their memory, but secondary data such as the R&D project approval report prefer to cover all potential outcomes even how this project can influence the local habitants after ten or twenty years later. The data triangulation between primary and secondary data enables the researcher to achieve credibility (known as internal validity in quantitative research) and confirmability (known as objectivity in quantitative research).

### **3.4 Data Analysis**

Unlike quantitative numerical data, qualitative data usually are text-based (Saunders, Lewis & Thornhill, 2012). Three data analysis activities were utilized in this research, including storage and transcribe in data preparation, and a followed template analysis.

#### **3.4.1 Data Preparation**

##### *3.4.1.1 Storage*

All data have been stored securely. First, electronic copies of the data, such as interview recordings and transcripts, are stored securely on a personal password protected laptop, and are backed up to the researcher's password-protected account on the work PC. Second, any data in hard copy version is securely stored in a locked cupboard, in the researcher's home. As part of the data analysis process, hard copies of the anonymized transcripts (raw data) were given to the Ph.D. supervision team to review and cross-check coding, but all hard copies have been returned to the researcher and will not remain in possession of the supervisors. The video recordings will be deleted after the completion of the researcher's Ph.D. However, the text transcripts will be held for a period of up to 5 years in case data obtained through this research might be reproduced and published by the researcher.

##### *3.4.1.2 Transcribe*

Fifty-four top and senior managers, employees and government directors were interviewed. All interviews were recorded in Chinese. Full information was transcribed into a word-processed format in Chinese, and each anonymized word-processed transcript was compared to the voice recording by the researcher herself, and was cross checked by the researcher's friends who have a secretary degree or working experience. Each individual interview transcript was then sent to the respective research participant, whereby they can have the opportunity to add any data, or to remove or amend data on the transcript. The participants were asked to confirm whether they agreed that it was a fair representation of the interview.

#### **3.4.2 Template analysis**

Qualitative researchers have developed a wide range of ways to manage and analyse textual data in a manner that focuses on human experience and meaning-making (Bernard, Wutich & Ryan, 2017; Gibbs, 2002; King & Brooks, 2017).

Sometimes these methods are incorporated into a wider methodology such as grounded theory, interpretative phenomenological analysis (IPA), content analysis, schema analysis, narrative analysis, discourse analysis, qualitative comparative analysis, cultural domain analysis and so on (Bernard, Wutich & Ryan, 2017; King &

Brooks, 2017). However, on other occasions, researchers have proposed generic forms of thematic analysis that do not come with particular methodological commitments and can be used from a range of epistemological positions (Brooks, McCluskey, Turley & King, 2015; King & Brooks, 2017; Waring & Wainwright, 2008).

To decide which method is more appropriate, the researcher reviewed the philosophical and methodology stance of the current research, which has been displayed at the beginning of this Chapter, and the research objectives and the sub questions in the Introduction and Literature Review. Template analysis is in line with the philosophical position of the researcher. Also, it fits in nicely with the choice of the semi-structured interview approach (King & Horrocks, 2012). In addition, among these qualitative approaches with a strong emphasis on research in real-world settings, template analysis is a well-recognised one that seeks to balance flexibility and structure in how it handles textual data (Brooks, McCluskey, Turley & King, 2015; King & Brooks, 2017). Therefore, template analysis was employed to analyse the data collected through interviews.

Template analysis is classified as a style of thematic analysis (King & Brooks, 2017); central to this technique is the development of a template by using codes and themes. According to King and Brooks (2017), “coding is the process undertaken by researchers through which they identify themes in accounts and attach labels (codes) to index them” (p.28). The template analysis allows having a predetermined list of codes, named priori codes, usually generated from the literature (King & Horrocks, 2012). Brooks, McCluskey, Turley and King (2012) recommended that analysts develop a priori themes that are related to the research question and may capture more key messages when analysing the data, rather than developing a set of coding levels in advance. During the analysis stage, the list of codes or themes may need to be amended or modified as the analyst examines the collected data (Gibbs, 2007). This process continues until all transcribed data are coded and analysed, resulting in the final template. However, Brooks, McCluskey, Turley and King (2015) pointed out that a ‘final’ version of the template is only achieved when new knowledge or codes cannot be generated from additional data.

Because template analysis offers a structured approach to data coding, it lends itself well to providing an audit trail which allows for a clear demonstration and explanation of how the researcher developed her themes and arrived at the final thematic structure (King & Brooks, 2017). Thus, template analysis help establish the quality of the researcher’s final analysis by recounting and explaining the decisions throughout the coding process.

To fulfil the research objectives, the thematic analysis and the explanatory analysis were deployed, and a framework approach was employed to allow the researcher to compare and contrast data between cases and the key themes that emerged (Smith & Firth, 2011). In practice, the researcher created tables in Excel to cluster, compare

and contrast. Distinctive patterns and themes within a data set were identified (Given, 2008; King & Brooks, 2017), and differences that emerged in empirical data were analysed (Boeije, 2002). In addition, the researcher tried to interpret the concepts and themes by understanding the relations between activities as well as explaining how factors influence these relations (Smith & Firth, 2011). According to Smith and Firth (2011), this approach allows the researcher to test and explain existing theories, as well as explore emerging relationships amongst the key themes that emerged. However, there are some limitations. First, this approach requires more time to manage the data than conducting a single analytical method (Bernard, Wutich & Ryan, 2017); in this process, the researcher might focus more on managing data rather than offering exact interpretations. Second, the researcher's thoughts might be limited to each participant's perspective, forgetting to analyse them comprehensively under the case or industry background (Smith & Firth, 2011). In practice, the researcher experienced both challenges but made substantial efforts to reduce these research biases during the whole research journey.

#### *3.4.2.1 Stages in Template Analysis*

The primary data of this study consisted of 54 interviews conducted using three different interview methods: internet video calls, survey and text interviews, and face-to-face meetings (see Appendix C). Throughout the interviewing process, no questions were asked that any participant declined to answer. In fact, all participants completed the interview process (and no participants asked to withdraw) and approved the use of interview content in the presented research. Because of the adoption of different interview formats, the author had to ensure a structured and rigorous process so that the most important data were highlighted and used to draw conclusions.

Miles and Huberman (1994) proposed a structured data analysis process that includes three processes: data reduction, data display, and conclusions drawing and verifying. Boeije (2010), however, focusing on the coding method used for qualitative analysis, claimed three steps, including open coding, axial coding, and selective coding. To the best of the researcher's knowledge, King and Brooks (2017) suggested the most detailed and comprehensive template analysis process, where they summarised seven stages, including familiarising the researcher's data set, preliminary coding, clustering, producing an initial template, applying and developing the template, finalising interpretation, and doing quality checks throughout the analysis process. King and Brooks' (2017) model was used to guide the template analysis process, and Figure 3.4.2.1-1 clearly illustrates the main procedural steps.

Although prior studies have recommended typical steps for conducting template analysis and coding qualitative data, many researchers have mentioned that there is no fixed rule for analysing qualitative data as this will vary from study to study

(Henn, Weinstein & Foard, 2009). Also, analysis often involves cycling back and forth between stages, and this is especially true in template analysis due to its highly iterative nature (King & Brooks, 2017).

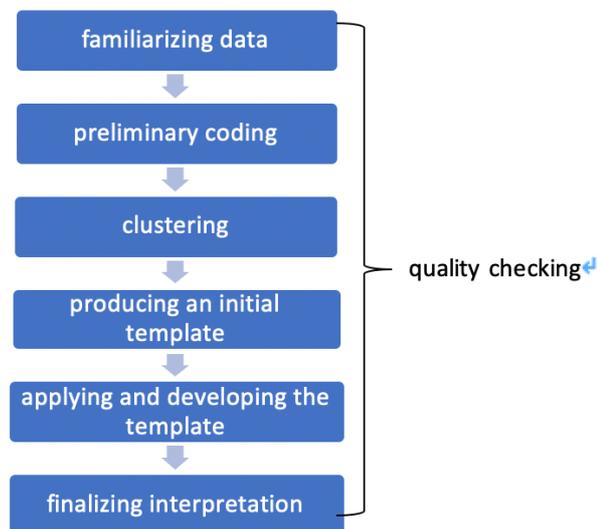


Figure 3.4.2.1-1 Typical stages in Template Analysis (cited by King & Brooks, 2017)

- Stage1 Familiarizing the researcher's data set

By converting recorded material to text, the researcher had already begun the process of engagement with and reflection on her data set (King & Brooks, 2017). Because the study was relatively large, the researcher took King and Brooks' (2017) suggestion, selected a subset of accounts with which to start, became familiar with the data, then moved on to the next stages, and did not familiarise the main data until the whole pilot study was completed. In detail, a pilot case containing nine interviewees, including managers and employees, was analysed, representing a cross-section of the researcher's whole data set (King & Brooks, 2017).

- Stage2 Preliminary coding

In this stage, the researcher went through her data and started to identify anything in the text that seemed likely to be relevant to her research topic, objectives, and sub questions (Bernard, Wutich & Ryan, 2017; King & Brooks, 2017). In practice, the researcher used the same word format, spacing, and layout for all transcripts of the pilot study; after that, the researcher read every transcript paragraph by paragraph and then line by line. The researcher highlighted the interesting sentences, double-lined the key words and typed her comments next to the highlighted sections using the Microsoft Word comments function. The researcher also set her word processor's line numbering function as 'continuous' throughout the document, so when she used both page-numbering and line-numbering to help index her coding, she did them accurately and effectively, as King and Brooks (2017) suggested.

As follows, 'soft' *a priori* themes were used to represent potential aspects of the data the researcher is interested in. *A priori* themes are defined as 'themes identified in advance of coding' (King & Brooks, 2017, p. 29), and the reason to use 'soft' *a priori* themes instead 'hard' ones is that the nature of this research is interpretive and qualitative; therefore, the researcher avoids using well-developed and precisely defined phase (King & Brooks, 2017). In practice, each of these themes was carefully selected only if it could form an area of concern within the objectives of this research and be related to the main research questions.

After that, the researcher used her preliminary comments to start defining potential sub themes. To identify sub themes, the researcher had to make choices about what to include, what to leave out and how to interpret the textual data (King & Brooks, 2017). Furthermore, sub themes should be relatively distinct in helping the researcher and other readers make sense of her interpretation of data (King & Brooks, 2017). In practice, representative sub themes were identified across at least two participant accounts (named recurrent codes); however, the researcher also identified a few sub themes that recur within a single transcript (named distinctive codes) because she thought these emerging sub themes were worth to be presented and interpreted. In other words, the reasoning (strong argument with evidence and example) and the strength (importance) of the primary data were emphasised by the researcher during coding. For example, only Interviewee 49 from Case 12 literately emphasised and quoted Chinese Confucius' culture and Confucianism, such as '*Kindness, Justice, Etiquette, Wisdom and Faith*', in interpreting CS from his perspective. However, by considering the detailed examples given, considering the observed fact that how Confucian education continuously influenced interviewees' knowledge and organizational behaviour during primary and secondary data collection, and considering the importance that this was a finding that can better help the researcher and the potential readers to understand the content and motivations of CSMEs' sustainability, the researcher chose to present and interpret this emerging sub-theme.

#### ● Stage3 Clustering

After identifying sub themes in the researcher's textual data, she began to organise them into meaningful clusters. Instead of assuming *a priori* themes will necessarily be top-level themes heading up a particular cluster (King & Brooks, 2017), the researcher thought about how the themes and sub themes relate to each other within and between clusters. The researcher moved her themes around the emerging structure until she found a place for them where they seemed to work best. In practice, the researcher typed and regrouped emerging themes on Microsoft Word and indexed the transcript and line number(s) where her evidence to support each potential theme can be found. For instance, themes such as 'capable to produce new product', 'manufacturing responsible products', although they were related to products, these themes can be better grouped into 'financial

sustainability-profitable business performance' and 'social sustainability-social expectations and responsibilities' of the 'definitions of corporate sustainability'.

- Stage4 Producing an initial template

Since most people generally had very similar views on the research topic, although a few perspectives were very diverse; therefore, the researcher confidently began developing the initial template after preliminary coding and clustering on five transcripts.

- Stage5 Applying and developing the template

After the researcher defined an initial coding template, she continued to keep an open mind when approaching new data to develop the template further and was ready to modify the template as necessary, as King and Brooks (2017) recommended. For instance, top-level or main themes were elaborated in some detail through the use of sub-themes.

However, the researcher had to balance the depth of coding in the analysis process and the organization and interpretation of data in the final stages of the research (King & Brooks, 2017); thus, the researcher limited the level of coding within four, by inserting new themes, redefining exiting themes, merging themes, changing the scope of themes (moving from a top level to a lower level in the coding structure), or even removing some themes if they seem redundant, as King and Brooks (2017) suggested. The researcher also used **parallel coding** during template development to modify the template. In other words, the researcher coded the same segment of text with two or more distinct themes (King & Brooks, 2017) if necessary. For example, 'reduce environmental fine' can be linked to 'government's environmental protection policy' or themed as 'financial motives'. However, when certain themes very often ended up being used in parallel, the researcher asked herself whether these themes were actually related to different aspects of the research topic, or might usefully be merged into a single one (King & Brooks, 2017). For example, the researcher decided to identify "catering to government policy" as a thematic cluster that grouped the descriptive codes of 'reduce environmental fine' and 'get government innovation bonus' because these two emerging aspects are linked to the institutional motives to design IDS strategy.

While the emphasis in template analysis is on the hierarchical origination of the themes, coding templates also highlight lateral relationships across thematic clusters (King & Brooks, 2017). Themes which permeate several thematic clusters are known as integrative themes (King & Brooks, 2017). They may not even be addressed by participants, but can be seen on a careful reading of the data to pervade participants' discussion of the research topic (King & Brooks, 2017). For example, when analysing different influencing factors in crafting and implementing IDS strategies, the researcher found that the IDS process was a theme that clearly connected other identified top-level themes. In the researcher's final template, she

therefore used 'what are the typical process of IDS for CSMEs?' as an integrative theme indicating the typical process of IDS practice in all her participants' accounts. Similarly, not so many participants directly addressed 'the definition of IDS' in detail; however, by analysing relevant themes such as 'definition of corporate sustainability' and 'the relationship between corporate sustainability and innovation', an integrative theme with rich data was achieved.

The 'final version' template was developed for the researcher to interpret her data, and it became a useful guide when it came to structuring and writing up her research findings. However, according to King (2004) and Brooks, McCluskey, Turley and King (2015), there is no "ideal" template or a "final" version of the template in the research project. This is because continued engagement with the data always has the potential to identify further potential refinements in coding. For example, about 'influencing factors to implement IDS', so many participants mentioned 'training' and offered detailed stories. Suppose the researcher wants to develop the template in further depth, she can always summarise and synthesise emerging but relatively irrelevant themes such as 'different forms and types of training', 'training stakeholders', 'influencing factors of training', 'training outcomes', 'motives to attend different types of training', 'motives to organise different forms of training' and so on.

On a pragmatic level, when all interview transcripts have been read through several times and coded (King, 2004), when the template has provided a rich and comprehensive representation of the researcher's data and met her research needs, including time and other available resources (Bernard, Wutich & Ryan, 2017; King & Brooks, 2017), the researcher needs to decide on the "final" template. For this study, the "final" template was confirmed when the researcher observed that no emerging theme was picked up after further reading each interview transcript twice more, and no data clearly relevant to the researcher's research question was left uncoded. In addition, the interview transcripts and codes were reviewed by another experienced researcher, who is not only the researcher's principal supervisor but also an associate professor at the Newcastle Business School; it helped to determine whether the "final" template was "good enough" and comprehensive.

- Stage6 Finalizing interpretation

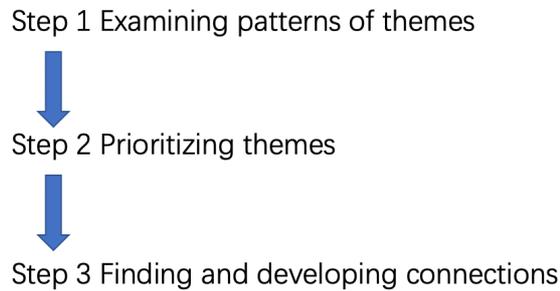


Figure 3.4.2.1-2 Final interpretation steps

**Finalizing interpretation** is a stage to develop the researcher’s final interpretation of her coded data and present an account of this.

Themes were listed to go through as the first step; Microsoft Excel was used to enable the researcher to review them systematically and comprehensively. This method alerted the researcher to aspects of the data warranting further examination (Bernard, Wutich & Ryan, 2017; King & Brooks, 2017). This is important because the frequency and pattern of theme distribution do not on their own reveal anything meaningful; instead, they merely highlight areas potentially worthy of closer examination for the researcher to consider (King & Brooks, 2017; Saunder et al., 2012).

Next, the researcher prioritised the themes she needed to examine in the greatest depth. This step is essential because, in any scale of qualitative study, researchers tend to generate more themes than they can talk about; even some themes and some clusters of themes are likely to provide much less insight into the topic the researcher is investigating than others (King & Brooks, 2017). In this research, to decide which themes need to be concentrated on, the researcher focused on her research objectives and sub questions throughout the analysis process and selected themes by evaluating the relevance of patterns or relationships to her research question. As a result, themes such as ‘definition of CS’ and ‘the relationship between innovation and CS’ were mainly concerned, compared to ‘types of innovation’. In addition, themes that contradicted common assumptions or conclusions in the existing literature or that distinguished between groups of participants in a meaningful way were prioritised over others. As a result, for instance, although ‘practicing core values of organizational culture’ had never been mentioned as a key driving force for SMEs to achieve IDS in previous articles, the researcher selected this distinctive theme to present and interpret. However, there are always some themes that were evidently important to participants but did not seem to relate to the identified aims of the study. Whether or not such a theme assists in understanding

any of the central themes then became the assessment to evaluate whether the researcher should include this theme in interpretation, as King and Brooks (2017) suggested.

Beyond looking for patterns and the relative importance of themes in addressing the research questions, the researcher explored how themes related to each other in addition to the hierarchical relationships within clusters by targeting integrative themes, a theme type that was emphasised by King and Brooks (2017). For example, the researcher also finalised her interpretation by analysing and interpreting the integrative theme 'what are the typical process of IDS for CSMs?'; and this process was taken further by developing a model of the phenomenon the researcher was investigating, as other scholars suggested (e.g. Shaw & Wainwright, 2007; McCluskey et al., 2011).

#### *3.4.2.2 On-going developed template*

This research had a large number of participants and cases; therefore, it was impractical to wait until all data had undergone preliminary analysis before proceeding with template formulation (King & Brooks, 2017).

A pilot study not only tests the feasibility of the planned research design (Arain, Campbell, Cooper & Lancaster, 2010) but also allow the researcher to focus on those areas of greatest relevance to her research, avoiding potentially lengthy repetitious and redundant coding (King & Brooks, 2017). In practice, after having analysed nine interview transcripts of the pilot study, the researcher used the steps in section 3.4 to analyse the rest interview transcripts of the main study to identify new codes and themes that could expand or amend the existing pilot case template.

Analysing the pilot study interviews without waiting until all interviews were completed also enabled the author to modify the interview questions for further analysis (Silverman, 2013). For example, the distinctive code 'Chinese traditional culture' generated a new interview follow-up question to understand the details and importance of this theme among other participants.

The on-going developed template was inputted to Microsoft Excel (main study) from Microsoft Word (pilot study); thus, the researcher was easier to view, group, regroup and compare coded data within cases and cross cases (horizontal exploration), within clusters and between clusters (vertical comparison).

### 3.5 Pilot study

The researcher conducted a pilot study to enhance the high quality of this research. In detail, one SME located in Jiangxi was interviewed before the main study, followed by a completed research process. The aim was to test the feasibility of the planned research design (Arain, Campbell, Cooper & Lancaster, 2010). Following that, the researcher modified the interview questions, the data collection and the data analysis methods for the main study.

#### 3.5.1 Rational of Pilot Case Location-Jiangxi Province, China

The Jiangxi government has treated industry development as the most important task over the years. One piece of evidence is that the investment in fixed-assets of the industrial sector reached 891.83 billion yuan by the end of 2015, accounting for 52.48% of the total fixed-assets investment (China Statistical Yearbook 2016, 2016). As a result, the value-added by this particular sector contributed to 41.37% total Gross Regional Product of Jiangxi.

In the industrial sector of Jiangxi, SMEs have played a remarkable role. Based on data mentioned in the Report on Industry and Information Technology Development of Jiangxi Province For 2015 (2015), by the end of 2014, there were 8097 numbers of SMEs above the designated size in Jiangxi Province, accounting for 98.0% of the overall numbers of industrial enterprises, and contributes to 76.82% of the overall revenue from the principal business.

Besides the industrial SMEs contributing to the largest percentage of Gross Regional Product, this province has several additional characteristics. First, similar to other areas in the central zone of China, Jiangxi has a historical foundation of agriculture. Manufacturers related to food or textile industries could get more convenient access to natural materials and resources (the Report on Industry and Information Technology Development of Jiangxi Province For 2015, 2015). Second, because employment opportunities and salaries in the nearby Jiangsu and Zhejiang are greater than in the local area, 5.61 million of 8.42 million migrant workers are worked in other provinces (China Statistical Yearbook 2016, 2016). Then along comes the fact that cheap or skilled labours are hard to be attracted or remained by the local manufacturing SMEs (Sun & Quan, 2016). Third, Jiangxi is the second top-ranking province that is environmentally friendly; to maintain regional sustainable development, the relevant regulation made by national and provincial authorities force local governments to sacrifice economic development for environmental protection (Xinhua, 2016, August 8th). Thus, while the domestic government and enterprises are exploring the “ecological Jiangxi” model for economic improvement, TBL sustainability has to be achieved simultaneously.

Following the development in innovation theories, manufacturing SMEs in Jiangxi begin to modify their survival or competitive strategies through innovation. In addition, in order to encourage green and sustainable development in the economy and increase the employment rate, the authority of Jiangxi Province has been committed to promoting the transformation and innovation of the manufacturing SMEs in recent years in various ways, such as giving financial rewards, constructing industrial parks and organising managerial skills training (the Report on Industry and Information Technology Development of Jiangxi Province For 2015, 2015).

This research selected the company ED from Jiangxi province as the pilot case. Theoretically, the outcomes of the pilot study brought great value and added new insights of SMEs’ sustainability theories from emerging market and economy transition perspectives. In addition, studying IDS of Jiangxi SMEs brought tremendous advantages in practice for Chinese SMEs. In detail, the generalisation of the research was achieved after the researcher gave an in-depth and detailed description of the specific social context and case background. Finally, the findings of this pilot study, along with findings derived from the rest cases, could benefit policymakers such as the Chinese Government, and NGOs. Because the researcher achieved an in-depth understanding of how Jiangxi industrial SMEs obtain a systematic IDS, an innovative and more practical model could be offered, particularly for SMEs located in underdeveloped areas to obtain their sustainability and for other stakeholders who want to engage in this process in the future actively.

### 3.5.2 Rational of pilot case selection—Company ED

Company ED (the pilot case) is a high-tech stock SME and the most famous international brand in the ramie textile manufacturing industry identified by the national authority. Since being founded in 1998 and located in Fenyi County, also known as “the hometown of Chinese linen” and “the most popular manufacturing town for ramie textile in China”, Company ED has developed various innovative technology and organised a complete value chain from planting to marketing. They specialise in producing and exporting hemp, jute, sisal, kendir, linen, ramie fibre, yarn, twine, rope, fabrics, clothing, bedding, arts & crafts etc. Company ED had been chosen for the pilot case study; the profile of the company and the reasons why it had been chosen can be seen as follows.

Table 3.5.2-1 The profile of Company ED

Selection Criteria		Sources	Details
Existing Government Selection Criteria	Basic Requirements	'Specialized, Fined, Peculiar and Innovative' SMEs Lists	-The SME is registered in Jiangxi province; the SME has an independent legal personality, in line with the "small and medium enterprises designated standard" (Ministry of joint ventures [2011]300).

			<p>-The SME has an annual revenue over 10 million yuan, the SME has been solidly profitable for the past two years, the SME's revenue and taxation have to maintain at least 10% growth (except for the policy of exempt enterprises).</p> <p>-The SME's owner and managers have strategic visions and innovative thinking; the management team can response to the market demands effectively; the management team is good at using modern operation and management theory; and the management team continuously focusing on creating and sustaining organizational culture.</p> <p>-The SME is certified by Quality Management System (QMS); the SME has good bank credit, tax credit and reputation.</p>
	<b>Optional Requirements</b>	'Specialized, Fined, Peculiar and Innovative' SMEs Lists	<p>-A strategic-oriented SME who is actively embedded in the supply chain, or in the leading position of a specific market.</p> <p>-The SME has a high revenue and production per employee, is eco-efficiency; has high equipment coverage beyond the average level of the industry.</p> <p>-The SME conducts a differentiation strategy, and have unique technology, design or resources.</p> <p>-Conducting technological, administrative or business model innovation; SME with independent intellectual property rights; SME has at least one patent/software copyrights or has a specific technology which has been certified at the provincial level, SME has built a R &amp; D centre, or the SME's innovation and application capacities are beyond the industry average.</p>
<b>Personal Selection Criteria</b>	<b>Innovation</b>	Corporate Annual Reports; Newsletters; Semi-structured Interview Transcripts from prior research (2015); Pre-interviews with the management team (2017).	<p>-Technological Innovation Only this firm owns and applies the unique and advanced biological microbe degumming technology in the textile industry. It also owns and introduce the 'natural plant dye ramie printing technology' to China. Enda owns 19 linen products research and development technology patents.</p> <p>-Product Innovation Incremental product innovation in colours, textile patterns and percentage of linen (blending). Produce environmentally friendly textile products with advanced technology. Produce products to meet the requirements for home intelligent Enda completed and on-going conducting dozens high tech projects with independent intellectual property rights.</p> <p>-Process innovation</p>

			<p>Invest in new advanced textile instruments and diversity active microbe.</p> <p>-Marketing innovation From market focus to customers focus. Use diversity distribution and advertising channels includes attend bedding exhibitions; invest in web-based advertising, held the first linen textiles exhibition.</p> <p>From increase numbers of bedding shops to introduce products through web-based advertising, and selling them in both stores, exhibitions and e-commerce websites.</p> <p>Change positional strategy from produce linen bedding to produce all kinds of textile products that are close skin, healthy and environmentally friendly.</p> <p>Expand target customers from adults to all range of ages customers including babies.</p> <p>-Organizational innovation Change employees' understanding about their relationships with markets and customers.</p> <p>Modify organizational structure to prepare for listing.</p> <p>Hire external experts to design modern enterprise management mechanisms.</p> <p>Expand business model from produce bedding products to produce and export diversity kinds of textiles especially ramie and linen products.</p>
	<b>Sustainability</b>	<b>Economic</b>	<p>Corporate Annual Reports; Newsletters; Semi-structured Interview Transcripts from prior research (2015); Pre-interviews with the management team (2017).</p> <p>-The firm accounts for 90% of linen exports to the South Korea (by 2016). -The annual production of Enda ranking the top five at the national level. -The brand is certificated as the most valuable, national and cultural textile brand since 2010. -The top 100 highest competitive Chinese textile companies (2012-2016); The top 3 highest competitive Chinese Linen companies (2012-2016).</p>
		<b>Environmental</b>	<p>Corporate Annual Reports; Newsletters; Semi-structured Interview Transcripts from prior research (2015); Pre-interviews with the</p> <p>-Energy, material and emission Apply the unique and advanced biological degumming technology: able to conduct an energy saving, pollution-free manufacturing process.</p> <p>-Waste Change positional strategy from produce linen and ramie bedding to produce all kinds of textile products that are skin-friendly breathable, healthy and environmentally friendly.</p>

			management team (2017).	
		<b>Social</b>	Corporate Annual Reports; Newsletters; Semi-structured Interview Transcripts from prior research (2015); Pre-interviews with the management team (2017).	-Ethics and transparency activities 2003 ISO9001-2000 2014 ISO9001-2008 High quality textile products -Social Company mission: "...to be a more ethical SME and take corporate social responsibilities through cooperating with governments and supporting ramie and linen farmers." Strong reputation in producing all kinds of textile products that are skin-friendly breathable, healthy and environmentally friendly. Inherit, spread and renew millennium 'China Grass' Linen Seiko Technology and Chinese traditional aesthetic culture. Since 2016 Constructing ramie and linen textile cultural park with government supports. -Employees Has constructed staff dormitories in order to offer employees convenient and fine accommodation, organized single staff associations, continuously increased wages, organized technical and management trainings.

### 3.6 Ethical Considerations

In relation to ethical issues, the researcher strictly obeyed Northumbria University's ethical policies and procedures. After the researcher acquired ethical approval from the University, organizational and individual informed consent forms were sent to potential participants with detailed explanations on the research topic, objectives, data collection methods and ethical considerations. After the researcher achieved the signed organizational informed consent forms, each potential participant who preferred to be involved in a semi-structured interview was asked to sign an individual informed consent form before the data collection, as Fontana and Frey (2005) suggested.

As the research involved both individual managers and organizations, anonymity and confidentiality were carefully considered at both individual and organizational levels.

#### 3.6.1 For individual

Their personal data must not be disclosed to any third party individual or organization without the consent of participants.

To manage the 'anonymity' of the qualitative data subjects, first, the researcher created two lists to record interview notes. The "index list" contained a unique

reference number next to the names of the participants. The “working list” used the same reference numbers against each set of data collected. By themselves, neither list identified a specific individual. The two lists have been stored separately so the list containing the names has been locked away from the “working” list.

When the interviewees mentioned some sensitive personal information (e.g. real names of colleagues), which can possibly identify the individual participant, the information was made anonymous or removed during the transcribing stage. The researcher proof-read each transcript carefully to ensure that other more subtle but obvious clues to a character, place or institution were not evident. Identifying details that had to be mentioned in the transcript and the Ph.D. thesis were replaced with pseudonyms (e.g. Interviewee 1 or Company ED).

### 3.6.2 For organisation

Organizations also need their anonymity to be protected. In principle, for the highest level of protection, some identifying details like geographical information should not be disclosed in the study. However, the level of anonymity that the researcher could realistically provide was using a fictitious name in the research report. This is because this research was a multiple-case study; some identifying details like the size of the company, the location of the company or the sustainable strategies adopted by the company were important data to analyse the case systemically and objectively.

It is worth noticing that anonymised data obtained through interviews might be reproduced and published in a variety of forms and for a variety of audiences related to the research detailed above (i.e. conferences, peer-reviewed journals, articles etc.). Both individual and company’s rights to confidentiality will be respected. Where participant data will be published, the anonymity of the participants will be maintained.

### 3.6.3 Further consideration

The notion that anonymity should be the default position was challenged by Grinyer (2002). She suggested that in some research contexts, it is possible that participants may be keen for their own voices to be acknowledged, and be happy to have their identities made known alongside their contributions to the research.

In this research, to ensure that participants can control the disclosure of their identities and contributions, the researcher’s contact number and email address were offered in case they have specific considerations and requirements for their identity or confidentiality.

Furthermore, in the research organisation informed consent form, four options of confidential forms were offered:

If confidentiality is required, what form applies?

- No confidentiality required
- Masking of organisation name in research report
- No publication of the research results without specific organizational consent
- Other by agreement as specified by addendum

Because all information was made anonymous and stored securely, it ensured that the collected data completely depended on participants' perspectives rather than followed others' opinions and preferences.

### **3.7 Research Quality**

According to Boeije (2010) and Wahyuni (2012), the degree to which the results can be generalised to a larger population has been the major point of criticism of qualitative research. This might be because the quantitative mainstream insists that "research should rely heavily on reliability and validity to ensure its replicability and generalisability" (Wahyuni, 2012, p77). On the contrary, Parker (2012) stated that qualitative research seeks to produce credible and in-depth knowledge of interpretations on understandings and practices of organisation and management processes; thus, compared to the quantitative approach, it emphasises more on uniqueness and contexts. King and Brooks (2017) argued a similar opinion that knowledge produced in such work does not aim to be universal; instead, it is acknowledged that there are multiple possible interpretations for any phenomenon, and that the position of the researcher as well as the specific social context of the research can influence such interpretations. Thus, King and Brooks (2017) claimed that such an approach should focus on "the multiplicity of the potential perspectives available" (p21). Therefore, unlike quantitative research, which is keen to focus on replicability and generalisability (Parker, 2012), qualitative research has a different mission and should be evaluated by different criteria (Bryman, 2012; Guba & Lincoln, 1989; Kalof, Dan & Dietz, 2008; Parker, 2012; Wahyuni, 2012). And to reflect the specific nature of qualitative research, alternative terms in criteria have been used to evaluate research quality assessed in quantitative research (Wahyuni, 2012). The researcher summarised and synthesised the most common criteria to evaluate a qualitative research's quality, and the practical methods to meet these requirements (*Table 3.7-1*).

Table 3.7-1 The most common measurements to evaluate a qualitative research's quality, and practical methods

Assessment criteria for qualitative research	Similar criteria for quantitative research	Relevant research quality	Method to ensure the quality
Credibility	Internal validity	The accuracy of data to reflect the observed social phenomena.	<ul style="list-style-type: none"> <li>✓ The carefully selection of case organizations.</li> <li>✓ Data triangulation.</li> <li>✓ Method triangulation.</li> <li>✓ Evaluator triangulation.</li> </ul>
Transferability	External validity	The level of applicability into other settings or situations.	<ul style="list-style-type: none"> <li>✓ A rich and thick explanation of research sites and characteristics of case organizations</li> <li>✓ With careful adjustments in the setting</li> </ul>
Dependability	Reliability	The notion of reliability which promotes replicability or repeatability.	<ul style="list-style-type: none"> <li>✓ Record all the changes that occur in a setting and how these affect the way research is being conducted</li> <li>✓ provide the main instruments used to gather empirical data (e.g. the list of interview questions)</li> <li>✓ Make a detailed explanation of the research design and process, which enable future researchers to follow a similar research framework</li> </ul>
Confirmability	Objectivity	The extent to which others can confirm the findings in order to ensure that the results reflect the understandings and experiences from observed participants, rather than the researcher's own preferences.	<ul style="list-style-type: none"> <li>✓ Triangulation methods</li> <li>✓ Research memos</li> <li>✓ Peer assistance to cross check coding</li> </ul>

*Note: This table is summarised and synthesised according to Bernard, Wutich & Ryan, 2017; Bryman, 2012; Guba & Lincoln, 1989; Kalof, Dan & Dietz, 2008; King & Brooks, 2017; Parker, 2012; Saunder et al., 2012; Wahyuni, 2012.*

Credibility, which resembles internal validity, refers to whether the study actually explores the targeted social phenomena and measures what is intended (Wahyuni,

2012). To achieve credibility, the researcher used non-probability sampling, and carefully selected case organizations based on the detailed selection criteria. This was claimed as 'the first practical step toward credibility in case study research' (Wahyuni, 2012, p77). In addition, questions in the interview checklists were designed, pilot-tested and amended to ensure they are relevant to research objectives and can be understood clearly and easily. Furthermore, by conducting the data triangulation methods described and discussed in Section 3.3.4, the research findings' credibility was enhanced (Wahyuni, 2012). For instance, the anonymous transcripts, emerging codes and developed templates were cross-checked by the researcher's supervision team in random, which is an efficient method to ensure no perspective related to this research had been overlooked by the researcher herself.

Transferability, which parallels external validity, deals with whether the research findings from a qualitative study have the possibility of being transferred into other settings or situations (Wahyuni, 2012). As Lincoln and Guba (1985) suggested, the researcher provided detailed explanations on case backgrounds to enhance transferability. In detail, the researcher made rich and in-depth descriptions and discussions about the research settings in data collection and pilot study sections, such as the Chinese industrial SMEs' IDS, and why she specifically targeted Henan and Jiangxi's manufacturing SMEs in the Central Zone of China. It enhanced the possibility of transferring such research findings into a different study of other industries within or across jurisdictions.

Dependability, which resembles reliability, concerns whether the research strategy and framework can be applied by future researchers (Wahyuni, 2012). However, it should be noted that, in qualitative research, what is emphasised are the research strategy and process's reproducible, not the data and results' reproducible (Wahyuni, 2012). Dependability was achieved by presenting a detailed and step-by-step explanation of the choices being made and how these affect the research strategy and processes in the methodology chapter. Furthermore, it was enhanced when the researcher chose to present the main instruments used to collect and analyse empirical data, such as the interview guides, PIS, coding steps and template analysis records in her methodology chapter and the appendices.

Confirmability, which parallels objectivity, corresponds to whether the findings fairly present interviewees' understandings and experiences instead of the researcher's or others' preferences. All questions were pilot-tested, all information was made anonymous to maintain participant confidentiality, and all interviews were conducted in Chinese; these activities ensured that participants could discuss the interview questions in great detail rather than following others' preferences. Moreover, having key respondents check their interview transcripts ensured that the confirmed transcripts were fair representations of the interviews and interviewees' opinions. Furthermore, the coding development and application were cross checked by her supervision team randomly; thus, the researcher's bias and preference were

efficiently avoided, and the interviewees' ideas were fairly presented. In addition to triangulation methods, Lincoln and Guba (1985) suggested using an 'inquiry audit' to enhance confirmability. In practice, data and progress of the research were carefully kept as memos and summaries; thus, the research process and outputs can be re-examined and backtracked, enhancing confirmability.

In sum, by fulfilling each requirement in these four research trustworthiness criteria, this Ph.D. research's quality was ensured and verified. Table 3.7-2 shows the assessment criteria and the corresponding sections.

Table 3.7-2 Examples of the researcher's practice to fulfil qualitative research quality assessment criteria

Assessment criteria for qualitative study	Method to ensure a qualitative research's quality	Examples of the researcher's practice
Credibility	<ul style="list-style-type: none"> <li>✓ The carefully selection of case organizations.</li> <li>✓ Data triangulation.</li> <li>✓ Method triangulation.</li> <li>✓ Evaluator triangulation.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Case selection criteria-Section 3.3.1;</li> <li>➤ Data triangulation-Section 3.3.4;</li> <li>➤ Method and Evaluator triangulation-Section 3.4.2.1; Section 3.5;</li> </ul>
Transferability	<ul style="list-style-type: none"> <li>✓ A rich and thick explanation of research sites and characteristics of case organizations are provided to enhance transferability.</li> <li>✓ With careful adjustments in the setting, such findings have the possibility of being transferred into a different study of other industries within or across jurisdictions.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Case selection criteria-Section 3.3.1;</li> <li>➤ Case background-Section 3.5, Chapter 4;</li> </ul>
Dependability	<ul style="list-style-type: none"> <li>✓ All the changes that occur in a setting and how theses affect the way research is being conducted.</li> <li>✓ Can be achieved by providing the main instruments used to gather empirical data (e.g. the list of interview questions)</li> <li>✓ Can be achieved by a detailed explanation of the research design and process, which enable future researchers to follow a similar research framework.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Methodology chapter-Chapter 3;</li> </ul>

Confirmability	<ul style="list-style-type: none"> <li>✓ Triangulation methods.</li> <li>✓ Research memos.</li> <li>✓ Peer assistance to cross check coding.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Triangulation methods-Section 3.3.4;Section 3.4.2.1; Section 3.5;</li> <li>➤ Research memos-Section 3.3.2.4;</li> <li>➤ Cross check coding-Section 3.4.2.1;</li> </ul>
----------------	---	---

## **4 Cross-case findings and analyses**

### **4.1 Introduction**

The research contains a pilot case study and a main case study. By conducting the pilot case study, an initial template was developed from the raw data, which helped the researcher conduct the following main study and organised the thesis's writing structure. The transcripts of nine participants from the ED company were themed and analysed, along with secondary data such as company annual reports and newsletters. They revealed empirical stories of how a small and medium-sized enterprise has achieved its corporate sustainability (CS) through innovation.

The findings of the following research questions are presented and discussed in this chapter by analysing data from the pilot case study and main case study:

- Sub-question 1. How do CSME managers and employees interpret the concept of corporate sustainability (CS) (Section 4.2) and the relationship between innovation and corporate sustainability from the sector leader's perspectives? (Section 4.3);
- Sub-question 2. What are the preferred sustainability strategies adopted by CSMEs? (Section 4.5);
- Sub-question 3. How is sustainability crafted and implemented towards innovation? Why are these actions taken? (Sections 4.4, 4.6, 4.7 and 4.8) ;
- Sub-question 4. How to measure the outcomes of IDS strategies, and how to evaluate whether these actions are effective in meeting their sustainability objectives? (Section 4.9).

## 4.2 CS definition in the context of Chinese SMEs

This section presented four key themes underlying the CS definition, including profitable business performance, business continuity in challenging times, social expectations and responsibilities, and considerations in China's context. Emerging sub-themes in the main study were marked in red in the diagram; for example, developing a responsible supply chain was not pointed out by interviewees from the pilot case but was emphasised by the rest 5 out of all 12 cases. In presenting the findings, the discussions are provided by interacting with the existing literature.

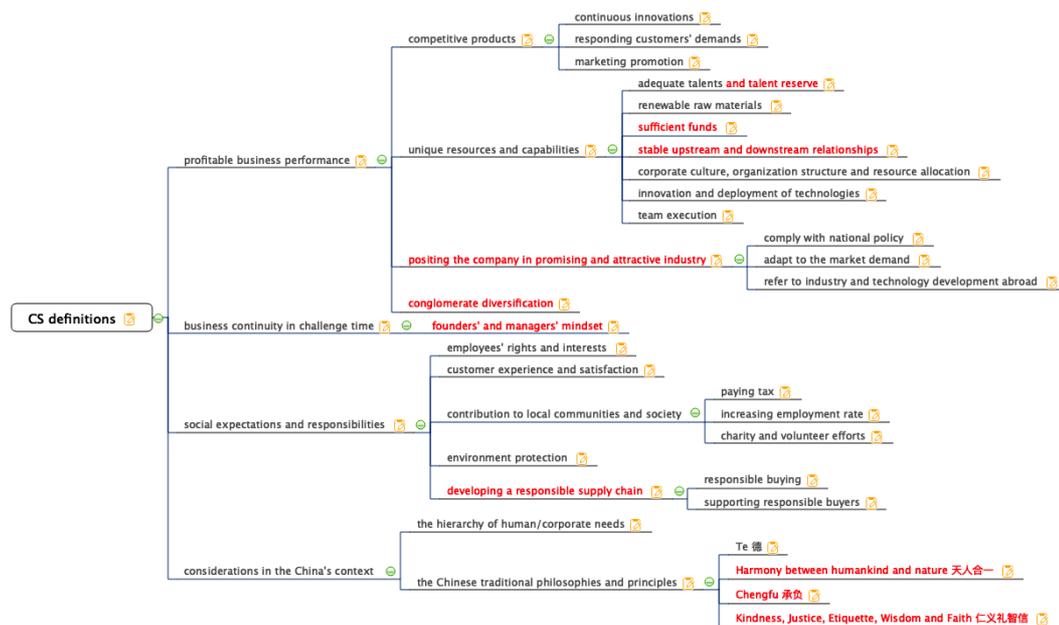


Figure 4.2-1 CS definition in the context of Chinese SMEs

### 4.2.1 Profitable business performance

The case data revealed that 'being profitable' is one of the most important aspects of CS. Four sub-themes emerged in the studied cases, including competitive products, unique resources and capabilities, positing the company in a promising and attractive industry, and conglomerate diversification.

Several interviewees, especially those in Case 1 (the pilot case), 2, 5, 7, 9 and 11, emphasised that profitability was the most important content of CS in the context of Chinese SMEs. In detail, Interviewee 3 (C1) particularly claimed that, as a private company, gaining a financial benefit is extremely important to sustain the company's development, which can relate to 'economic sustainability'. Interviewee 1 (C1), the owner and top manager of the company, shared a similar but more in-depth opinion by confirming that 'profitability' not only ensures economic sustainability but also

provides funds for the company to fulfil its social and environmental responsibilities. He strongly emphasised that:

‘If your products are not good, even you have a strong sense of social responsibility, you can’t realize it. How can you do it without money? For example, you plan to contribute to environmental protection and poverty alleviation, you plan to make everyone enjoy a high income, but they are just some impossible goals (unless you have money) .....’ (C1 Interviewee 1)

#### *4.2.1.1 Competitive products*

As a key element, all interviews from the studied cases emphasised the importance of competitive products. Underlying this theme, three lower level sub-themes emerged from the studied cases, including continuous innovations, responding to customers’ demands, and marketing promotion.

Based on the pilot study, 6 out of 9 interviewees (Interviewees 1, 2, 5, 7, 8, 9 from C1) defined CS from a product perspective and claimed that CS, in particular, the economic sustainability and social responsibility, can be achieved by the SME if the company can offer unreplaceable products and services to their consumers. Therefore, their products have to target and fulfil customers’ expectations. Particularly, Interviewee 9 (C1), the factory manager in charge of production, indicated that CS first means product sustainability based on his working experience; obtaining it requires continuously renewing highly competitive products. For instance, in transcript 9, he stated that:

‘One crisis is that products are substitutable, thus, those products should always be prevented from being replaced by others. If corporate sustainability is to be achieved, products cannot be replaced by others. Once they are replaced by others, what are the advantages of our products? We must conduct continuous innovation to ensure that our products will not be replaced.’ (C1 Interviewee 9)

Instead of focusing on continuous and incremental innovation, based on interviewees’ experience, another way to ensure product unreplaceable and competitiveness to achieve economic and social sustainability is to launch entirely new and differentiated products. For example, Interviewee 8 (C1), who is responsible for monitoring, measuring and recording production performances related to ISO (the International Organization for Standardization) standards and Quality Control, strongly advised that, to achieve further sustainable development, company ED (the pilot case) should not only target its existing customers and markets, but also conduct product innovation through applying advanced technology and external cooperation. In transcripts 7-8, he pointed out that:

‘.....If our company want to achieve sustainable development and innovation, we can’t just apply our innovative and advanced blending technology for one type of production, we have to apply it in other area such as aerospace, military, medical surgery and diving. ....we have to mix our innovative fibers with other fibers and discover new ones (products and markets). After conducting product development through cooperation, the new products can be highly competitive, and we may unintentionally invent something entirely new.’ (C1 Interviewee 8)

According to the interviewees, to achieve sustainability in ‘product’, these targeted and selected cooperators are normally large-sized and have high reputations in their sectors. For instance, Interviewee 2 (C1) mentioned that, to achieve sustainable development of the company, ED must develop innovative, sustainable and differentiated products by cooperating with large and well-known brands. In transcript 2, he claimed that:

‘To achieve sustainable development, the company must rely on external cooperation with large and competitive enterprises. In other words, we must cooperate with well-known brands and large enterprises (cooperation, joint ventures etc.) to achieve a win-win situation. Specifically, we must develop our company’s innovative and sustainable fabrics to differentiated products by cooperating with well-known clothing enterprises such as YOUNGOR.’ (C1 Interviewee 2)

The theme of ‘competitive products’ has also been mentioned in all the rest of the case studies. Interestingly, to interpret and achieve CS, interviewees not only focused on enhancing the competitiveness of a single product (e.g. C7 Interviewee 35, C10 Interviewee 45, C12 Interviewee 50) as what was emphasised in the pilot case, but also targeted forming a product echelon. To illustrate this point, three managers explained:

‘.....although the profit needs to be improved, but we have formed typical products that are unique to us, .... instead being obsessed with one particular product’s development and competitiveness, we are upgrading the entire product structure, increasing the proportion of high-tech products.....’ (C7 Interviewee 36)

‘To better commit and maintain our company’s sustainability, the product line is continuously developed.....’ (C10 Interviewee 47)

‘In our case, we keep forming a strategic product echelon.....’ (C12 Interviewee 50)

It is also worth to be noticed that, although customers were identified as key stakeholders to ensure the competitive position of products, this acknowledge was more likely to lead to market research instead market promotion, which both the pilot and main study confirmed. However, ensuring product competitiveness is not only about releasing new products which were innovative (C6, C7, C8, C9, C10, C11, C12) and customer-sensitive (C4, C8, C9, C12), but also about getting the attention and acceptance when these innovative products were introduced to the market (C3 Interviewee 17; C7 Interviewees 34, 36; C8 Interviewees 41, 42; C9 Interviewees 43, 44; C10 Interviewee 46; C12 Interviewees 49, 50). Therefore, market promotion strategies and activities were summarised as an important sub-theme under 'competitive products' because they were able to attract the customers to notice the new products' existence and their superiority and even generate new market awareness (C5 Interviewee 21; C7 Interviewee 37; C12 Interviewees 49, 50).

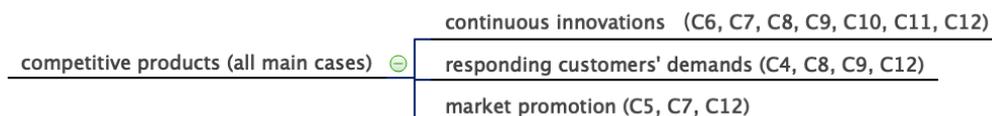


Figure 4.2.1.1-1 Mind map: Competitive products (main study)

It is worth noticing that these different activities were normally applied comprehensively because they interact with each other in various ways. An example is that, as mentioned in the pilot study, only by responding to customers' demands can the innovated products be sold; thus, the innovation ideas usually have to be generated from consumers' preferences and follow the market trend. Interviewee 35 from Case 7 gave a similar statement that only by conducting continuous product innovations that can fulfil the market demand can the company achieve its CS, by answering that '.....*continuous product innovation to meet continuous changeable market demand*'.

#### 4.2.1.2 Unique (specified) resources and capabilities

Another key element identified by all interviews from the studied cases was 'unique resources and capabilities'. Underlying this theme, seven lower level sub-themes emerged from the studied cases, including adequate talents and talent reserve, renewable raw materials, sufficient funds, stable upstream and downstream relationships, corporate culture, organization structure and resource allocation, innovation and deployment of technologies, and team execution.

Interviewee 4, the project approval manager from the pilot study, was the first to claim that sustainability in resources and capabilities is related to CS. In detail, she claimed that the supportive forces to achieve CS should be defined as part of the CS, including 'resources' in talents and raw materials, and 'capabilities' in technological innovation and operational management. Particularly, in transcript 4, based on

personal experiences, Interviewee 4 divided the concept of CS into four main activities, including 'conducting technological innovation', 'cultivating talents', 'managing' and 'ensuring the supply of raw materials' by pointing out that:

'.....The first is to achieve continuous innovation in technology. The second is to cultivate our own talents. The third is about management, only well-managed companies can have vitality, and retain talents. The fourth is about raw materials. If ramie is no longer planted, then how can we achieve corporate sustainability? .....Also, our company does not consume (unrenewable) resources or pollute the environment, therefore, it supposed to be a good (and sustainable) project. Unlike mining companies, they have exhausted resources of the plant, they cannot be sustainable because resources such as petroleum are not renewable.' (C1 Interviewee 4)

The main study also described having and using renewable raw materials as an important performance measurement of achieving CS. Just like how the pilot study evaluated the company itself to be sustainable by claiming that they were using renewable raw materials so the continuous supply of raw materials could be ensured and the resources needed by future generations would not be permanently consumed, Interviewee 21 also emphasised that 'using renewable resources' is the main manifestation of a sustainable company (C5). This statement is closer to the general definition of 'sustainable development', which was first introduced and interpreted by the Brundtland Commission (1987). Another repeatedly mentioned unique capability to support CS is innovation and the technologies deployment in product (C2 Interviewee 10; C3 Interviewees 16, 18; C6 Interviewee 31; C9 Interviewee 44; C10 Interviewee 47; C11 Interviewee 48; C12 Interviewee 49), which was first identified by Interviewee 4 in the pilot case, and in process (C4 Interviewee 20; C11 Interviewee 48; C12 Interviewee 49).

*Adequate talents and talent reserve.* In all the rest of the case studies, this sub-theme has been confirmed and expanded. A sustainable company must have valuable resources such as talents because they are the people who decide future strategy, practice advanced technics, sustain the business, and develop new products and services. And in particular, talents can realize these sustainability visions and missions with their professional knowledge and experience in innovation. How a sustainable company can attract talent and how talents can support the company to achieve its sustainability further were also detailed investigated by Stefańska and Bilińska-Reformat (2020) and Aggerholm, Andersen and Thomsen (2011) in their prior employer branding and CSR research.

However, compared to the pilot study, the sub-theme 'adequate talents' was expanded to 'adequate talents and talent reserve', due to reserving talents and constructing the echelon of talents (talent echelon construction, e.g. C7 Interviewees 34, 35 and 38; C12 Interviewee 50) was pointed out by main study participants as

important methods for ensuring CS, same as recruiting talents (talent recruitment, e.g. C7 Interviewee 38; C8 Interviewee 41; C11 Interviewee 48; C12 Interviewee 49) and retaining talents (e.g. C8 Interviewee 41; C9 Interviewee 44; C10 Interviewee 46; C11 Interviewee 48). Furthermore, the main study data were able to specify what kind of talents a sustainable company should recruit, retain and reserve, including senior and top managers (e.g. C7 Interviewee 37), top experts in the industry (e.g. C9 Interviewee 44), and technical personnel who were backbones and key players in the research and development (e.g. C 10 Interviewee 46). For instance, Interviewee 37, the Executive Deputy General Manager who is managing human resources (HR), referred that:

‘In my opinion, some employees need to be retained but some do not.....first of all, I will measure this person’s work efficiency, or the value he has created for our company, or whether this person can be replaced? This is what I will do to evaluate whether an individual should be retained.....and our middle-level managers, they are what we have to retain.....‘the barracks are fixed; and every year veterans leave and new recruits come, like running water (铁打的营盘流水的兵).’ A company cannot force all its employees to stay, we realize the fact and can afford the loss of our entry-level employees as long as our middle-level is relatively stable.....’ (C7 Interviewee 38)

The reason why they felt that senior managers are the foundation for a SME to retain its sustainability can be explained according to the literature review and methodology chapter above. Which was, for most SMEs, employees in or beyond the senior level are the actual decision-makers or at least the decision-involvers of the company, and these senior managers also directly intervene in the company’s daily operation (Freel, 2005 Prajogo; McDermott, 2014). Thus, in an era when ‘employees have free rights and can easily change to another job’ (C5 Interviewee 24), senior managers are not only the bridge between strategy orientation and adoption, but also the key to ensuring management stability and policy continuity. An example was given by Interviewee 38 that:

‘Including the first-line supervisors, .....people who are responsible for leading the different levels (from the entry to top level) of management in our company, for instance, the supervisors or departmental managers...each managerial position has its backup human resources. For example, if I am a manager, if something happens, well, such as I resign, or have some family issues, or gave birth to a child recently, or under other circumstances that I appear to be in a state of long-term leave, ah, then there will be someone who can take over things when this long-term leave or resignation happens .....it will be more conducive to ensure that our internal management will not lose control.’ (C7 Interviewee 38)

Another reason why interviewees felt that senior managers are the fixed assets for a sustainable developed company, can be interpreted from RBV. As several people mentioned in their interviews (e.g. C1 Interviewees 4, 7 and 8), in SMEs, department heads and deputies usually are family members or experts. In other words, the people who hold these positions must be relatives, or experts who are strengthened in technics or management. The staying or leaving of these experts has largely affected the management and innovation capabilities of the company, and these corporate capabilities have further affected whether the company can achieve and sustain its sustainable development. The details of these parts were further interpreted in the following capabilities section.

However, as SMEs located in the Central Zone of China, interviewees noticed that recruiting and remaining talents and reserving forces can be a well-known challenge. This might be because, considering the salary level (C1 Interviewee 7) and the potential personal development opportunities (C1 Interviewees 7 and 8), Central Zone SMEs can be less competitive and attractive in the labour market. This challenge or weakness was also identified in prior studies about SMEs in underdeveloped regions or rural areas (O'Dwyer, 2009; Sun & Quan, 2016).

Even so, these representative SMEs who achieved innovation-driven sustainability (IDS) successfully and efficiently shared experience that, towards cultivating talents as well as applying management and corporate culture, this disadvantage can be conquered, and corporate sustainability can be ensured. In other words, as SMEs in unfavourable regions, when attracting talent remains difficult, the efficient ways to reduce the negative impact of this almost inevitable weakness on achieving corporate sustainability are a) *cultivating employees' sustainability awareness and their professional skills to better serve sustainability practices* (talent cultivation, e.g. C2 Interviewees 10, 11, 12; C5 Interviewee 21; C6 Interviewee 27) and b) *making sure the management and corporate culture are effectively attracting, retaining and engaging talent* (employer branding, e.g. C7 Interviewee 34).

In detail, first, by investing in talent cultivation, the SME can attract and engage its talents effectively, and then further utilise these skilled human resources to pursue its corporate sustainability. For instance, Interviewee 27 from Case 6 claimed that *'.....by cultivating talents who are able to practice green manufacturing can the SME attracts and engages its talents and then further achieves its corporate sustainability'*. Second, recruited and cultivated talents can be retained with efficient management, including building positive corporate culture at the workplace. In particular, Interviewee 34 emphasised that *'.....your management, and especially building a positive and effective corporate culture, is one of the most important endeavours for small business like us, because they are the key to retaining a highly engaged and productive team to fulfil the company's sustainability commitment'* (C7 Interviewee 34). This was mentioned again by Interviewee 38 from the same company that *'put the right person in the right position, he will have a sense of*

*accomplishment and a sense of belonging. In this case you don't need to ask him to stay, he might stay spontaneously.....person-post matching and cultural atmosphere.....'* (C7 Interviewee 38). How corporate culture helps to build the employer branding (e.g. Szymańska, 2014; Ed Nathanson, 2018), and how the employer branding helps to retain human resource (e.g. Chițu, 2020; Chițu & Russo, 2020; Figurska & Matuska, 2013; Chhabra & Sharma, 2014; Mandhanya & Shah, 2010) were also recognised by several researchers and business consultants in their prior employer branding and talent management publications and pieces of training, which supports the solution that, by applying efficient management, and particularly, by building a positive corporate culture, the SME is able to retain its talents even it is located in an unfavourable region.

*Strategic management capabilities.* Strategic management capabilities, which were briefly described in the pilot study, were explored in-depth in the main study. Based on the interviewees' responses, there were some descriptive measurements to evaluate whether an advanced and sustainable management was taken, including 'corporate culture, organization structure and resource allocation', as well as 'team execution'. In detail, CS means the company has built and prompted the sense of mission and responsibility in the corporate culture (C7 Interviewee 34; C12 Interviewee 49), specified and improved organization structure and departments functions (C3 Interviewees 17 and 18; C7 Interviewees 35 and 38; C10 Interviewee 45), practised the best resource allocation (C11 Interviewee 48) such as assigned talents to their most suitable positions (C11 Interviewee 48), as well as practised efficient team execution (C3 Interviewee 16; C6 Interviewee 31; C9 Interviewee 43); and can be achieved towards improve, sustain and innovate these managerial activities (C6 Interviewee 31; C7 Interviewee 36). It was worth to be noticed that these specified management capabilities can also be seen as valuable resources to recruit and retain talents based on Interviewee 34 and Interviewee 38 (C7)' experience, which were discussed in-depth in the 'talents' section.

Interestingly, two sub-themes emerged in Case 8: 'sufficient funds' and 'stable upstream and downstream relationships'. Interviewees further explained that 'sufficient funds' related to financial capacity, which was not only about applying accounting and risk management to ensure sufficient funds and cash flow (C8 Interviewee 41; C9 Interviewees 43 and 44) but also included the SME's capability to attract and achieve external resources such as equity investment funds (C12 Interviewee 49) and venture capital funds (C8 Interviewee 41; C10 Interviewee 46). In the researcher's opinion, this might be due to, first, the financial performance of the company was related to economic sustainability and was the most direct quantitative indicator of 'being profitable'. And second, having sufficient funds also acted as a supportive resource for conducting sustainable development strategies, which was discussed in-depth in the following influencing factor section. In addition, the case data reveals that maintaining supply chain stability was one of the most important aspects of CS. For instance, Interviewee 41 claimed that 'CS means the

SME had and has a long and stable relationship with its upstream suppliers and downstream buyers' (C8). Two practical methods to maintaining supply chain stability that were identified in the main study are '*creating value and profit for suppliers and buyers*' (C11 Interviewee 48) and vertical integration (C8 Interviewee 41; C10 Interviewee 45).

#### *4.2.1.3 Positing the company in promising and attractive industry*

The main case data reveals that 'positing the company in a promising and attractive industry' was also an important aspect of CS. According to the interviewees, the industry with sustainable development prospects has three typical characteristics: comply with national policy, adapt to the market demand, and follow the trend of technology application.

First, only by conforming to the country's policy guidance and meeting the country's policy requirements can companies achieve sustainable development. Similar statements were made by Interviewee 16 (C3), Interviewee 44 (C9) and Interviewee 49 (C12). This is supported by the prior regional study that, in the context of China, the regulation environment matters because the government is acting as the key stakeholder who influences a company's strategy and survival comprehensively and significantly (Bos-Brouwers, 2010; Halme & Korpela, 2014). An interesting statement was given by interviewee 16 that, when an enterprise complies with policy guidance and regulations, it will naturally fulfil most of its social responsibilities (C3). Furthermore, only by adapting to the market demand can companies achieve sustainable development. Interviewee 46 emphasised that '*the industry's development cannot go against the trend*' and '*the industry only has a future when its products are sustainable demanded*' (C10). This is supported by the prior regional study that meeting market demand matters because customers are the key stakeholder influencing companies significantly (e.g. Bos-Brouwers, 2010; Cuerva, Triguero-Cano & Corcoles, 2014). In addition, companies can achieve sustainable development by following the trend of technology application, which can be acknowledged towards referring to the development history of relevant industries and technology abroad. Interviewee 49, the founder of Company ZX, gave a specific example that, one important reason why he thought intelligent and green animal husbandry was promising and could be attractive and sustainable in the future and then made the final decision to enter it was that, refer to the mature animal husbandry and their intelligent and green practices in the developed countries, in China it was under-developed but future-demanded (C12). However, the researcher noticed that in the prior studies of under-developed states and regions, referencing mature businesses' development path to help them identify the potential market before competitors and remain proactive to national policies was not commonly identified, which requires in-depth future research.

#### 4.2.1.4 Conglomerate diversification

Many interviewees emphasised that if a company cannot achieve profitability, then it cannot achieve long-term survival and development, let alone fulfil other social and environmental responsibilities; therefore, earning and retaining profits is one of the main manifestations of corporate sustainability (C2 Interviewees 11 and 15; C5 Interviewee 21; C7 Interviewees 34 and 38; C9 Interviewee 43; C11 Interviewee 48). Interviewees from the governments made similar statements that the quantity and profits of the green and innovated products were the most significant and direct indicators to measure their CS performances (e.g. Government Interviewee 39). This might be the most significant definition related to the company's economic sustainability. But, as repeatedly emphasised by the interviewees (e.g. in C3, C7, C8, C9, C10, C12), monetising (new and innovated) products requires strategic marketing to make potential buyers realise that these products can better satisfy customers. In addition, as Interviewee 48 from Case 11 said, retaining profitability benefits both the company itself and the society (through increased taxes or employment chances, for instance). Thus, the pursuit of financial benefits is generally accompanied by the fulfilment of social responsibilities, such as better satisfying customers, and results in better taking the company's social responsibilities, such as paying taxes or helping solve employment issues in the region.

However, Interviewee 41 from Case 8 gave a unique example that carrying out conglomerate diversification also helped their company make profits and achieve economic sustainability and it should be included in the content of CS. In detail, he gave an example that when their firm diversified into an area totally unrelated to the organization's current business and earned profits, these successful investments further supported the company to retain its cash flow stability and sustainability-oriented innovation (SOI) investments; thus, he claimed that *'the exploration of unrelated business models is also a kind of sustainable development'* (C8 Interviewee 41). On the contrary, Interviewee 49 from Case 12 emphasised a disagreement due to the fact that, for many Chinese enterprises, the result of the diversification is not ideal. According to prior studies in diversification, the main reason is lacking the essential acquaintance with its risk (Shao et al., 2020). Thus, based on the evidence, this emerging idea about why carrying out conglomerate diversification belongs to and can contribute to achieving CS should add an adjective to the front: successful.

#### 4.2.2 Business continuity in challenge time

Although the interviewees widely identified the profitable business performance as the key theme of CS definition, however, according to the interviewees, in a challenging time, profitability was hard to ensure; thus, the requirement of CS was reduced to retaining business continuity. And two influencing factors according to interviewees' answers, were summarised by the researcher as the founders' and managers' mindsets. First, maintaining the founders' willingness to continue the

business. This was pointed out by Interviewee 16 according to his personal working experience that the life of a SME is largely impacted by the entrepreneur’s will, and if he or she decides to dissolve the company, the business is no longer sustained, even at that time other managers and employees remain confidences (C3). This might be why Interviewee 46 insisted that ‘*only in the joint-stock system, when the boss can no longer make the decisions alone, the CS can be ensured*’ (C10). Another factor in ensuring sustainability even in challenging times was the managers’ mindset, which was identified in 4 cases out of 12 (C1, C4, C6, C7). In particular, CS means the managers have continuously developed their management knowledge and capabilities to conquer the business challenges (economic sustainability) and fulfil CSR commitments (environmental and social sustainability). The finding that the founders’ and managers’ mindsets could influence the CS was not specified in the prior studies; however, these prior research about why owners and managers are the most important internal forces for a company, especially for small ones, can support these findings by explaining individuals who hold a managerial position or ownership are the people who hold decision power about the company’s strategy and operation (Pfirrmann, 1994; Prajogo & McDermott, 2014).

#### 4.2.3 Social expectations and responsibilities

The case data reveals that ‘social expectations and responsibilities’ also play an important role in interpreting CS. In other words, achieving CS means the company has to meet social expectations and contribute to both the company and society. Five sub-themes emerged in the studied cases, including employees’ rights and interests, customer experience and satisfaction, contribution to local community and society, environment protection, and developing a responsible supply chain. These main social expectations showed the key sustainability stakeholders for small and medium-sized companies: employees, customers, local communities and society, plant and human, upstream suppliers and downstream manufacturers. This was agreed by authors such as Biondi, Iraldo and Meredith (2002), Bos-Brouwers (2010) and Cuerva, Triguero-Cano and Corcoles (2014).

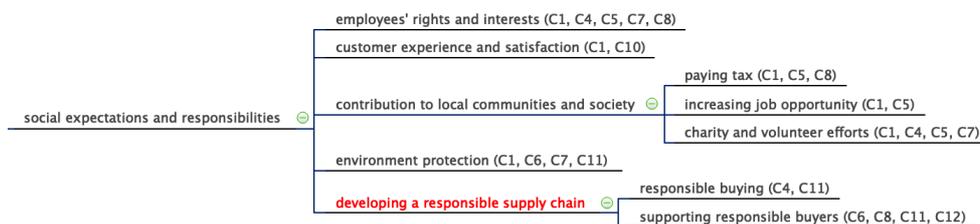


Figure 4.2.3-1 Mind map: CSMEs’ social expectations and responsibilities

Table 4.2.3-1 CS in social and environmental perspective and their key stakeholders

CS definition in social expectation and responsibility perspective		Representative keywords & cases	Key stakeholder
Guarantee and improve the rights and interests of employees		Happiness and belonging (C4 Interviewee 20; C7 Interviewee 34)	Employees
		Welfare and salary (C4 Interviewee 20; C5 Interviewee 21, Interviewee 24; C8 Interviewee 41)	
		Safe and health (C4 Interviewee 20; C5 Interviewee 21, Interviewee 24)	
		Skill and career development (C7 Interviewee 34)	
Improve customer experience and satisfaction		Satisfied experience and low costs (C10 Interviewee 45)	customers
Contribute to local communities and society	Pay taxes	Tax (C5 Interviewee 24, Interviewee 26; C8 Interviewee 41)	Local community and society
	Increase job opportunity	Employment issues in the region (C5 Interviewee 21)	
	Do charity and volunteer efforts	Charity work (C4 Interviewee 20; C5 Interviewee 21)	
		Cooperative volunteer efforts (C7 Interviewee 34)	
Protect the environment		Environment protection and energy saving (C7 Interviewee 37; C11 Interviewee 48) Green production (C1 Interviewee 4; C6 Interviewee 27)	Plant and human
Develop a responsible supply chain		Responsible buying (C4 Interviewee 20; C11 Interviewee 48)	Upstream suppliers
		Responsible buyers (C6 Interviewee 27; C8 Interviewee 41; C11 Interviewee 48; C12 Interviewee 49)	downstream manufacturers

#### 4.2.3.1 Develop a responsible supply chain

An interesting finding was that, when talking about the content of CS, interviewees in the main study no longer only targeted the company itself, its resources and capabilities, but also mentioned how it can form a sustainability ecosystem by encouraging other supply chain participants to be sustainable and responsible; this was identified and then presented as an emerging key theme. In detail, although from a resource-based view (RBV), Interviewee 41 (C8) identified maintaining supply chain stability as an important supportive force to achieve CS, but 5 out of 11 main cases (C4, C6, C8, C11, C12) further shown their advanced understanding that, only by selecting and supporting the responsible suppliers and downstream buyers can the companies better fulfil its CS. This might be influenced by the traditional Chinese

philosophy and value of ‘a community of shared destiny (命运共同体)’, which were interpreted further in the following Chinese traditional philosophy and principles section.

According to interviewees, to form a responsible supply chain, a SME has to make decisions about selecting what kind of suppliers and buyers, and taking what kind of actions to them. For instance, the SME can ask its suppliers to use environmentally friendly materials and process them in an environmentally friendly way, and let them know that their environmental measures will be a factor in the company’s purchasing decisions. By doing so, the SME’s environmental commitments are multiplied along the supply chain. Interviewee 20 (C4) and Interviewee 48 (C11) repeatedly mentioned this detailed example in interpreting their CS practices. Another effective and practical effort to form a responsible supply chain is to offer green components, products or skills to responsible downstream buyers. By doing so, these downstream buyers could offer eco-products to substitute their irresponsible competitors’ products (e.g. C6, C8, C11), or be able to manufacture products in a more energy-efficient and environmentally friendly way (e.g. C6, C12).

Table 4.2.3.1-1 Representative cases in forming a responsible supply chain

Main Industry	Representative Cases	Resources
Rubber	By promoting and selling customized equipment along with providing life-long technical guidance to other manufacturers around the country, the company successfully shared a cleaner and more energy-saving method for producing reclaimed rubber.	(C6 Interviewee 27)
Solar power	Committed to conquering innovation and deployment of technologies obstacles in the clean energy industry, particularly in the solar industry, the company provides downstream manufacturers technical and equipment support.	(C8 Interviewee 41)
Refrigeration	The company deliberately selects suppliers who use environmentally friendly materials. The company innovates environmentally friendly and energy-efficient refrigeration skills and core components to its downstream manufacturers, which then drastically decreases the power consumption and air pollution during the use of the final products. The company cooperates with its upstream and downstream supply chain participants together, focus on encouraging and exploring the application of environmentally friendly raw materials and green manufacturing components.	(C11 Interviewee 48)
Animal husbandry	The company provides green, intelligent, quantifiable and customized pig farming equipment, waste disposal equipment, resources recycling equipment and even designs an entire comprehensive breeding project for individual breeders and farming enterprises, helps them reduce the excess and unnecessary water, electricity and other resources consumptions as well as the water, air and soil pollutions during the breeding process.	(C12 Interviewee 49)

#### 4.2.4 Considerations in the China's context

The definitions given by interviewees indicate that the Chinese companies' understanding of CS has been significantly influenced by traditional Chinese beliefs and culture, and has reflected thoughts and theories such as *the hierarchy of human needs* and *engaged sustainability stakeholders*.

***The Chinese traditional philosophy and principles.*** An interesting and emerging finding in the pilot multi-case study is from the owner and top manager (C1 Interviewee 1), who attempted to explain CS from a traditional culture perspective. The researcher further probed what specific Chinese cultures are related to corporate sustainability, and the interviewee explained that from his perspective, corporate sustainability means the company has to have 'De/Te (德)'. In modern society, 'De' is usually interpreted or translated as 'virtue', 'goodness', 'moral excellence' or 'being ethical'; however, it was first introduced by the ancient Chinese philosopher Lao Zi/Lao-Tzu (老子) in *Dao De Jing/Tao Te Ching* (《道德经》) as 'the application of the underlying principles of the universe'. Interviewee 1 further concluded that CS is a comprehensive and complex term that not only has to reflect and satisfy the company's desires and actions in 'products', 'profitability', 'social expectations' and 'hierarchy of human needs', but also practice the way and law of the virtue, goodness and underlying principles of the universe in Chinese traditional culture context. Interviewee 1's attitudes and answers showed how the principles and spirit in the Chinese traditional culture can impact a Chinese's understanding and practice of corporate sustainability and how the roots of these principles and spirits, which are the culture and history of the country and nation, have enriched and customized the definition of 'sustainable development'.

'.....Good products (reflection of 'product' and 'profitability'), good ideas (reflection of 'social expectations' and 'hierarchy of human needs') --and, you must have 'De' (by the ancient Chinese philosopher Lao Zi), that is, we Chinese says that, only by practice the way and law of the virtue, goodness and underlying principles of the universe can we achieve sustainable development.' (C1 Interviewee 1)

Just as the interviewee from the pilot case argued that 'De' is a part of the CS, interviewees from the main study cases also mentioned traditional Chinese idioms, proverbs, and fables to better interpret the definition of CS from their perspectives. The researcher was not surprised to notice that these traditional Chinese idioms, proverbs and fables, and the cultures, ethics, values and beliefs behind them, created the ethical environment and cultural background to run a business. It was similar to the fact that other companies' national and regional cultures have unavoidably impacted their corporate cultures (e.g. Khan & Law, 2018). However, an

interesting finding was that they also significantly formed people's understanding and practices of CS. In detail, through the interviews, the researcher noticed that the Chinese companies and their employees are accustomed to inheriting the thousands of years of traditional Chinese culture and national spirits; thus, their cognition of the harmonious and scientific development, the *Chengfu Doctrine* (承负说), and the *Kindness, Justice, Etiquette, Wisdom and Faith* (仁义礼智信) are deeply rooted in their character, sentiments and thinking distinction, which continuously affects their understanding and practice of sustainable development. This is a finding that can better help the researcher and potential readers understand the content and motivations of Chinese SMEs' sustainability.

Table 4.2.4-1 CS and practiced Chinese philosophy and principles

Representative philosophy, beliefs and culture	Principles	Cases & Interviewees	Literatures	Links to CS
De from Taoism	Practicing the way and law of the virtue and goodness. Underlying principles of the universe to achieve scientific and sustainable development.	C1: Interviewee 1; C7: Interviewee 35.	Lao Zi (n.d.) and Wang (2006)	<ul style="list-style-type: none"> <li>● Being ethical</li> <li>● Develop scientifically: exploring and following inherent laws in the process of nature or human society's movement and development</li> </ul>
Harmony approach	A community of shared destiny and the responsibilities. Common interests between different groups, nations, and between human and nature.	C3: Interviewee 16 and 19; C5: Interviewee 21; C7: Interviewee 35; C8: Interviewee 41; C11: Interviewee 48; C12: Interviewee 49.	Wang (2006), Wang & Juslin (2009) and Tolcachier (2019, September)	<ul style="list-style-type: none"> <li>● Develop environmentally friendly: protecting environment and reducing pollution</li> <li>● Develop harmony: protecting interests of both the company itself, the environment and society</li> </ul>
Chengfu Doctrine	Everyone's actions and their consequences influence the future and the next generations	C3: Interviewee 19; C11: Interviewee 48.	Shi (2004) and Wang (2016, April 8)	<ul style="list-style-type: none"> <li>● Develop sustainable and harmony for the future and next generations</li> <li>● Being ethical, sacrificed, responsible and contributed</li> <li>● Accumulate resources</li> </ul>
Confucianism	Being kindness, justice, etiquette, wisdom and faith	C12: Interviewee 49.	Deng (2005)	<ul style="list-style-type: none"> <li>● Being ethical and responsible</li> <li>● Develop strategically and scientifically</li> </ul>

***The hierarchy of human needs.*** Another interesting finding in the researcher's study is that the sustainable development of enterprises can be analogous to the survival and development of human beings; it is about fulfilling the hierarchy of needs. The company has to meet their basic need of survival by having resources, to fulfil their physiological needs by returning to the society and plant and being recognized by the local community. For instance, in transcript 4, participant 4 claimed that to interpret CS, the company should see itself as a human being and explore its sustainability goals from both material and spiritual satisfaction aspects:

‘.....just like a person, how to survive and live well. ....A person needs air, water, food and clothing. In addition to meeting the physiological needs, he also has some emotional and psychological needs (to live a better life).’ (C1 Interviewee 4)

Interviewee 1 also explained CS by identifying a similar hierarchy of needs between humans and the company. In particular, in transcript 1, he claimed that CS is about the company's desires and actions to survive, develop, repay and be recognized, just like what a human being would expect for a living. He further identified that CS means targeting and fulfilling the company's desire to provide economic, environmental and social benefits:

‘In my opinion, corporate sustainability (CS) should be consistent with the concept of corporate survival and development. Survival is not easy, and after it is secured, the company must seek more development. Producing products that can offer economic and social benefits, being recognized by the society, repaying society..... among which, an ecological sustainable development will be formed, which is in line with human ecological development. Thus, CS is not only about (protecting) the environment, (following) the policies, but also reflecting the survival philosophy of the company itself, the human survival and development concept. You have desire to survive, make money, repay community, achieve recognition.....you meet them, and they will motivate you to develop further.’ (C1 Interviewee 1)

The sub-theme of ‘*the hierarchy of human needs*’ has also been mentioned and observed in all the rest of the case studies. For instance, Cases 7 and 12 clearly emphasised that the company must have its monetary affluence first and then consider its intrapersonal affluence.

Case 7: ‘Our vision is to become a company with social value, be respectable and have happy employees’ (Interviewee 34), ‘the company itself create social assets, brand and dignity’ (Interviewee 37). However, ‘you have to have physically (fulfilment/success) first, and then consider upper-level

psychologically development, consider what are the spiritual desires' (Interviewee 38).

And

Case 12: 'The company has to meet survival objective first, and following by achieve its sustainable development'...eventually, everyone in this company has his or her ideals and ambitions, and satisfied by actualizing their personal values towards pursuing personal and organizational sustainability (Interviewee 49)

***Engaged sustainability stakeholders.*** By analysing the definition of CS from the company's perspective, the researcher noticed that the examples and interpretations provided by interviewed employees and employers were related to different stakeholders. In detail, key relevant stakeholders are shareholder, employees, customers, government, residents, suppliers and buyers; all of these individuals are affected by the company's sustainability efforts, and their vested interest in the company's strategies and development plans were noticed and respected by the company.

### **4.3 The relationship between innovation and CS**

#### **4.3.1 The triangulation structure**

When exploring the relationship between innovation and CS, all nine interviewees from the pilot case believed that there is an inevitable and positive connection between innovation and corporate sustainable development. More specifically, participants 4, 7, and 8 concluded that innovation and corporate sustainable development complement each other in the real business world. In terms of how innovation and sustainability complement each other, it is indicated that there is a complex system that can be described as an ecosystem.

Regarding the complementary of innovation and sustainability, interviewees used different Chinese terms such as '一起的' ('together', C1 Interviewee 4), '互相的'

('mutual', C1 Interviewee 4), '相辅相成的' ('complement each other', C1

Interviewees 7 and 8), '密不可分的' ('inseparable', C1 Interviewee 8). In conclusion, corporate sustainability offers development direction as well as necessary resources and capabilities for innovation, and innovation is a pragmatic method for enterprises to pursue and successfully achieve corporate sustainability. For instance, interviewee 4 claimed that a company's sustainable development provides necessary resources and capabilities for innovation, and a successful innovation can help the company to achieve its sustainable development:

‘Sustainable development can only be achieved if innovation is done well. Without innovation, the company cannot have vitality and sustainable development; without sustainable development, the company cannot provide the necessary resources and capabilities for innovation. The relationship between these two parties is mutual.’ (C1 Interviewee 4)

Furthermore, Interviewee 8 gave some further examples from the practice aspect that a company’s sustainable development can be the orientation and the outcome of its innovation; and to realize this positive connection between corporate sustainable development and corporate innovation, both the government, the company and the individual have to contribute to it. For example, Interviewee 8 claimed that:

‘It can be said that sustainable development comes first (as an orientation), and it can also be said that it is behind (as an outcome). Corporate sustainable development is definitely inseparable from innovation, and if you innovate, this company will definitely develop. In practice, as a SME in the textile industry, under the intention to save energy, we have to conduct corporate innovations by developing new ideas and begin to actively utilize the e-commerce platform. This (ecosystem) is what we (government, company and people) trying to target and achieve in ‘Made in China 2025’ (C1 Interviewee 8)

It is worth noticing that what was mentioned as ‘corporate innovation’ by Interviewee 8 was also mentioned by Interviewee 3 in detail as ‘new product’ and ‘new process’ (C1 Interviewee 3); these are the two most commonly used forms of innovation based on the researcher’s knowledge by reviewing prior literature. According to her, China’s rapid development forces companies to achieve sustainable development towards product and process innovations because they can attract markets and consumers immediately and continuously. For instance, interviewee 3 concluded that:

‘.....As China develops so rapidly, the first and basic element for a company to achieve sustainable development is to continuously innovate, as follows, its attractiveness to the market can be enhanced, and everyone’s attention will be attracted.’ (C1 Interviewee 3)

The most interesting finding is that, although none of the interviewees made a clear and summarised statement that the actual and in-depth connection between innovation and sustainable development within their SME is a comprehensive cycle (or ecosystem) (Figure 4.3.1-1), their specified descriptions and examples of the inevitable and positive (and even complement) relationship between innovation and sustainability reveals this finding. Even prior literature used to describe the connection as a simply straight and flat path, such as innovation encourages

sustainable development or sustainable development orients innovation; however, after summarising and synthesizing the empirical stories, the researcher divided them into different sub-connections which were claimed as below:

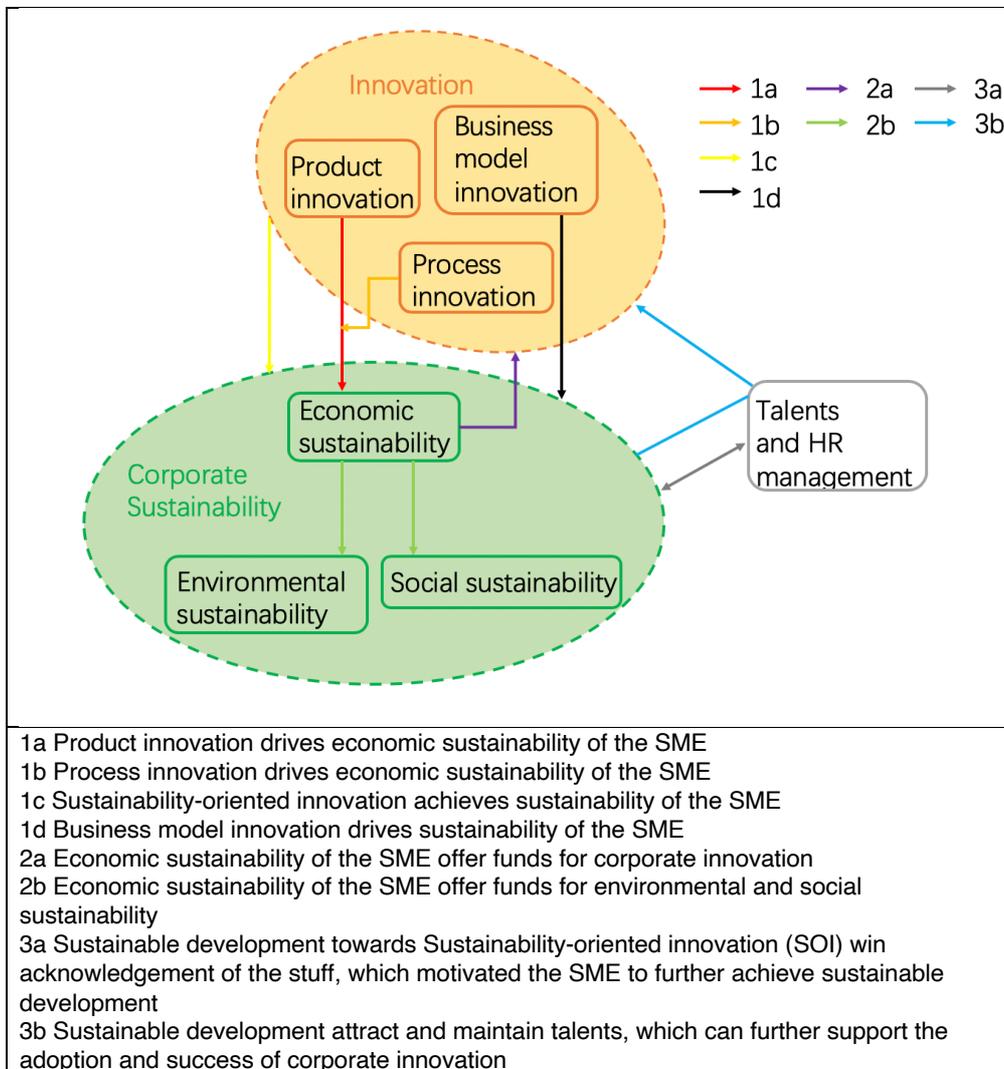


Figure 4.3.1-1 Relationship between innovation and corporate sustainable development in the pilot case

Table 4.3.1-1 Specific examples related to each connect (the pilot case)

Interviewee Connect	1	2	3	4	5	6	7	8	9	Narrative
1a	✓	✓	✓				✓		✓	Product innovation drives economic sustainability (Interviewees 1, 2, 3, 7, and 9)
1b	✓		✓		✓			✓	✓	1. Reduce R&D and manufacturing costs of new products through process innovation, which drives economic sustainability ➤ Through equipment automation and intelligence (Interviewee 1)

											<ul style="list-style-type: none"> <li>➤ Through training, and equipment reposition (Interviewee 9)</li> <li>➤ Through innovation in manufacturing technique, equipment, operating procedure and even the entire operating system (Interviewee 8)</li> </ul> <p>2. Improve the quality control of new products through process innovation to achieve economic sustainability (Interviewee 3)</p> <p>3. Enhance market attention and recognition of new products through process innovation to achieve economic sustainability (Interviewees 3 and 5)</p>
1c	✓		✓	✓				✓			<p>Product and/or process innovation directly targets and achieves both economic, environmental and social sustainability of the SME:</p> <p>Example 1: The rest table and bar set up in the store provide almost free handicraft teaching (product innovation), turn scraps from rubbish into treasure (environmental), it effectively attracts customers and promote brands (economic), promotes the declining Gan embroidery culture and hand-made traditions, so that everyone can calm down their impetuous hearts and spend time with children and friends (social) (Interviewee 7).</p> <p>Example 2: The Bast and Leaf Fibres Fashion Show (product innovation) attracts customers and collaborators (economic), promotes Chinese culture and aesthetics, supports young designers, and showcases traditional textile and embroidery skills (social), promotes green manufacturing in the industry (environmental) (Interviewee 1).</p> <p>Example 3: Microbial degumming technology (process +product innovation) improves the company's competitiveness, reputation and profitability (economic), encourages green manufacturing in the industry (environmental), promotes regional economic development and cultural revival, and increases local residents' income (social) (Interviewees 1, 3 and 4).</p>
1d	✓		✓	✓	✓						Business model innovation drives sustainability of the SME (Interviewees 1, 3, 4 and 5)
2a			✓	✓							Economic sustainability of the SME offers funds for corporate innovation (Interviewees 2 and 4)
2b	✓										Economic sustainability of the SME offers funds for environmental and social sustainability (Interviewee 1)

3a					✓			✓		Sustainable development towards Sustainability-oriented innovation (SOI) wins acknowledgement of the staff, which motivated the SME to further achieve sustainable development (Interviewees 5 and 8)
3b				✓						Sustainable development attracts and maintains talents, which can further support the adoption and success of corporate innovation (Interviewee 4)

The empirical stories of the main cases revealed similar sub-connections between innovation and corporate sustainability as what were identified by the researcher from the pilot case.

For instance, Cases 2, 6, 7, 11, 12, and 13 indicated that product innovation is essential and important to ensure the company's economic sustainability. For example, few interviewees believed that product innovation is an effective method to 'avoid vicious/cut-throat competition in the industry' (C7 Interviewee 38), maybe because it can innovate products and even the entire product lines to be unreplaceable or competitive (e.g. C6 Interviewee 30; C7 Interviewees 34, 35, 36 and 37; C8 Interviewee 41; C9 Interviewee 44; C10 Interviewees 46 and 47; C11 Interviewee 48); thus, product innovation can support the company to maintain its advantages even in a highly competitive business environment, which ensures its survive and economic sustainability. Furthermore, new products are introduced towards continuous product innovations, as follows, profits are earned by selling these new and market-demanded products to customers; thus, product innovation can ensure the company achieve its economic sustainability by increasing its profitability (e.g. C10 Interviewee 46; C11 Interviewees 48 and 50).

In addition, Cases 2, 6, 9, 10, and 11 believed that process innovation drives the SME's survival and economic sustainability. For instance, Interviewees 27 and 33 of Case 6 pointed out that, to ensure the production can be permitted by the government and the products can be accepted by the market, the company had and has to continuously utilize process innovations to introduce environmentally friendly products and even ensure green manufacturing. In particular, the top manager, Interviewee 27, gave the researcher a representative, detailed and experienced example of how process innovation not only ensures the company's economic sustainability but also truly transforms a sunset industry with high pollution and energy consumption into a vibrant industry which fulfils both economic, social and environmental stainabilities together. According to him, because the production of reclaimed rubber requires strong acids and alkalis and would pollute the air and water heavily, after the 1960s, in most developed countries, companies were prohibited from producing reclaimed rubber, and the whole rubber reclamation industry was 'stagnating' and 'abandoned' (C6 Interviewee 27). However, abandoning the rubber reclamation technology and clamping down on relevant

products and industries only forced people to process large quantities of used rubber, such as discarded tires, by pouring them into the sea or piling them up in gullies. With time, while the reclaimed rubber technology was stopped and forgotten in developed countries, China has gradually become a major producer and consumer of rubber products, which requires talents and companies to innovate the rubber reclamation process to 'turn garbage into valuable resources' in an efficient and responsible way. By making special equipment and innovating the manufacturing processes, the company in Case 6 successfully reduces or replaces the use of strong acids and alkalis, purifies polluted air and water, and prevents its employees and the end users from inhaling toxic dust, which fulfils the company's environmental and social responsibility. Furthermore, by selling not only the reclaimed rubber products to downstream buyers but also the environmentally friendly equipment and skills to other companies in the same industry, process innovation not only sustains the company's profits but also encourages the supply chain and the industry to be responsible and sustainable.

#### 4.3.2 SOI and IDS

Interviewees thought there was no significant difference between SOI and IDS when it was used to describe the phenomenon that reflects the complementary connection between innovation and corporate sustainable development, although they used to utilize the term 'IDS' because it has been widely mentioned in the government documents and social reports in China (Interviewees 1 and 4). However, these two terms can be slightly different to indicate whether sustainability is the orientation (SOI) or the outcome (IDS) or whether innovation is more defensive (SOI) or proactive (IDS). These two interesting opinions were brought by Interviewee 8 during the in-depth semi-structured discussion, and more evidence is required to support them in the main study and future studies.

First, as an employee who is in charge of monitoring ISO and Quality Control and is extremely familiar with the production process, Interviewee 8 claimed that SOI and IDS are two paths which reflect how innovation and sustainability can support and lead to each other; thus, when choose to use which term to describe the complementary of innovation and sustainability, SOI is better to be used to indicate the company's strong motive and intention to pursuit sustainability, and IDS is preferred to hint that the company has successfully achieved sustainability towards innovation. 'It can be said that sustainable development comes first (as an orientation), and it can also be said that it is behind (as an outcome).' (C1 Interviewee 8). By reviewing prior literature and analysing empirical data, the researcher understands this idea because not all sustainability-orientated innovation can lead to significant achievements in corporate sustainability; this is one of the reasons why the researcher thought empirical study in the influencing factors and the measuring criteria are under-researched and valuable.

Second, Interviewee 8 claimed that SOI and IDS not only reflect the preference for sustainability between intention and result, orientation and outcome, but also show different attitudes towards innovation between passive and proactive, defensive and active. He further emphasised that IDS is preferred to describe the comprehensive relationships between innovation and sustainability not only because the interviewee himself is an innovative and motivated person but also because he observed and believed that successful companies were normally proactive in initiating changes and innovations; for instance, he claimed that:

‘.....but I also think these two terms are different in another way. One (IDS) is proactively and the other (SOI) is passively. Personally, I prefer to actively challenge the difficulties; and I think it reflects a spirit of ‘fighting’ that is rooted in the bones of our Chinese nation. As a male, I prefer to initiate changes and innovations, and utilize them to drive sustainable development actively. In other words, if there is (a potential to create or find) something new, we should research it proactively. There are so many examples about how all those companies pursued advanced technological innovations that could not be easily replaced by others, which brought the following corporate development.’ (C1 Interviewee 8)

It is worth noticing that the findings of the systematic literature review revealed that the phenomenon that reflects the comprehensive connections between innovation and corporate sustainable development has been under-researched, and there were no clear, well-recognized definitions of SOI or IDS. Thus, to enable the cross-case study and comparative analysis and to ensure this research can be triangulated and transferable (an assess criteria of research reflexivity), derived from the prior researchers’ opinions, IDS was used to describe this phenomenon in this research and can be defined as ‘the (set of) innovations which have been started to fulfil CS consideration and commitment, and successfully contribute to corporate sustainability from both economic, environmental and social perspectives’ (in the literature review chapter).

In the main study, although this question was asked, just as in the pilot study, most interviewees could not distinguish a significant difference between SOI and IDS. However, following a deeper understanding of the integrated innovation-driven sustainability strategy (section 4.3.3), the researcher also came up with a sense that SOIs are sub-actions within the comprehensive IDS strategy in the real business world. It was supported by the prior findings of the comprehensive literature review that intentional or unintentional innovation may lead to an enterprise’s sustainable development; still, if the company intends to achieve IDS, it has to conduct SOIs.

#### 4.4 Drivers and motives of pursuing IDS

Based on the pilot study, the findings show a company's pursuits of IDS are not individually driven but combined-multiple-factors-driven. The findings relating to the motives to pursue SME's IDS were divided into a) catering to government police, b) satisfying customers, c) pursuing economic benefit, and d) practising core values of organizational culture. Table 4.4-1 presents each participant's understanding of the motivation from the corporate level. Based on this pilot study, the two most powerful external stakeholders, the government and customers, can be identified. It is worth noting that, by analysing *sub-theme 3: sense of crisis and risk* of motive d, besides government and customers, competitors can also be identified as the main external stakeholders who drive company ED to target IDS.

Table 4.4-1 Key themes of IDS motivation (derived from the pilot study)

Force	Main stakeholder	1	2	3	4	5	6	7	8	9
Catering to government police	Government (external)	✓				✓	✓			
Satisfying customers	Customer (external)	✓		✓					✓	
Pursuing economic benefit	Owner or shareholder (internal)	✓		✓						
Practicing core values of organizational culture	Employer and employee (internal)	✓	✓	✓	✓	✓		✓	✓	

##### 4.4.1. Catering to government policy

According to the pilot study's findings, interviewees stated that, from the corporate level, an important motive for pursuing IDS was to respond to government policies (e.g. laws and regulations) in environmental protection and technical innovation.

First, increasingly stringent environmental protection policies prompt companies to pursue sustainable development towards innovation. In detail, Interviewee 5 claimed that the unchangeable macro environment, in particular, the national environmental protection policy, is one of the main driving forces for SMEs to pursue environmental sustainability: 'The external driving forces for our company to pursue sustainable development is mainly related to the objective survival environment of our company. Thus, it is mainly the national environmental protection policy that promotes us.' (C1 Interviewee 5). Particularly, continuously updated government policies in fuel and sewage treatment encouraged the owner and top manager, Interviewee 1, to explore a more sustainable way of development (proactive and 'be prepared'), rather than struggling to meet the government's environmental policies or waiting for others to introduce the sustainable technological innovation for the whole textile industry.

'For boilers, whenever we had met the standards, they were raised.....we used to burn coal, but then the government required gas or wood. The government used to require a second-level standard of sewage treatment for the textile company but then they required us to meet the first level...There were residents lived next to our sewage treatment facilities. There were no strict requirements, but then no residents can live within 500 meters from the facilities and we had to be relocated or closed. It costed us over 1 billion...but a company need to meet social and legal requirements, at least it is what we are doing...The government uses coercive laws and regulations to force (us), but the situation is different from company to company. Some have prepared, others are not. Some cannot afford the change, and some are unable to apply the technics, but the country has not considered it in a detailed degree like that...' (C1 Interviewee 1)

It is worth noticing that the examples of updated environmental policies mentioned above also reflected the national transformation and upgrading trend towards traditional industries, which is that the manufacturers are required to act in a more environmentally and socially responsible way.

In addition, for company ED, another motive to pursue IDS is to enjoy potential financial rewards that were revealed in the government's guiding documents of technical innovation. Interviewee 6 answered sincerely and honestly that there is an unspoken rule for Chinese SMEs in qualified industries, which is to generate their development trends and ideas by analysing governments' documents to enjoy project funds and rewards. They normally hire a specific project department director or even a whole department to fulfil this mission.

'.....in China, there are project funds that can be applied by (companies in) qualified industries. Duty of the project department director (of those companies) is to use their information channels, such as the government's websites or from documents issued by higher-level authorities.....this is an unspoken rule.' (C1 Interviewee 6)

In conclusion, as an important external stakeholder, the government's integrated policies force and guide SMEs to be more sustainable and innovative. Based on the empirical evidence, the most effective political approach to encourage an SME to become innovation-driven and sustainability-oriented is to use both 'stick' and 'carrot', which is to announce increasingly strict regulations and standards in the environment, as well as offer financial rewards for new techniques.

#### 4.4.2 Satisfying customers

The pilot study's evidence strongly suggests that satisfying customers is one of the IDS drivers; the customer is one of the important stakeholders for SMEs. Company ED values its customers and the potential ones so much that the general manager (one of the most important decision-makers; another is the owner and top manager) also serves as the sales director. For example, according to Interviewees 1, 3, and 8, one important reason for pursuing IDS is that a relevant sustainability commitment and the following innovations can satisfy customers and may even create new demand. For instance, in company ED's case, well-educated customers demand not only skin-friendly products but also green ways of producing. In particular, Interviewee 3 claimed that, currently, for textile companies, an increased number of their targeted consumers are expecting green products that are not only made with natural fibres but also manufactured in environmentally friendly and pollution-free processes.

'Nowadays, consumers are paying more and more attention to the use of natural fibres, (they expect) not only natural fibres, but also environmentally friendly and pollution-free manufacturing processes (the researcher: which is also known as green manufacturing). They expect the products to be safe and green. These are something that consumers value.' (C1 Interviewee 3)

It is worth noticing that the ultimate goal of satisfying customers is to gain economic benefit, which can be achieved in the short or long term, directly or indirectly. For example, Interviewees 1 and 8 made similar statements that a successful IDS practice will eventually result in new products that can meet or create the demands of customers and be purchased by them. This 'hidden motive' was previously identified by Biondi, Iraldo, and Meredith (2002) and Hansen et al. (2002).

#### 4.4.3 Pursuing economic benefit

Interviewees 1, 3, 5 and 8 in the pilot study believed that motives combined drive Company ED to pursue its sustainability. Besides responding to forces from external stakeholders such as the government and consumers, pursuing economic benefit by decreasing cost or increasing added value is also a motive to consider and adopt IDS strategies, according to the owner and top manager, Interviewee 1. As the actual decision-maker to define or change the corporate development orientation and strategies, which was mentioned by all interviewees of the company ED, he further claimed that pursuing and receiving economic benefits are important and more pragmatic for an SME to fulfil its environmental and social sustainable development goals: 'It is unrealistic and hypocritical to target only environmental and social contributions without pursuing and receiving economic benefits. I would say for all companies the top priority is to gain profit..... You're a business institution, therefore, profitability comes first (the researcher: unlike NPOs). How can you return

to society without achieving profitability, how can you practice your environmental awareness without achieving profitability? It (social and environmental sustainable development) requires investment.’ (C1 Interviewee 1). Interviewee 3 agreed with this opinion by stating that profitability is important not only for corporate survival but also for the company’s continuous development; he further explained that ‘as a private company, our profitability is the foundation of continuous development.’ (C1 Interviewee 3). However, instead of seeing profitability as a significant driving force of IDS, it is more like a basic motive or ultimate goal for all business behaviours, although it might be achieved indirectly or take years. Thus, both interviewees did not treat ‘pursuing economic benefit’ as a single and individual force but combined it with other motivating forces. This finding was shared by Hansen et al. (2002) and Ki-Hoon (2009), who argued that profitability is the fundamental but not the only pursuit for profit SMEs.

#### 4.4.4. Practicing core values of the organizational culture

Three sub-themes emerged by coding motives that were driven by and can reflect the core values of the organizational culture: cherishing and protecting nature, being grateful and repaying, and having senses of crisis and risks. For instance, when asked to conclude motives for pursuing corporate sustainable development, Interviewee 5 claimed that the corporate culture, which includes cherishing and protecting nature as well as being grateful for every moment of our life, is a driving force to pursue environmental and social sustainability:

‘.....The second (driving force) is the corporate culture. Savoring every moment with our hearts. Treating gratitude as a way of life. Cherishing and protecting nature as our common home.....’ (C1 Interviewee 5)

In particular, to interpret why ‘being grateful and repaying’ motivates the company to pursue both economic, social and environmental sustainability, Interviewee 1 further explained that appreciating and repaying the government, employees, farmers, and society is the reason for himself and the company to target corporate sustainability. According to him, *‘If we review and analyse the growth path of the company, we would find out that, only because we have been supported by the society and the government, we can enjoy today’s achievement, today’s atmosphere and trend to develop, and our personal growth space. Thus, we must thank and repay the governments, relatives and friends, employees, and farmers. ... (pursuing corporate sustainability) is a way to say ‘thank you’, to thank the national policy, to thank these people who have done so many practical things for the success of the company and myself.’* (C1 Interviewee 1).

Apart from Interviewees 6 and 9, all the rest of the interviewees in the pilot study claimed that another motive to pursue sustainability towards innovation is the company’s senses of crisis and risks. For instance, Interviewee 1 claimed that ‘be

*aware of the difficulties and risks even when we are enjoying stability and prosperity*

(*居安思危*) is the awareness that drives the company to be innovative and

sustainable developed. He further claimed that the idea and strategic decision of whether to pursue IDS depend on the company's and its decision-makers' senses of risk and crisis, particularly their sense of competition and innovation.

'.....it depends on the company's, including its decision-makers'--in this case is mine--senses; they are very important. If you are satisfied with the current situation, you will be left behind. If you have a sense of risk and act innovative, you may not be easily eliminated; and this (stay in a competitive advantage position) is definitely a result (to have the sense of crisis and risk). Innovate continuously, you will not be overtaken so quickly; but if you do not innovate, it will be difficult to catch up (your competitors) once you are caught up.' (C1 Interviewee 1)

It is worth noticing that the findings of this pilot study show that 'crisis consciousness' manifests itself in three dimensions: creative and innovative, competitive, and proactive. In other words, *the anxiety and desire to conduct innovation, win competition (in product, brand and process), and be prepared for future trends (towards laws, HR costs, and customer requirements)* encourages the company to pursue IDS. Details can be seen in Table 4.4.4-1 below.

Table 4.4.4-1 Classifications of the crisis consciousness

Key themes	Codes	1	2	3	4	5	6	7	8	9
Innovative		✓	✓			✓		✓	✓	
Competitive	Product quality and function	✓	✓					✓	✓	
	Brand	✓	✓					✓		
	Technics, equipment and Processes	✓	✓		✓			✓		
Proactive	Government laws	✓								
	Human resource costs	✓								
	Customer requirements			✓				✓		

It should be noticed that interviewees' quotes revealed that the sense of competition and the spirit of proactive could encourage the desire and practice to be creative and innovative, and further indicated that these core values not only motivate the SME to be innovative and sustainability-oriented directly, but also influence each other and motivate the SME comprehensively. For instance, Interviewee 3 mentioned that competing with traditional environmentally unfriendly

producers and responding to consumers' future-growing demand in sustainable manufacturing encouraged the company to achieve sustainability towards technology innovation comprehensively:

'[Interviewer: May I ask, from the beginning, what motivated your company to approach these IDS projects that you mentioned?] This is a wise choice of our business owner. At that time, traditional products on the market used chemical degumming, which used some strong acids and alkalis that caused greater pollution to the environment. We aware that people's requirements and standards for the environment (protection) would become higher and higher, that is to say, this production method would not be sustainable. We needed to find a production method suitable for sustainable development.....' (C1 Interviewee 3)

Another interesting finding was that the core values of the corporate culture that motivated the company to pursue its innovation-driven sustainability were significantly influenced by the Chinese culture and beliefs. In other words, what can be concluded and defined as '知恩图报' (being grateful and repaying), '居安思危' (having a sense of crisis and risks), '未雨绸缪' (being proactive) were well-known traditional principals and spirits of the Chinese nation. Moreover, according to the researcher's memo, during and after the interviews, proverbs such as '滴水之恩,当涌泉相报', '鸦有反哺之义,羊知跪乳之恩' (being grateful and repaying); '生于忧患,死于安乐' (孟子), '如逆水行舟,不进则退', '宜未雨而绸缪,勿临渴而掘井' (清初朱柏庐《治家格言》) (having senses of crisis and risks) were frequently quoted by interviewees or presented in the bulletin board to promote corporate culture. This finding that national culture can influence corporate culture has been well-studied by previous researchers such as Khan and Law (2018).

#### 4.4.5 The IDS drivers that emerged

Key factors and stakeholders who motivated the SMEs to pursue their sustainability were similar to what was found in the pilot study. In detail, catering to government policy, satisfying customers, pursuing economic benefits, and practising the core value of the organizational culture were also identified as the main driving forces for SMEs to achieve sustainability towards innovations. However, a few themes emerged, including key themes such as pursuing long-term competitive advantage and (at the individual level) meeting owners' and top managers' self-actualization needs. Furthermore, in the existing themes, several new sub-themes were also

identified by the main study's interviewees, including 'phase out the backward and redundant industrial capacities', 'energy-saving (conserve energy)' and 'support circular economy' as detailed government policies of sustainable development that motivated companies to achieve sustainability by conducting innovations, as well as 'being responsible' to human beings, society, customers and employees as the particular core value of the organizational culture that drove the company to be innovative and sustainable. The details can be seen in Appendix E3.

#### **4.5 CSMEs' IDS actions, strategies and adoption process**

##### **4.5.1 IDS actions**

During the study's interviews, participants mentioned several detailed IDS behaviours adopted most commonly and successfully by CSMEs. The findings revealed that innovations in product design, product development and application, techniques, equipment, processes, and strategic supply chain are comprehensively used and continuously developed.

Table 4.5. 1-1 Actions in achieving both economic, social and environmental sustainability (the pilot case as examples)

Key themes	1	2	3	4	5	6	7	8	9	Representative cases (actions and how they link to sustainability)
Product innovation	✓	✓			✓	✓	✓	✓		<p>By applying similar technology and materials but different designs in its cultural surroundings, personalized products, and Bast and Leaf Fibres Fashion Week projects, the company has achieved economic benefits (economic); promoted a low-carbon and environmentally friendly lifestyle (environmental), and successfully saved and presented the traditional culture and technics, encouraged regional development, and changed the development speed and direction of the industry (social) (Interviewees 2, 5, 7 and 8; ED Exhibition Hall Info; Guo, 2018; Wu, 2010)</p> <p>In particular, with the technical support of energy saving and environmental protection (environmental), the company produces, displays and sells arts and crafts with Xia Bu (夏布) on the basis of cooperation.</p> <p>This project has helped the company to get more revenue, attracted customers other than the targeted ones in large bedding (economic), satisfied customers' demands in gifting and personal use, spread the Xia Bu culture and continued the Gan embroidery (赣绣) techniques, promoted Chinese traditional arts and poetry, increased embroidery worker's income and promoted the development of local tourism (social) (Interviewees 2, 7 and 8; ED Exhibition Hall Info; Guo, 2018; Liang, 2017)</p> <p>Another example is that, with the same technical support of energy saving and environmental protection (environmental), the company organized and funded fashion design competitions. The series of competitions integrated the best domestic textile and fabric suppliers and art designers (social), promoted natural fibres and green production (environmental), applied national intangible cultural heritage skills such as Xia Bu, Batik (蜡染), counted-thread embroidery (挑花) and hand push embroidery (手推绣) (social), inherited Chinese philosophical ideas such as the unity of nature and human (天人合一) (social and environmental), promoted the popularity and design innovation of the bast and leaf fibres textile industry (social),</p>



Business model innovation	Strategic supply chain/ Extended enterprise/Vertical integration strategy 全产业链	✓	✓	✓						<p>The entire supply chain, from the planting of raw materials to the selling of the finished product, the company implements protective price purchases, promotes mechanized operations, bans synthetic fertilizers and pesticides, prints and dyes in environmentally friendly and zero emission way, and designs and develops products by following the internationally popular and consumer-recognized ideas. The whole process is environmentally friendly (environmental), customer-satisfied (social and economic), and the company itself is profitable (economic). And it increases local farmers' income, reduces their labour intensity, and solves local residents' unemployment (social) (Interviewees 1, 3 and 4)</p>
---------------------------	---	---	---	---	--	--	--	--	--	---

From an innovation form perspective, Interviewees 7 and 8 pointed out that product innovation (e.g. product design, product development and application) is the most commonly used innovation to achieve corporate sustainability. The interviewees further explained that it is because, in their opinion, Company ED is a manufacturing SME thus product is the main activity. In particular, participant 8, the employee in charge of assessing and monitoring ISO and Quality Control, claimed that Company ED is a producer thus producing innovative and sustainable products that can satisfy customers is the most practical objective for the company.

‘.....I think (we achieve sustainable development) mostly by conducting product innovation, because we are mainly a production-oriented enterprise. Other companies, such as those strategic-oriented enterprise, may commonly utilize other classifications or forms of innovation. They might introduce a new lifestyle or change the mainstream thoughts; however, our innovations are more related to pragmatic (product) application. Whether the product can meet customers’ demands and make them pay or not is one of the most practical indicators to evaluate whether an innovation is successful or not. This (the real business world) is very realistic.’ (C1 Interviewee 8)

However, Interviewee 5 specified that not only product innovation in design or development and application but also process innovation in environmentally friendly technology are the two main engines in achieving IDS. An ‘applied advanced environmentally friendly technology – invented new fabric – launched new product and expanded new market’ example was given to interpret that the product innovations in design and application are relied on and supported by the successful process innovation in technology; thus, she concluded that:

‘I think that, currently, our innovation-drive practices have two levels: one is the innovations of production technology, especially environmentally friendly and ecologically sustainable technological innovations; and the other is product R&D, design changes life, and design can also change the development speed and direction of an industry.’ (C1 Interviewee 5)

Interviewee 3 agreed with Interviewee 5 by briefly concluding that ‘new products and new processes are both important’ (C1 Interviewee 3) to evaluate a company’s innovativeness and sustainability from the innovation output perspective.

On the other hand, Interviewee 9, from the degree of newness perspective, pointed out that incremental innovation is more practical and less risky for an SME. As the head of one of the most important and innovative factories and an awarded innovation model who recently designed and implemented a process innovation in equipment and HR relocating as well as processes upgrading successfully, he pointed

out that incremental innovation can reduce the company's risk in spending long time and large fund by recommending that:

'(Any IDS-related innovation) must be based on the actual situation of the enterprise. It must be carried out with strategic plan and step by step. And we must not be too greedy for developing and applying advanced and radical technology; like (a country must not target to invest and develop) too advanced weapons, we cannot learn it in a short time, and the cost might be too high.' (C1 Interviewee 9)

#### 4.5.2 IDS strategy

However, when interviewees were asked to give a detailed example of the IDS strategy that impressed them the most, two integrated strategies were mentioned most frequently: *a) the continuous innovations based on the advanced microbial degumming technology* and *b) the extended strategic supply chain*. Interviewees further explained that the reasons to choose these two were that: first, they are the most successful, integrated and representative IDS strategies which define the sustainable and highly competitive business model of the company; furthermore, their contribution to the economic, environmental and social sustainability are direct, remarkable, significant and long-lasting. The detailed measurements and indicators were coded and clustered, which can offer readers a more comprehensive measuring criterion based on empirical evidence. They were then presented in Section 4.9.

Table 4.5.2-1 Interviewees who mentioned at least one integrated strategy (the pilot case)

Representative IDS strategies	1	2	3	4	5	6	7	8	9	How is this strategy integrated?
a) the continuous innovations based on the advanced microbial degumming technology	✓	✓			✓					Process innovation (in techniques + equipment + processes) + Product innovation (in development and application)
b) the extended strategic supply chain	✓		✓	✓			✓	✓		Agriculture (as material buyer and cooperator) + Manufacture (as semi-finished products manufacturer + products manufacturer) + Service (as retailer + cultural promotor)

By reviewing, coding and analysing IDS actions within these two innovation-driven sustainable development strategies in detail, the researcher got an interesting finding that neither of these strategies is limited to adopting the SME's preferred product innovations (as mentioned by Interviewees 7 and 8) or incremental innovation (as mentioned by Interviewee 9), but is more radical, integrated and continuously innovated.

In addition, by coding and analysing interviewees' personal memories about these two IDS strategies, the researcher found out that not only both *strategies a* and *b* are integrated strategies that last for years and are continuously innovated, but also, in fact, *strategy b* is the extended strategy based on and supported by *strategy a*. The reason why most mentioned innovations and *strategy b* can be linked back to *strategy a* might be that, by successfully adopting *strategy a*, especially by integrating techniques and innovating equipment, the company achieved its dynamic capability that enhanced its competitive advantage in the textile industry, as follows, the company's main business is changing, and even the business model is upgrading to make the company more sustainable; it further influence the company's technology, development goal and even their understanding and motivations about IDS. This possible interpretation is made by synthesising all interviewees' answers and secondary data, such as news in reliable industry journals and newspapers and the patent application reports of the company. All these relevant motivations and influencing factors were discussed in-depth in the following sections.

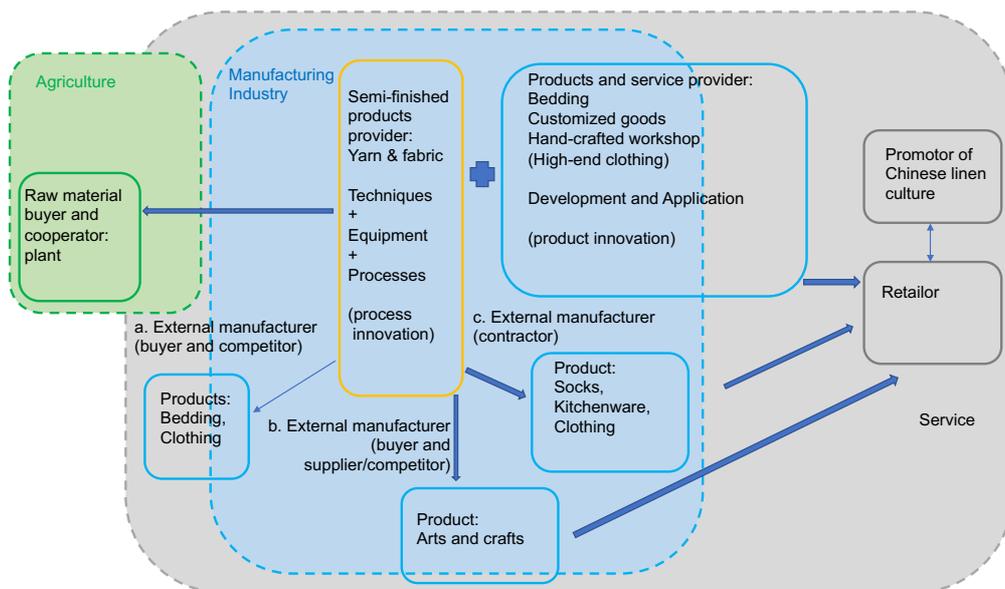


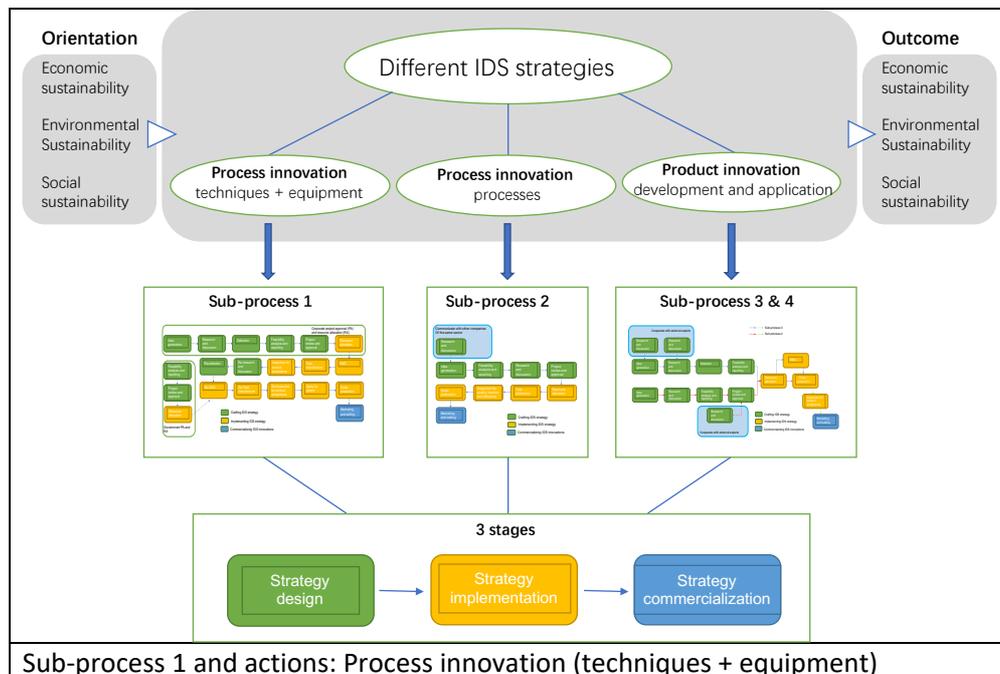
Figure 4.5.2-1 An extended strategic supply chain (strategy b) that contains continuous innovations based on the advanced microbial degumming technology (strategy a)

#### 4.5.3 Integrated process of IDS strategy adoption

In interpreting how to craft, implement and commercialize IDS strategies, representative strategies included *a) the continuous innovations based on the advanced microbial degumming technology* and *b) the extended strategic supply chain* were discussed in detail during the in-depth interviews, activities and processes were described in-depth by recalling the interviewees' professional knowledge and their personal experience in participating in these specific projects.

Concerning (and noticing) that milestones (e.g. dates and activities) might be (and were) misremembered, data were triangulated across the transcripts and the secondary data, including feasibility study report (FSR), product acceptance report and patent application records to ensure reliability.

By conducting data analysis, different forms of innovations emerged within different IDS strategies. After examining details of the most representative or extreme innovations' processes (1 process about innovation in techniques and equipment, 1 process about innovation in processes, 2 processes about innovation in development and application), three key findings were concluded. First, three stages were classified, summarised as 'strategy design', 'strategy implementation' and 'commercialization'. Second, a stage can be re-experienced, and actions in each stage can be re-conducted, simplified, and even skipped. Third, representative actions in each stage were coded, clustered and then summarised; relevant, interesting findings were discussed in-depth.



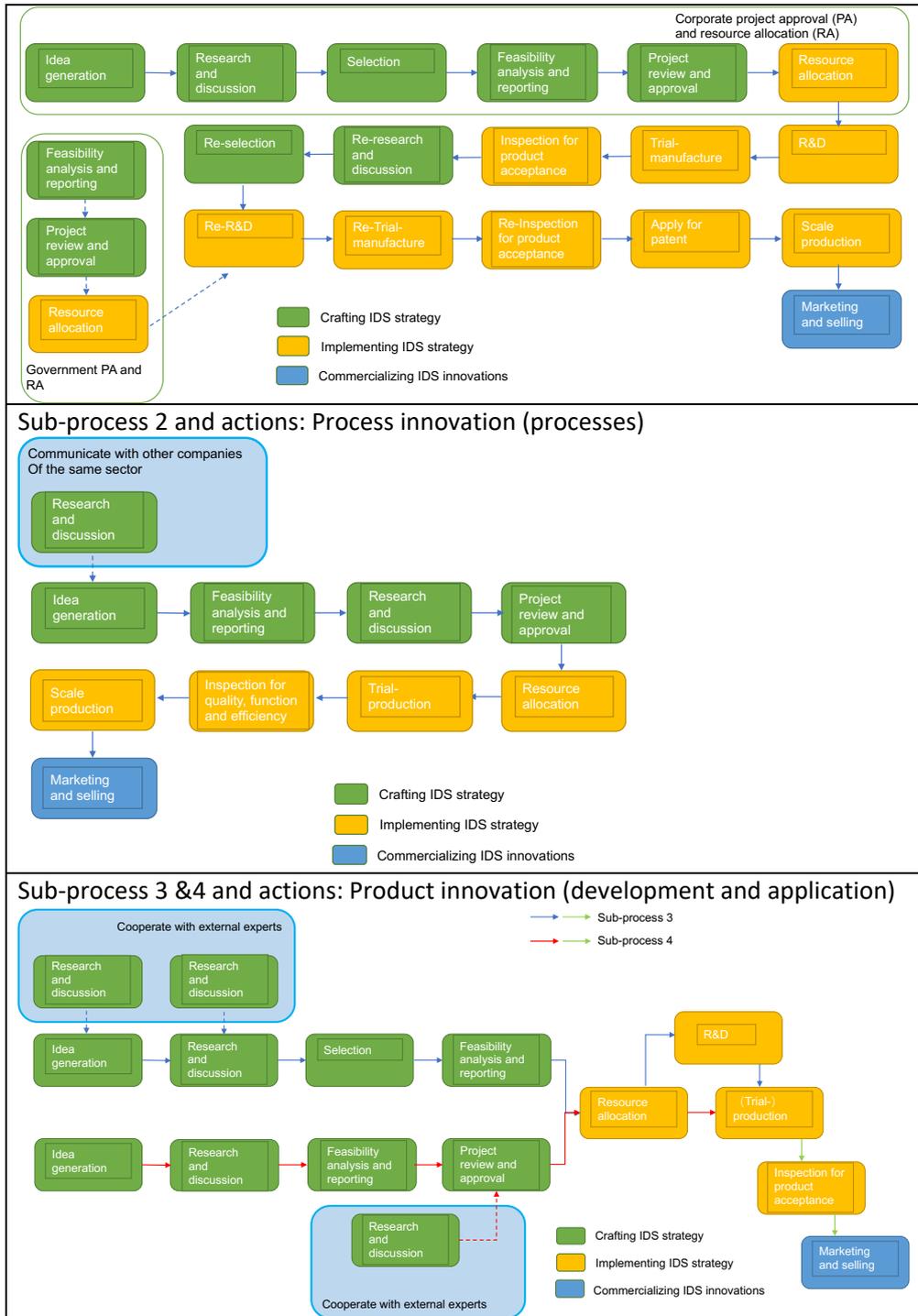


Figure 4.5.3-1 Integrated process of IDS strategy adoption

The empirical data revealed that, although in the real business world there are plenty of actions involved in the process to adopt IDS strategy, in each (sub-)innovation or view them as an integrated process, these actions can be classified into three different stages: strategy design, strategy implementation and

commercialization. These stages can be re-experienced, and actions within each stage can be re-conducted, simplified, and even skipped.

First, stages and actions can be re-experienced and re-conducted, not only in the integrated IDS strategy, but also in the process of each (sub-)innovation within the integrated IDS strategy. For instance, most interviewees, especially Interviewees 1 and 3, mentioned that when the company experienced difficulties in applying the advanced microbial technology from lab to trial-manufacture (in the implementation stage), they re-conducted actions included 'research and discussion' and 'selection' (belongs to strategy design stage) due to technical challenges and fund shortage, and then decided to re-open the project after three years and finally solve the problem out by applying government funds (government support) and inventing the new equipment which integrated technics and knowledge from different subjects with external designers and manufacturers (cooperation). In this case, strategy design and implementation were both re-experienced, and actions such as 'selection' in 'strategy design' and 'R&D' in 'strategy implementation' were re-conducted (see Figure 4.5.3 in detail). The existence of 're-conduct' can also be identified by reviewing sub-processes 2, 3 and 4; among them, 'research and discussion' was appeared repeatedly.

Second, actions in each stage can be simplified, and even skipped. Sub-process 3 is a top-down strategy which tried to launch a new product (according to Interviewees 1 and 7); by discussing with industry experts and potential cooperators, the owner and top manager, Interviewee 1, noticed increased market demand in green fashion and specific types of yarn and fabric and then emerged new ideas about product development and application; therefore, the company simplified the formal 'project review and approval' and targeted 'feasibility analysis and reporting', in particular, designing a practical resource allocation plan, as the most important action in the strategy design stage. Interviewees 7 and 8 said most product innovations based on the advanced microbial degumming technology were top-down strategies ('follow the top manager's order'), and actions were simplified or even skipped because they try to be more flexible and respond to the emerging trends in consumers' preference as fast as they can. This can be supported by studies of the nature of SMEs, which is that they are flexible in responding to market and policy demands (Aragón-Correa et al., 2008; Brammer et al., 2012). Interviewees 1 and 7 emphasised that these simplified processes can be efficient and successful because the top manager made the right decision at the beginning, and this relies on the decision-maker collecting and selecting valuable information through cooperation (Interviewee 1) and his personal networks (Interviewees 7 and 8). Although they were both processes related to innovations in product development and application, unlike sub-process 3, sub-process 4 is described as a bottom-up strategy which tried to sell existing products to new markets (according to Interviewees 7, 8 and 9); therefore, no R&D was conducted.

By reviewing the descriptions of these innovations within the integrated IDS strategy, there were some other interesting findings, such as a company's cooperation with external experts has different objectives, influencing different actions and their results. However, cooperation was analysed in-depth in the following sections about influencing factors in each stage, so it will not be discussed further in this section. Furthermore, themes were identified and clustered by coding and analysing actions in these processes. These themes were presented in depth in sub-sections 4.6.1, 4.7.1, and 4.8.1.

## 4.6 Crafting IDS strategy

### 4.6.1 Crafting IDS strategy

The findings based on the pilot study (*Table 4.6.1-1*) show that in crafting (also coded as the strategy design stage), actions were concluded as 'idea generation', 'research and discussion', 'selection', 'feasibility analysis and reporting', and 'project review and approval'. The main cases show no differences.

Table 4.6.1-1 Representative Actions in crafting

Key themes	I1	I2	I3	I4	I5	I6	I7	I8	I9
Idea generation 产生构思					✓	✓	✓		
Research and discussion 研讨		✓		✓	✓		✓	✓	
Selection 筛选		✓		✓	✓				
Feasibility analysis and reporting 拟定可行性方案		✓		✓					
Project review and approval 审批		✓		✓					

Compared to findings based on reviewing and analysing prior literature (e.g. Bradley et al., 2012; Hansen et al., 2002; Kesting et al., 2016), 'feasibility analysis and reporting' and 'project review and approval' were new. These two representative actions reflected that Chinese SMEs (CSMEs) attach great importance to project establishment. This finding is supported by the fact that all interviewees mentioned 'project establishment' in describing either integrated IDS strategies or sustainability-related innovations. In addition, the fact that every targeted company has a 'project application department' or 'project application staff' can also support the CSMEs' enthusiasm for the 'project' (based on pre-interview information collection). This may be due to the fact that the advanced system of project management is a relatively newly introduced or updated knowledge to CSMEs compared to their international competitors (e.g. case JDZG, HR manager), and they prefer to make more effort to apply and even innovate their practice in this area to find a more practical and efficient way to adopt the IDS strategy (e.g. case ED, project manager), and meet or even ahead of the updated IOS standards (e.g. case JDZG, HR manager). It might also be because well-organised and reported actions

such as ‘feasibility analysis and reporting’ and ‘project review and approval’ can help the SME to pursue resources, verification and reward from their external stakeholders such as government and bank (e.g. case ED, project manager). Another possible reason was that, in SMEs, top managers and the owners are the most important or even the only decision-makers (e.g. case ED, owner); by separating these two actions from the typical *discussion and selection*, they could show authority, and more comfortable and practical to make final decisions. Interviewee 2 (C1) even claimed that ‘...Unlike the management team who have to know technics...the boss is allowed to understand nothing, as long as he can plan and approve the resource allocation’. For these SMEs, these two actions were necessary to be separated from the *discussion and selection* that other management and technical experts get involved.

#### 4.6.2 Influencing factors

A set of influencing factors at the stage of crafting IDS strategy were discovered from both pilot and main studies. The emerging key themes can be classified into four main hierarchy levels: the industry and market level, the firm level, the team level and the individual level. Considering contextual factors, in other words, factors at the industry and market level, are similar to what had been identified in the motivation section, and word limits, they were briefly presented in the Appendix without further discussion. Influencing factors at firm, team and individual levels were presented and interpreted with details.

##### 4.6.2.1 Firm-level factors

The empirical data collected from the pilot study indicate that five key themes emerged. Details can be seen below.

Table 4.6.2.1-1 Key influencing factors for IDS strategy crafting (firm-level) (the pilot case)

Key themes		1	2	3	4	5	6	7	8	9	Narrative
Technic and processes		✓						✓		✓	The internal competencies in technics and processes influence strategy selection (e.g. Interviewee 1, Interviewee 7, Interviewee 9)
Talent	Recruitment		✓					✓	✓		Recruiting professional and innovative technic talents generate innovative ideas (e.g. Interviewee 2, Interviewee 8)  Recruiting professional and skilled sales staff provide information to select feasible strategy (e.g. Interviewee 7)
	Training	✓			✓						Training talents’ sustainable development awareness

											generate sustainable ideas (e.g. Interviewee 1)  Training talents' innovative capability generate innovative ideas (e.g. Interviewee 4)
Cost-control		✓									✓ Cost-saving objective generates innovative and sustainable ideas (e.g. Interviewee 9)  Cost-control consideration influence strategy selection (e.g. Interviewee 1, Interviewee 9)
Innovation incentive action			✓		✓						Material and spiritual rewards encourage innovative ideas (e.g. Interviewee 3, Interviewee 5)
corporate development goals			✓								Target innovations in every stream of the supply chain (e.g. Interviewee 2)  Target economic, environmental and social sustainability (e.g. Interviewee 2)

The above table revealed that, among these key factors, the activities that generate innovative ideas were *'recruiting professional and innovative technic talents'*, *'training talents' innovative capability'* and *'rewarding innovative talents with both material and spiritual benefits'*. However, by training sustainable development awareness of talents, the company can further generate ideas that also meet the company's sustainable development intention. An interesting finding was that, these sustainable development awareness training sessions and programmes were promoted in introducing the company's development goals and organizational culture; however, they were mainly updated by attending external training sessions and then shared within the company (e.g. C1 Interviewee 6). As Interviewees 2 and 6 pointed out, internal training mainly focuses on 'corporate history', 'corporate culture', 'fire safety', 'production safety' and 'skills learning and development'; thus, by actively attending external training sessions that organized by the government, the industry association, large and well-known enterprises or specialized training institutions, the company itself can 'absorb' advanced and latest experience and knowledge in management, innovation and sustainable development. Interviewee 1 highlighted the role of external training institutions in fostering a sustainable development mindset, stating that 'although the company has its own HR department and training team, however, limited to their personal capabilities, these personnel can only train employees in management and production technics. But in terms of sustainable development awareness, particularly the latest recognitions, are definitely rely on inviting specialized training institutions to lecture and coach.' (C1 Interviewee 1).

Another interesting finding was that, cost-control was a key firm-level influencing factor in crafting IDS strategy; however, when in-depth exploring how an objective like that can generate employees' innovative and sustainable ideas, the personal sensitivity and interest in cost-saving and efficiency, an individual-level factor, was identified as the initial driving force. According to Interviewee 9, the main reason for him to notice the opportunity and generate the IDS idea was that he and other workers suffered the inconvenience of running from one workshop to another (which had different production lines separately), and then he observed one year that the current human and facilities allocation caused great cost in human resource, electricity, as well as machine maintenance and replacement. His personal interest in cost-saving and efficiency encouraged him to design a solution that can both contribute to economic sustainability (e.g. save human, electricity and machine cost, improve work efficiency), environmental sustainability (e.g. energy-saving) and social sustainability (e.g. improve employees' capabilities in team-working, multitasking and multi-technics).

In addition, the above table revealed that, among these key factors, the empirical elements that influenced strategy selection were *'the internal competencies in technics and processes'*, *'the market demand and consumers' preference that collected by recruited professional and skilled sales staff'* and *'cost-control consideration'*. Based on interviewees' examples (primary data) and the company's feasibility reports (secondary data), they were the combined elements of the selection criteria to evaluate and decide whether an IDS strategy and its (sub or follow-up) innovations are worth investing in and able to be accomplished.

It is worth noticing that, although the interviewees did not emphasise the important roles of their corporate development goals in strategy crafting, such as 'target innovations in every stream of the supply chain' (relevant strategy such as the extended strategic supply chain) or 'target economic, environmental and social sustainability' (relevant strategy such as the continuous innovations based on the advanced microbial degumming technology); however, these goals influence every action of the strategy crafting from the idea generation to the project review and approval (detailed actions of the strategy crafting can be seen in section 4.6.1). For instance, when talked about how to contribute to strategy crafting, Interviewee 2 pointed out that, as a technical talent and manager, only an opinion that not only investigated the feasibility and adaptability of the technology but also considered whether this technic is consistent with the sustainability orientation of the company can be regarded as a professional opinion.

#### 4.6.2.2 Team-level factors

Findings from the pilot study indicated that the main team characteristics that can support and encourage IDS strategy craft are being professional and cooperative. First, a professional team is able to contribute to reasonable and feasible IDS

decision-making. Particularly, the management team mainly contribute to the IDS strategy crafting by providing professional knowledge and information about technology, marketing, finance and production, and whether this strategy can support its sustainability orientation. Second, to support a better decision, the team has to not only express different opinions but also integrate these various information and knowledge together.

First, a professional team is able to contribute to reasonable and feasible IDS decision-making by providing professional knowledge and information about technology, marketing, finance, and production. For instance, according to Interviewee 2, providing professional analysis and findings about the feasibility and adaptability of the technology, as well as whether this technic is consistent with the sustainability orientation of the company, are the main contribution of the management team to decision-making:

‘As the Executive Deputy General Manager of the company, I have to know about the situation of our innovation and sustainable development as much as possible. In particular, (I have to know) the feasibility and adaptability of the technology, and whether this technic is in line with the development direction of the company or not. Only when we clearly understand the situation, we are able to better participate in decision-making.....The management team itself is a technical team. It is necessary for the team to understand technology. And in fact, it is difficult to enter the management team without knowing technology. (Unlike the management team), the boss is allowed to understand nothing, as long as he can plan and approve the resource allocation.’ (C1 Interviewee 2)

Interviewee 4, who is the Project Approval Manager, also claimed that the management team mainly contribute to the IDS strategy crafting by providing professional knowledge and information about technology and marketing:

‘We mainly provide technical information such as what kind of products are able to be invented and produced, or which products are expected by the market. We also provide other marketing information and knowledge.’ (C1 Interviewee 4)

Interviewee 4 further specified other members such as the marketing, accounting and producing experts who had actively contributed to the IDS strategy design:

‘Our company has a research and development (R&D) centre and has its own technical management committee and appraisal centre committee. This group of people will participate in the whole process every time when an IDS project is initiated and discussed. The CEO, the deputy general manager, the main person in charge of every department and every factory are all

required to participate.....sales staff and financial staff are there.....And they will express different opinions according to their job responsibilities.’ (C1 Interviewee 4)

Second, to contribute to reasonable and feasible IDS decision-making, the team itself must be not only professional but also cooperative. In other words, in order to support a better decision, the team has to not only express different opinions but also integrate these various information and knowledge together. For instance, according to Interviewee 7, every employee in each department must generate creative ideas from raw materials to the end-use products, as well as express and integrate opinions from generating ideas to analysing and reporting the feasibility of the IDS-related project:

‘Making a new product is not as simple as you think. Even a small decoration such as a fan is not as simple as it sounds. How do you launch a new product that can contribute to corporate sustainability? --you start with raw materials. Why it is feasible and practical? --because everyone must brainstorm the strategy: what am I going to target? what are we able to innovate? and what can be accepted by the current market.....this may not only related to our R & D department, others such as the marketing department and the sales experts may have some opinions and have to be cooperated.’ (C1 Interviewee 7)

It is worth noticing that, although the senior managers and employees from each department were actively involved in the IDS strategy crafting, decisions in this stage were actually made by the owner and his close family members. Others, even the R&D Manager (Interviewee 3), the project approval manager (Interviewee 4), and the Factory Manager (Interviewee 9), positioned themselves as information and knowledge providers instead of decision-makers. And family ownership was seen as the main reason to shape an exclusive decision-making mechanism and power structure like that. For instance, Interviewee 4 claimed that:

‘We do not participate in decision-making but only provide opinions and reference information. Because it is a private company, not a state-owned one. It has a family-run decision-making circle. We are not involved, we just work.’ (C1 Interviewee 4)

and that:

‘..... (the decision) it must be made by the CEO and the general manager (memo: the CEO’s sister). As a family-owned company, the boss is definitely the person to make final decisions. In a state-owned company, it is necessary to listen to everyone’s decisions, but in a family firm, all decisions are made by its ‘parents.’’ (C1 Interviewee 4)

The small company and family firm's exclusive decision system was widely noticed by prior research (Prajogo & McDermott, 2014; Tsai, Lin, Lin, Lu & Nugroho (2018)). For instance, Tsai et al. (2018) found similar decision-making mechanisms and power structures in their study of the family-owned business. The fact that the owner is the actual and even the autocratic decision-maker has become a well-known characteristic of small businesses, and nepotism has become the biggest obstacle to the sustainable development of family businesses. Although many small and medium-sized enterprises and family businesses are beginning to realize these potential problems and start to improve, this requires strong determination and patience.

#### *4.6.2.3 Individual-level factors*

Based on the pilot study's findings, at the individual level, the main abilities that can impact IDS strategy design are information-collecting and problem-finding abilities.

First, each employee's information-collecting ability helps the company develop an IDS strategy that caters to the market better. In detail, according to Interviewees 7 and 8, by analysing information on the consumers' preferences and market demand, the company can predict how they will respond to what kind of new products, and this analysis can better help the company select and design particular innovation strategies. For instance, Interviewee 7 claimed that, because opening stores is the main selling channel of the company, each salesman and saleswoman's information collecting and analysing abilities are important to help to select next year's new product launch:

'Because the company's marketing strategy mainly relies on opening local stores, the sales staff's ability to collect and analyse information about consumer's needs is very important. For example, the customer wants a cushion, in order to offer an advanced service, the employee has to collect information about its size, fabric or processes.....employees record valuable information and send them back to us, so we can analyse whether a new product can be launched next year based on this year's records.....' (C1 Interviewee 7)

In addition to information collected by employees in the sales department, Interviewee 8 claimed that information collected by technical employees also matters for IDS strategy design. However, information about technology and products was mainly collected from the latest published magazines; thus, the sales staff's information collection was important so innovations in technology and products could better meet the customers' demands and preferences. For instance, in transcript 8, Interviewee 8 claimed that:

‘For employees in our production department, the ability to collect information is also very important. However, we know very little about external information, and we mainly learn about them (e.g. advanced industry technology and newest products) through some of the latest magazines. Some people outside, especially salespeople, will understand (the market) and send feedback to the company; (in considering designing an IDS-related strategy,) we need to cater to the customer needs and preferences that they have collected.’ (C1 Interviewee 8)

According to Interviewees 3 and 8, another important ability to support the idea generation of the IDS strategy design is the individual’s finding ability, which includes finding in production and the market. For instance, Interviewee 3 emphasised that, from an individual perspective, the ability of senior managers to find creative ideas and the ability of the top manager to value and encourage these ideas are the most important abilities to support IDS strategy design:

‘..... what’s more important is that the leaders pay a lot attention to this aspect (innovation and corporate sustainability) and can find some things in the details of the production process. I think leaders are very important in this part, which is can they find problems in their lives, can they attract attention to these problems, and can they turn these problems into something with intellectual property rights and use value? (Does the leaders mean the top manager? Or senior managers like you? ) Both. The design of the incentive measures involves more about the highest leadership level. We are in close contact with the front line of production; thus, we may find that the heavy task to find ‘something’ falls into our responsibilities a lot more.’ (C1 Interviewee 3)

Besides that, finding opportunities to occupy a market is also important for individuals to contribute to IDS strategy design. The consequence was well-known as the ‘*first-mover advantage*’ in prior studies (Hirose, Lee & Matsumura, 2017; Yang, Luo & Wang, 2017). According to Interviewee 8, companies are living in a market-oriented and highly competitive environment; thus, whether an individual can find the opportunity to develop an innovative product which can capture a large market share is the most important factor not only for designing a practical and successful IDS strategy but also for maintaining the corporate sustainability:

‘The market for the enterprises as if the light source for the phototaxis bugs: everyone will go in one direction. So how do you maximize your advantage while everyone is walking? Whoever can make the best product first, he or she can occupy the market. China has a lot of relevant examples recently, such as Taobao et cetera, they all have the decided advantages by launching advanced new products. The finding ability of a person is very important. We have so many Chinese people, and I have to say that there are so many

intelligent ones.....' (C1 Interviewee 8)

In addition, 4 out of 9 interviewees emphasised that the top manager's capabilities, especially his or her information management and decision-making abilities, play important roles in an SME's IDS strategy design (see *Table 4.6.2.3-1* below). This is supported by the prior literature that, as an SME, the owner and top managers play the most and even the only important roles in operation and decision-making (Freel, 2005; Prajogo & McDermott, 2014). In company ED, the owner and top manager (Interviewee 1) and the general manager and sales director (Interviewee 5) are the most important people who take major responsibility for the company's survival and sustainable development. By using their networks as information sources, they lead the corporate development goals at the firm level, approve the feasible IDS strategy, and allocate resources that can support the IDS strategy to achieve relevant sustainability achievements; thus, their support, especially their information management and decision-making abilities, influence the SME's IDS strategy crafting significantly. As Interviewee 8 pointed out in transcript 8, 'They should be better than us.....particularly in decision-making, which mainly depends on their great leadership. Only when they have the corresponding resources, we will be given the opportunity to produce ... The company is similar as a ship. Sailors are the lower-level employees. The captain is the leader. Whether the decision of the company is made successfully or not determines the company's direction (to its failure or development)' (C1 Interviewee 8).

Table 4.6.2.3-1 Top managers' influence in strategy crafting (the pilot case)

Top managers' influences in strategy crafting	Representative quotes
lead the corporate development goals at the firm-level	By studying, investigating and exchanging information with externals, about the development orientation and goals, first of all, I myself (as the chairman) must have a basic idea and concept..... (Interviewee 1) The leader is very important, just like in a flock of sheep, the head sheep is very important (Interviewee 4)
approve the feasible IDS strategy	I design the feasible R&D plan and wait for the owner to approve, and then organize marketing and R&D personnel to be responsible for the implementation (Interviewee 5) They should be better than us.....particularly in decision-making, which mainly depends on their great leadership... (Interviewee 8)
allocate resource that can support the IDS strategy	(Unlike the management team who have to know technics), the boss is allowed to understand nothing, as long as he can plan and approve the resource allocation.' (Interviewee 2)

	Only when they have the corresponding resources, we will be given the opportunity to produce ...(Interviewee 8)
--	---

## 4.7 Implementing IDS strategy

### 4.7.1 Implementing IDS strategy

The findings based on the pilot study (*Table 4.7.1-1*) revealed that, in the implementation stage, actions were concluded as ‘resource allocation’, ‘R&D’, ‘Trial-manufacture’, ‘inspection for product acceptance’, ‘scale production’ and ‘apply and register the innovation outputs’. Reviewing key themes from the rest of the case studies shows that no new sub-themes have emerged.

Table 4.7.1-1 Representative Actions in implementing

Key themes	I1	I2	I3	I4	I5	I6	I7	I8	I9
Resource allocation 资源配置		✓		✓	✓	✓			
Research and development (R&D) 研发				✓		✓			
Trial-manufacture 试制				✓				✓	
Inspection for product acceptance 产品验收		✓		✓				✓	
Scale production 规模生产						✓		✓	
Apply and register the innovation outputs 申报				✓				✓	

An interesting finding was, whether to conduct trial manufacturing, scale production, or both, depending on whether the specific project targeted contracted customers or potential markets, and their required quantity of the products. For instance, company XDF only conducts trial manufacture but no scale production in every project because they target contracted customers with fixed and small quantities. In addition, whether the innovation is radical or incremental also influences their practice in this stage. For instance, company ED’s radical innovation in techniques and equipment requires trial manufacturing before scale production; however, its incremental innovation in product development and application only requires scale production.

Another interesting finding was, applying and registering the innovation outputs can result in ‘patent’, ‘verified by government’ and ‘awarded innovation model’ (see section 4.9), which are used by SMEs to monitor the outputs and even the outcomes of their IDS strategy (and the sub-innovations within these strategies). In addition to making it easier to evaluate innovations, a motive and reason to apply and register is that intellectual prosperity can be protected by authorities, and well-recognized by the industry, potential customers and local community; this further leads to their economic sustainability in finance and branding, and social sustainability in

employee satisfaction (e.g. C1, C3, C6 and C7). However, not every IDS-related innovation within the strategy will be applied and registered. Based on interviewees' interpretations, this is because actions like this will reveal information, and other competitors might copy the idea or even buy and test the relevant products to figure out the IDS-related techniques behind them (e.g. C5 and C11).

#### 4.7.2 Influencing factors

Reviewing the data and findings of both the pilot study and other case studies, in total, 14 key themes are discovered; amongst them, 11 are derived from the pilot study, including contextual factors and networks such as the raw material, policy, markets and consumer preference, and supply chain cooperation, 'technic, processes and equipment', 'talents recruitment, allocation and training', 'fund/project investment' and 'innovation incentive action' at the firm level, and being persevere, professional and cooperative at the team level. 3 key themes that emerged from the main study are components, competition, R&D department and TFT. Each theme from the pilot and main studies was discussed in turn in this subsection, and the interactive influencing effects were further explored and analysed.

##### *4.7.2.1 Contextual factors and networks*

Based on the findings of the pilot study, from landscape, regime and niche perspectives, key factors that impact IDS strategy implementation are raw material, policy, markets and consumer preference, and supply chain cooperation. Details can be seen below.

Table 4.7.2.1-1 External factors and networking in influencing IDS implementation (the pilot case)

Contextual factors and networks		I1	I2	I3	I4	I5	I6	I7	I8	I9	Representative quotes
Raw material (supplier)	Nature		✓	✓						✓	The agitator has a device similar to a propeller, which will twist the ramie. Therefore, the external circulation is used, and the air is used to promote it. This is a special design that we originally innovated... We also refer to the biological fermentation industry. Because the fermentation industry usually uses liquid as the carrier, however, because our raw materials are solid, some adjustments have been made accordingly... We also got the invention patent in that design and technic..... (Interviewee 3) Ramie has many advantages, but also many disadvantages, for instance..... Thus in implementing the product innovation strategy, we have to build blending production lines to learn from each material's strengths and avoid it's weakness..... (Interviewee 9)
	Quality and quantity				✓				✓	✓	Some SOI projects have no choice but to give up because the raw materials cannot meet the requirement. [Interviewer: Can you give a detailed example about it?] Our county is one of the four major areas in the country in planting the ramie, and the Xia Bu we produced in the Tang and Song Dynasties were tributes to the royal family...now, due to rural urbanization, most of the farmers go to cities, and few people grow ramie. In some places, ramie is planted but no one harvests it. Even if it is harvested, the quality cannot be guaranteed like it used to be.... Nowadays, we have to adapt to market demand, innovate and then produce high-count yarns and high-end fabrics. Because the quality and quantity of raw materials cannot meet the requirements, it has caused great difficulties for us. (Interviewee 4) For technological breakthrough, necessary resources, such as sufficient raw materials that meet the quality requirements, should degummed and then handed over to us for trial production (Interviewee 9)
	Alternative material and cost				✓						For example, for a particular project, the purchaser reported that the raw materials cannot be solved (e.g. quality or quantity), then I can't advance this project temporarily. Whether it can be replaced by other materials, whether these alternative materials are cost-effective or not will then have

																			significant impact on whether this project can be further implemented..... (Interviewee 4)
Policy (government)	Industrial support	✓	✓																<ul style="list-style-type: none"> <li>➢ Guaranteeing bank loan ...later, when we had encountered more difficulties, or had wanted more IDS practices, we went to the bank for a loan. But banks were enterprises, and they talks about efficiency and risks. At this time, our local government, the county and city ones, they helped us by guaranteeing our bank loan, to bear such risks..... (Interviewee 1)</li> <li>➢ Reimbursing employee training expenses ...there are also trainings for our employees, which can be reimbursed directly from the government...Every year, the government requires us to learn new technics and knowledges, it provides at least RMB 300 to RMB 1,500 for training, these reimbursements are quite useful in implementing a successful SOI (Interviewee 1)</li> </ul>
Markets and consumer preference (consumer)	Environmental protection	✓					✓												<ul style="list-style-type: none"> <li>➢ Market demand If the implementation time is too long and the customer no longer needs these products, I will directly terminate the project (Interviewee 4)</li> <li>➢ Customer preference If the customers' prefer ... Our crafts-persons need to adjust their technology and processes to meet the needs and preferences of customers (Interviewee 6)</li> </ul>
Cooperation and Networking	University or other research institution	✓	✓	✓															
		Buyer		✓															

Compared to the pilot study, most key themes that emerged in the rest of the case studies were similar to what were identified, including raw material (supplier), policy (government), market demands and consumers' preference (consumer), and cooperation and networking. Among them, two key themes have been expanded: policy (government) and cooperation and networking. In addition, two key themes have emerged: components (supplier) and competition (competitor). In other words, from a practical perspective, the components and the competition also impacted the companies to implement their innovation-driven sustainability strategies. All emerging themes were highlighted in red in the following table.

Table 4.7.2.1-2 External factors and networking in influencing IDS implementation

Contextual factors and networks		Narrative
Raw material (supplier)	Nature	the nature of the material limited the potential application context, as well as the success rate of the R&D (e.g. C5 Interviewee 22; C6 Interviewee 27)
	Quality and quantity	the supplied quality and quantity of the available raw materials significantly impact the implementation progress and its result (e.g. C5 Interviewees 22 and 23; C6 Interviewee 27; C8 Interviewee 41; C10 Interviewee 46; C11 Interviewee 48)
Alternative material and cost		
<b>Components (supplier)</b>		whether the components are compatible affects whether the product R&D can be carried out quickly and successfully (C3 Interviewee 16; C5 Interviewees 22 and 23)
Policy (government)	<b>Industrial innovation and environmental protection</b>	Six specific policies related to industrial innovation were identified as the factors that impact the SMEs IDS implementation the most, includes: guaranteeing bank loan and reimbursing employee training expenses that were identified in the pilot study, as well as approving lands (e.g. C2 Interviewee 10), training talents (e.g. C6 Interviewee 27), guiding industrial development trend (e.g. C7 Interviewee 35), and sharing knowledge (e.g. C6 Interviewee 31; C10 Interviewee 46) that were emerged in the main study.
Markets and consumer preference (consumer)		Market demands and consumers' preference was also an important influencing factor in the implementation stage (C2 Interviewee 14; C5 Interviewees 23 and 25; C6 Interviewee 31; C7 Interviewee 35)
Supply chain cooperation	University or other research institution	<ul style="list-style-type: none"> <li>➤ In new techniques (e.g. C6 Interviewee 27; C9 Interviewee 43; C10 Interviewee 46; C12 Interviewee 49)</li> <li>➤ In new equipment (e.g. C6 Interviewee 27)</li> <li>➤ In product design (e.g. C11 Interviewee 48)</li> </ul>
	Downstream buyer	<ul style="list-style-type: none"> <li>➤ In new product R&amp;D and validation (e.g. C7 Interviewees 34 and 35; C12 Interviewee 49)</li> </ul>
	<b>Upstream supplier</b>	<ul style="list-style-type: none"> <li>➤ to design and produce compatible components (C5 Interviewees 22 and 23; C8 Interviewee 41)</li> <li>➤ to reduce costs (C2 Interviewee 11)</li> <li>➤ to learn advanced production processes (C9 Interviewee 43; C12 Interviewee 49)</li> </ul>
<b>Competition (competitor)</b>		<ul style="list-style-type: none"> <li>➤ The price war affects the continuity of R&amp;D investment (C8 Interviewee 41)</li> </ul>

One emerging influencing factor was the components. In particular, whether the components are compatible affects whether the product R&D can be carried out quickly and successfully. Interviewee 23 from Case 5 especially pointed out that, as an SME located in a small and remote area, the company suffered poor supply and supporting system when compared to its competitors in the urban and developed locations, which affects its R&D. A background has to be noticed here that, although China has joined the WTO and actively participated in the process of globalization, however, considering how Wassenaar Arrangement has been strategically used to sustain regional and national competitiveness through controlling the export of materials, components, software and equipment with self-defined advanced and sensitive technology, China and its located businesses have continually suffered challenges in raw material, components, technic, processes and equipment. And for outlying SMEs with even less bargaining power than their local, national and international competitors, the disadvantage was well-noticed and emphasised by their interviewees (e.g. C3 Interviewee 16; C5 Interviewees 22 and 23; C6 Interviewee 27; C8 Interviewee 41; C10 Interviewee 46; C11 Interviewee 48). However, it is worth noticing that, not all companies thought that being located in a small but remote place is supposed to be a disadvantage. For instance, the owner and top manager of Case GY emphasised that, one important reason why he chose the particular county, instead of the capital city of the province where he worked and lived for decades, to start his business years ago, was because he was attracted by the strong and considerate government supports (remote cities used to offer stronger and customized supports to attract SMEs in order to increase their GDP), the convenient traffic, and the fact that this county was and is located near one of the three major distribution centres of the materials it wants to recycle. In addition, another emerging external influencing factor was competition. Interviewee 41 (C8) only briefly claimed that the price war affects the continuity of R&D investment, which requires further exploration in future studies.

Two expanded key themes were cooperation and networking, and policy (government). First, cooperation and networking were emphasised as important support in implementing. And in addition to stakeholders that were prior identified in the pilot study, such as universities or other research institutions and downstream buyers, upstream suppliers were also identified as important stakeholders to offer support in designing and producing compatible components (C5 Interviewees 22 and 23; C8 Interviewee 41), reducing costs (C2 Interviewee 11) and learning advanced production processes (C9 Interviewee 43; C12 Interviewee 49). Another expanded key theme related to the government was policies. The empirical evidence mentioned frequently can be grouped into two aspects: industrial innovation and environmental protection. Six specific policies related to industrial innovation were identified as the factors that impact the SMEs' IDS implementation the most; they were guaranteeing bank loans and reimbursing employee training expenses that were identified in the pilot study, as well as approving lands, training talents, guiding

industrial development trend, and sharing knowledge that were emerged in the main study (see Table 4.7.1.1-2). The researcher chose the word ‘policies’ instead of ‘supports’ due to the fact that whether the policy acted as a supportive or strict factor depended on the decision-makers’ mental flexibility, and policies in one particular area can bring both positive and negative influences. For instance, guiding industrial development trends can be difficult to identify as support or restriction; the reason is that mental flexibility, the executive skill to modify plans when faced with new information or new events (Anderson, 2002), can be crucial, because it allows or prevents the SME to profit from the new policy (e.g. Cases 1, 6, and 9). The government’s policy on sharing knowledge can also be difficult to define as a support or restriction. In particular, according to Interviewee 31 from Case 6, the government has established a self-learning platform so that corporate personnel can learn and filter the information they need, which is positive for the enterprise’s IDS implementation. However, the government also limited the information collection channels by blocking search engines like Google, which was negative for implementing the IDS strategy, according to Interviewee 46 from Case 10, especially when they were particularly eager to generate ideas about possible solutions of the R&D challenges by referencing the latest knowledge around the world.

#### 4.7.2.2 Organizational factors

The main firm-level factors that can influence IDS strategy implementation were ‘technic, processes and equipment’, ‘talents recruitment, allocation and training’, ‘fund/project investment’ and ‘innovation incentive action’. Details can be seen below:

Table 4.7.2.2-1 Firm-level factors in implementing

Firm-level factors	I1	I2	I3	I4	I5	I6	I7	I8	I9
Technic, processes and equipment	✓	✓	✓				✓	✓	
Talent	recruitment	✓	✓				✓	✓	
	allocation	✓	✓		✓		✓	✓	
	Training		✓	✓	✓				
Fund/project investment		✓		✓					
Innovation incentive action			✓		✓				✓

Among these firm-level factors, there were three interesting findings. First, in applying an advanced technical innovation, technology integration was required. For instance, to introduce microbial technology into the textile industry, to ‘conquer the difficulty from laboratory to production’, technics from biological fermentation, engineering, mechanical manufacturing and automation, digital information, and environment were integrated together in order to invent the equipment (C1 Interviewee 3). Although not mentioned by participants as an important influencing factor to support the strategy implementation, the findings above revealed that ‘the capability to integrate technology’ plays an important role in implementing IDS

strategy. In fact, by reviewing Interviewees 1, 2 and 3's experiences, the researcher found that 'the capability to integrate technology' was the unnoticed but determining factor that helped the company apply the advanced microbial degumming technology from R&D to trial-manufacture.

Another interesting finding was that, participants claimed that the innovation incentive actions have to include both financial and emotional benefits. For instance, when asked what encouraged individuals to participate in IDS implementation actively, Interviewee 5 stated that the company has to utilise multiple rewards not only limited to offering traditional cash rewards but also included planning an appropriate career path as well as providing specific retraining opportunities, '..... material treatment and spiritual treatment should be parallel, (such as) planning an appropriate career path, providing specific retraining opportunities.....'(C1 Interviewee 5). Similarly, when talked about how they conquered the difficulty in implementing a process innovation in processes and equipment re-allocation and integration, Interviewee 9 claimed that, besides the contracted payment, emotional encouragement and respect were effective:

'(To cope with the difficulties in process innovation) ... have been signed for fixed financial rewards, (thus, what I can do as a factory manager is to) mainly focus on spiritual encouragement. Spiritual encouragement works well, (it is important and useful because it) shows the respect for an employee (and his or her involvement and contribution).....'(C1 Interviewee 9)

Interviewees 7 and 8 further explained why it is so difficult to attract talent to company ED, which is located in China's Central Zone. First, from a resource perspective, programmes such as textile or textile technology were unpopular in China for decades and not so many students prefer to apply for and respond to relevant offers; thus, not enough talents prefer to keep working in this industry after the graduation (e.g. Interviewees 7 and 8). Interviewee 8 described from his own experience that he himself treated the textile programme as the least favourite undergraduate programme and only accepted this 'safe choice' because he was 'failed to get a better offer', he believed that, '.....those who enrolled in our programme-- in our class we have over 30 students----maybe nearly 30 of them were transferred here (from their favourite programme)' (C1 Interviewee 8). Another reason is that the company's location and the job responsibilities are less attractive; thus, talents who keep working in this industry would prefer to stay elsewhere. Interviewee 7 gave an example from her own knowledge that most designers would either want to work in modern and highly competitive places such as Beijing and Shanghai or live in rural and isolated places; however, Central Zone is neither 'fashion', 'restless', 'challenged' and 'personalized' enough like the advanced places, nor isolated and calmness enough to offer a lifestyle similar as 'a layman secluded in the forest' (C1 Interviewee 7).

In the main study, as what were presented in the mind map below, corporate-level influencing factors were similar as what were identified in the pilot study; however, one additional factor that can influence the company to implement its IDS strategies was described. In particular, the factors included the technic, processes and equipment, the talent, the project investment, the innovation incentive action, and the emerging key factor was the R&D department and task force team (TFT) (highlighted in red).

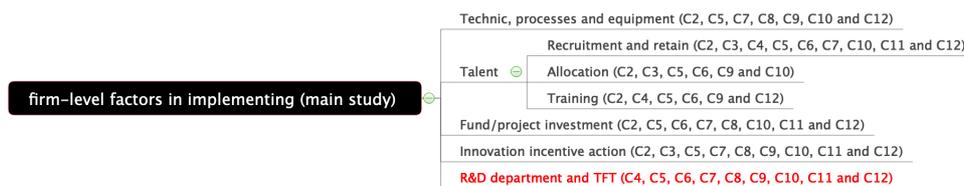


Figure 4.7.2.2-1 Organizational factors for implementing IDS strategies

All the rest of the main cases treated the R&D department or task force team (TFT) as an important factor in implementing CSMEs’ IDS strategies, except the interviewees from Cases 2 and 3, who tend to emphasise the importance of talents instead of the teams. In detail, the interviewed SMEs who have a projectized type of organizational structure build a TFT for the new IDS project as their routine (C4, C9 and C12); in their opinion, a TFT is a basic setting to implement IDS (e.g. C9 Interviewees 43 and 44). On the other hand, SMEs who have a functional type of organizational structure usually emphasise the importance of their R&D department in implementing IDS (C5, C6, C7, C8, C10, C11 and C12). From their perspective, whether the R&D department and its experts can design proper processes and facilities was the key to applicate the technics ‘from the lab to the factory’ (e.g. C8 Interviewee 41; C10 Interviewee 45). However, an interesting finding was that, the function-structured company could show a trend and preference to create a specific task-force team, so relevant tasks and the following responsibilities can be clearly clarified and distributed, and the IDS projects can be well organised and implemented (C12 Interviewees 49 and 50). In implementing sustainability-related innovations, the importance of the TFT or R&D department was also emphasised by prior researchers who targeted Eastern countries, such as Ki-Hoon (2009).

#### 4.7.2.3 Team characteristics

According to the pilot study, the main team characteristics that can support and encourage IDS strategy implementation were being persevere, professional and cooperative.

Table 4.7.2.3-1 Key team characteristics that can influence the IDS strategy implementation (the pilot study)

team-level factors		11	12	13	14	15	16	17	18	19	Representative quotes
being persevere		✓	✓								<p>...Now we are struggling with the goal. I am not the one who wants to give up, but some people in the team want to give up...it requires teamwork, being persevere...the success in implementing IDS, it has something to do with goal-directed persistence... (C1 Interviewee 1)</p> <p>There were so many challenges and conflicts during the pilot test, because it is a long distance to apply the technology from the laboratory to the production. But we did not give up, and finally made it (C1 Interviewee 2)</p>
Being professional								✓			<p>In China, it is necessary to understand the processes as a manager, understand every step in production.....(C1 Interviewee 7)</p>
Being cooperative	Between team members							✓	✓	✓	<p>... I feel that our advantage is having a cooperative spirit in production, and we all do things well together...after the task was started, the following step is for the entire team, every member of it, to work together and discuss together, to figure out how to realize the objectives..... (C1 Interviewee 8)</p> <p>Strengthen cooperation between departments...work together..... (C1 Interviewee 9)</p>
	Between the owner/top manager and the team								✓		<p>For the above leaders, and between colleagues, we have to learn from each other, communicate with each other, encourage each other's growth, and try everyone's best effort; in this way, the company's competitiveness will become stronger and stronger. I feel that nothing is more important than cooperation and communication. There has been an old saying in China since ancient times, "The hearts of the people are united, and the mountains are shifted (人心齐，泰山移)". In any matter, no matter how great a leader is, if the hearts of the people below are not aligned, the strategy can't be carried out; no matter how capable the people below are, if the leaders don't support them, their ideas will not be able to implement (C1 Interviewee 8)</p>

For the rest of the cases, team-level factors were the same as what emerged in the pilot study, which emphasised a persevering, professional, and cooperative team in IDS implementing.

#### 4.7.2.4 Interactive influencing effects

Reviewing specific examples gave the researcher a comprehensive understanding of how factors acted as combined driving forces to help company ED implement its IDS strategy successfully. The challenges and influencing factors in the process innovation (in techniques + equipment) of the *strategy a* (which was mentioned in section 4.5) were presented here (Figure 4.7.2.4-1) as a representative example. Within the process of conducting process innovation based on the advanced microbial degumming technology, the grey area of the below figure (the re-experienced actions) shows the company's key challenge, which was to 'conquer the difficulty from laboratory to production' (C1 Interviewee 3). In other words, the company experienced failure and success in applying the microbial degumming technology from R&D to trial-manufacture.

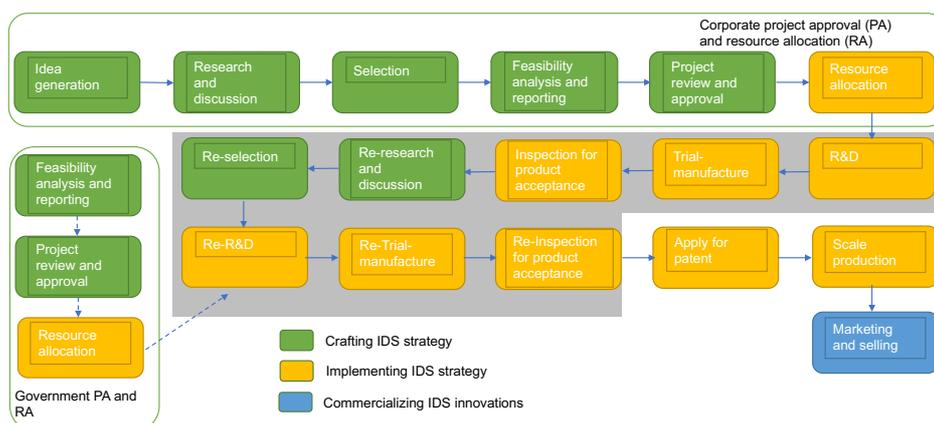


Figure 4.7.2.4-1 Sub-process 1 and actions: Process innovation (techniques + equipment)

In 'research and development (R&D)', key influencing factors were 'networking', 'internal resource and capability' and 'raw material supply'. In detail, first, the network mattered because the company had to cooperate with the university that discovered and cultivated microbes to solve the problem of how to use these microbes to degum the ramie in a quasi-natural environment at an appropriate speed (Interviewees 1, 2, 3 and 8). Second, the raw material mattered because the nature of the ramie influenced the method of the stir and what types of fibres could be blended (Interviewees 1 and 3), the microbes had to adapt to ramie from different origins and with different qualities and quantities (Interviewees 4, 8 and 9), and the quality and quantity of different fibres such as ramie, cotton, hemp or jute influenced whether the degummed and blended fibre can meet quality expectations (Interviewees 1, 8 and 9). Third, the company's internal resources and capabilities mattered because technic, processes and equipment influenced the degumming process as well as the quality of the products (Interviewees 1, 2, 3, 7 and 8), talent recruitment, allocation and training influenced the company's research and development capabilities (Interviewees 1, 2, 3, 5, 7 and 8), and fund influenced whether the company can afford continuous investment in this process innovation (Interviewees 1, 2 and 4). The government support, particularly the

government's policy to reimburse employees' training expenses, also indirectly supported research and development (R&D) by encouraging talent training and improving the company's technics and its R&D capability (Interviewee 1).

However, although resources and capabilities in network, funds, talents, technic and processes had brought positive impacts on R&D, the company failed to transform its R&D success to trial-manufacture because their internal resources and capabilities in technic, processes and equipment were not developed or innovated enough to control the degumming quality by taking water and air conditions as well as relevant technical problems under control (Interviewees 2 and 3). The failure of the trial manufacture (Interviewees 2 and 3) and the shortage of funds (Interviewees 1 and 2) forced the company to stop the project, and it re-started years later because key influencing factors such as 'government support', 'internal resource and capability' and 'networking' were able to support the IDS-related innovation back then. In detail, first, the government guaranteed bank loans for corporate innovations in specific industries that can benefit both the economy, environment and society; and Company ED successfully applied for and received the fund (Interviewees 1 and 2). In addition, the company developed its technics, processes, talents, and its corporate capability in integrating multiple knowledge and technics (Interviewees 1, 2, 3 and 8). Thus, by cooperating with one particular university and another research institution that were experienced experts in engineering, as well as mechanical manufacturing and automation, the company solved the technical problems in mixing liquid materials with solid materials, and the specialised and customised equipment was invented (Interviewees 2 and 3).

Based on the above evidence and analysis of the influencing factors from R&D to trial-manufacture (which can also be seen in *Figure 4.7.2.4-2*), it revealed the fact that the factors acted as combined influencing elements to support or delay Company ED's implementation success in its most important process innovation and the overall integrated IDS strategy based on the advanced microbial degumming technology.

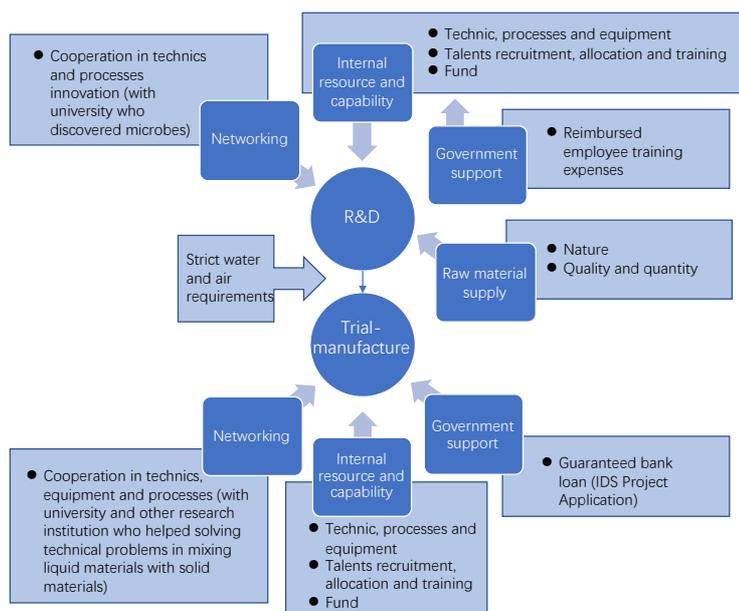


Figure 4.7.2.4-2 Representative example and combined influencing factors

For the rest of the cases, the interviewees failed to directly identify the significant relations between the influencing factors they mentioned; however, according to their stories, they actually pointed out a few connections between different influencing factors, similar to what was discovered in the pilot study. For instance, how the government indirectly affected the IDS implementation towards the technic and talent was also emphasised in the main cases. Besides reimbursing employee training expenses, relevant policies include training talents and sharing knowledge (e.g. C5 Interviewee 24). This situation about how a factor acts on another factor, which indirectly affects IDS implementation, widely existed in the interviewees' stories, supported by their empirical evidence.

#### 4.8 Commercialising IDS strategy

##### 4.8.1 Commercialising IDS strategy

The pilot study's data indicated that, a largely ignored stage, the commercialization stage, was unescapable and there were representative actions such as 'marketing and selling' (Table 4.8.1). The main cases emphasised the same finding.

Table 4.8.1 Representative Actions in commercializing

Key themes	I1	I2	I3	I4	I5	I6	I7	I8	I9
Marketing and selling 市场营销		✓	✓	✓	✓			✓	

Commercialization cannot be skipped because economic sustainability can only be gained if the products are sold; otherwise, cost-saving or value-adding is meaningless and cannot be realized. For instance, by using the example of the microbial degumming technology, Interviewee 5 made a clear statement that, without marketing and selling, this technology can only bring short-term environmental benefits in producing; otherwise, it can bring economic sustainability not only in profit but also in branding and consumer satisfaction, and these economic benefits can further drive and guarantee the company's sustainable development in both economic, environmental and social aspects:

'Microbial degumming technology is an environmentally friendly production technology in terms of production. However, when transform this technology into the market competitiveness of the company, it needs marketing, to create the company's core competence based on this specific technology. Among different ways of the transformation of technological achievements, the transformation of consumer goods is the most likely method to obtain economic benefits. We have registered a trademark for ramie fibres that were produced by microbial degumming technology.....the superiority of these specific fibres and relevant products has formed intangible value for the company in the industry and market, they are the driving force and guarantee for the sustainable development of the company.....' (C1 Interviewee 5)

#### 4.8.2 Influencing factors

The findings showed that, when commercialising IDS strategy in the context of CSMEs, the influencing factors are complex and dynamic. Combining the data of the pilot study and the rest of the investigated cases, two key influencing factors were discovered, including cost control and (IDS-related) marketing strategies.

##### *4.8.2.1 Cost control*

Interviewees 1, 3 and 5 emphasised that control costs were important in the commercialization stage. The main reason was due to the fact that new products that were both innovative and sustainable normally required large investments in R&D and marketing (Interviewee 5); thus, their market price is difficult to reduce and is considered relatively higher in comparison with their competitors (Interviewee 1). Even if these new products can better satisfy consumers' increased expectations in terms of environmental and social sustainability (Interviewees 2, 3 and 5), it might take years for the majority of consumers to pay for the value of these products (Interviewee 1). According to Interviewees 1 and 3, two main practical solutions to reduce costs but maintain or even increase the value-adding are cooperating with suppliers to reduce resources' original costs (e.g. C1 Interviewee 1) and saving energy by conducting process innovations (e.g. C1 Interviewee 3).

As interviewees in the pilot study mentioned how the costs appeared as the key reason they failed to promote the technology to the whole industry, the relevant cost-control ability was also noticed by the following main study interviewees. In detail, 4 out of 11 main cases (C2, C8, C10 and C11) gave particular examples that, when the costs were too high, even if the new products were produced, the IDS project, especially its activities in the commercialisation stage, would be stopped or cancelled. According to them, it is because, from cost-control and risk-assess aspects, without providing a competitive price, the company will need to invest a large amount of extra money in persuading customers to accept the product and may not be able to get the return. To reduce the poor cost-control's negative effects on market promotion, the practical experiences of these cases (C1, C2, C8 and C11) did indicate how process innovations could help because it can result in cost reduction and efficiency improvement, but Interviewee 45 (C10) particular emphasised and then interpreted that process innovation had not been an available choice for their company, because the special nature of the pharmaceutical industry makes it difficult to innovate in the manufacturing process.

##### *4.8.2.2 (IDS-related) marketing strategy*

Besides controlling costs in production, operation and marketing to improve the attractiveness of the market price, another method to promote IDS-related products was making customers understand the value of these sustainable and innovative products. This can be achieved from five perspectives based on personal knowledge and professional experience from Interviewees 2, 5 and 6. In other words, the following actions are the five key influencing factors in commercializing IDS-related products.

First, from talent management and employee perspective, relevant marketing activities include recruiting skilled marketing staff (Interviewee 5), conducting skills training in utilizing multiple distribute channels such as B2C (Interviewee 6) as well as strengthening training in employees', especially the marketing staffs', confidence in culture, product and brand (Interviewee 5). Second, from raw material and consumer perspectives, IDS-related products can be promoted by advertising the benefits of using natural fibres in a sustainable way (Interviewee 5). Third, by considering the government's policies in specific regions, industries and cultures, IDS-related products can be promoted by explaining how these products can contribute to the regional and industrial culture (Interviewees 2 and 5).

Besides the above three IDS-related marketing strategies that targeted the commercialization of the sustainable new products particularly, there were two other general marketing activities focused on the same stakeholders: the downstream buyers and consumers. In detail, first, according to Interviewee 2, the most effective way to promote innovative products was to allow potential downstream buyers to use the products first with less or no deposit. The researcher can understand this opinion because this is the direct method for the potential downstream buyers to experience the new products and notice the competitive advantage in product quality. However, it was noticed by Interviewee 2 that, by applying this strategy, it might take longer to retrieve costs thus the pressure on funds would be increased as follows (e.g. C1 interviewee 2). In addition, another way to promote IDS-related products from a general aspect was to cooperate with well-known enterprises in using their brands to advertise and verify the product quality (e.g. C1 interviewee 2).

The importance of market acceptance and recognition in commercialising IDS products was also emphasised by interviewees of all the rest cases. For instance, Interviewee 35 (C7) and Interviewee 48 (C11) made similar statements that, new products, especially new products with high-tech content or advanced concepts, can easily become inventory rather than commodities due to the lack of market acceptance; only by coordinating with appropriate marketing strategies and cultivating customer needs, the innovated products can be accepted and recognised by the customers, and further help the SMEs to achieve sustainable development. Each sub-theme that had been discovered from the rest of the studies was discussed in the following table, and emerging sub-themes were highlighted in red.

Table 4.8.2.2-1 Strategies in commercializing IDS products (main study)

Stakeholder	Main cases	Strategy
Employee	(C6 Interviewee 29; C10 Interviewee 47; C11 Interviewee 48)	recruiting skilled marketing staffs
	(C11 Interviewee 48)	conducting skills training in utilizing multiple distribute channels
	(C7 Interviewees 35 and 37)	strengthening training in employees' confidence in culture <b>and technology</b>
	<ul style="list-style-type: none"> <li>➤ Departments cooperation (C10 Interviewee 47)</li> <li>➤ Goal-directed persistence (C7 Interviewee 37)</li> </ul>	<b>being cooperative between departments and being preserve</b>

	(C10 Interviewee 47)	<b>Build positive working environment and sense of belonging</b>
Government	<ul style="list-style-type: none"> <li>➤ The government policies influence the IDS in industry environment and market trend (C2 Interviewee 10; C3 Interviewee 16; C6 Interviewees 27 and 29; C9 Interviewee 44; C10 Interviewee 47)</li> <li>➤ R&amp;D grants and tax relief lead to competitive price in selling (Government Interviewee 39; C10 Interviewee 45)</li> </ul>	being flexible, and explaining how the innovated products can contribute to the regional culture and industrial development
	the authorities such as the governments are third parties who can offer trusty and reliable quality verification (C3 Interviewee 16).	
Downstream buyer and Consumer	(C6 Interviewee 29; C8 Interviewee 40)	advertising the benefits to use environmentally friendly materials in a sustainable way
	potential downstream buyers helped the IDS marketing by testing the market validation (C2 Interviewee 11; C3 Interviewee 16) and users' preference (C10 Interviewee 45)	allow potential downstream buyers to use the products first with less or no deposit.
	compared to the normal downstream buyer, their contribution mainly appeared in the product promotion (C3 Interviewee 16; C4 Interviewee 20; C5 Interviewee 23; C12 Interviewees 49 and 50)	cooperate with well-known enterprises in using their brands to advertise and verify the product quality
Owners	(C3 Interviewee 16; C5 Interviewees 21 and 23; C6 Interviewee 29)	<b>Accumulating informal connections will help companies gain access to communicate and promote innovated products with potential buyers</b>
The knowledge institution (university or other research institution, external experts and talents)	help the marketing by exploring the potential market (C7 Interviewee 34; C10 Interviewee 45)	Cooperate with the university or other research institution, external experts and talents

#### 4.9 Measuring IDS strategy

Findings showed that all actions related to the adoption of the IDS strategy can be classified into three stages: strategy design, implementation and commercialization. To evaluate whether the integrated IDS strategy was implemented successfully, in other words, whether each innovation succeeded, Section 4.9.1 revealed key indicators and measurements according to empirical evidence. An interesting finding was that, to further evaluate whether the integrated IDS strategy actually leads to economic, environmental and social sustainability, in other words, whether these sustainability-oriented innovations actually contribute to sustainability outcomes and are reflected in sustainability performance,

additional measurements were used. Section 4.9.2 revealed these key indicators and measurements according to empirical evidence.

It is worth noticing that, to answer this section’s research question, besides primary data from interviews, secondary data, especially the project feasibility report (PfR), were also coded and then referenced. The utilisation of the secondary data not only allows the researcher to apply data triangulations in order to ensure the reliability of the evidence, but also helps the researcher specify particular indicators and measurements that were briefly mentioned by the interviewees. Interviewee 4 even directly suggested that, to answer better how the company evaluated whether its innovation really achieved its initial sustainable development goals, the most effective way is checking the company’s PfR instead of relying on her words and memories:

‘(how to evaluate whether it reached your IDS strategy objectives?) There is a very detailed chapter to analyse how to evaluate and measure in the feasibility report.’  
(C 1 Interviewee 4)

#### 4.9.1 Innovation success

The findings revealed that different IDS strategies can integrate different innovation strategies. When asked about how they actually measured the innovation success, measurements from both product and process perspectives were mentioned. In particular, a successful product innovation would lead to: ‘the innovation process became a written principal’, ‘increased number of new products, expanding potential markets’, ‘optimized product quality’, ‘achieved customer satisfaction’ and ‘gained brand recognition and industry influence’. On the other hand, a successful process innovation strategy would be evaluated from ‘technology’, ‘cost-control’, ‘quality-control’ and ‘be permitted to continue production’ aspects.

Table 4.9.1-1 Product innovation measurements

Key themes		I1	I2	I3	I4	I5	I6	I7	I8	I9
Increased number of new products, expanding potential markets				✓		✓				
Optimized product quality (in R & D and/or Production)	Experimental data beyond quality standards		✓	✓			✓	✓	✓	
	Excellent trial experience (within the enterprise, or by external users)		✓	✓		✓				
Achieved customer satisfaction	Met customer preference	✓		✓	✓			✓	✓	
	Had long-term customer							✓		
	Maintained or increased market share/order		✓					✓	✓	
Gained brand recognition and industry influence				✓		✓		✓		

Table 4.9.1-2 Process innovation measurements

Key themes	Sub-themes	I1	I2	I3	I4	I5	I6	I7	I8	I9
Technology	Reached more technical cooperation			✓						
	Patented 专利			✓					✓	

	Passed the science and technology achievement appraisal 科技成果认证		✓		✓				
	Gained brand recognition and industry influence			✓					
Cost-control	Improved work efficiency					✓		✓	✓
	Saved costs			✓		✓		✓	✓
Quality-control	Stabled product quality		✓	✓				✓	
	Optimized Product quality		✓					✓	✓
	Be permitted to continue production (environment)					✓			
	The innovative processes became a written principal							✓	

An interesting finding was that, in China, whether more technical cooperation can be reached, or even whether joint laboratories can be established, has always been one of the measurements to evaluate the success of technological innovations. For instance, when asked Interviewee 3 to explain further why the integrated IDS strategy (mainly driven by technic innovation) he mentioned was a representative case, he responded that:

‘(Based on the success in the microbial degumming technology)..... in the past few years, we have continued to develop these innovations. For example, we cooperated with xx Institute of Industrial Biotechnology, which is directly affiliated to the National Chinese Academy of Sciences, signed related technical cooperation contracts, and established technical joint laboratories. Following that, we have been able to research the technologies related to the flax industry.’ (C1 Interviewee 3)

Another interesting finding was that measurements should be integrated to assess whether the innovation succeeded. For instance, Interviewee 8 gave an example that, whether the product is launched and sold sooner or later, and whether the product quality is superior or not, should be considered together to measure whether a product innovation was successful. In detail, he claimed that:

‘For example, if what you have sold are poor quality products, even though you may produce them one month faster than your competitors, it only caused negative impacts; my products may be released relatively late; however, if everyone still recognizes their superiorities in the market, then maybe (they are still successful innovations)..... So, when talking about our biggest advantage, I feel like it is the spirit of cooperation that we have in production--we work together to do things well, so they are able to satisfy everyone. Having products like these, we don’t need to find others (e.g. the downstream buyers), they will come to us actively and passionately.’ (C1 Interviewee 8)

Another example was presented by Interviewee 9, the production manager, who said work and management efficiency, technical content and quality of the products, and production cost should be considered together to measure whether a process innovation succeeds. In particular, he repeatedly used the comparison in the production speed, the level of technics, the product quality, the electricity and labour cost, and the work and management efficiency to prove that the story he told is a representative example of a successful process innovation:

'Innovation should fully consider the company's human, financial, and material resources. Use our workshop as the example, there used to be two workshops, one was using old manufacturing process and the speed was slow; although the quality of the outputs was excellent, however, the labour cost was extremely high. And the other had adopted the process innovation by adding an extra process but improving the overall efficiency; under the premise of ensuring faster speed, the levels of technics and product quality were reached. In 2014, we moved these two workshops together and improved the manufacturing process, which lead to better performance. For example, the electricity consumption of a ton of yarn used to consume 2300 yuan, after the relocation and reconstruction, the cost has dropped to 2000 yuan, which is a reduction of more than 10%. Bring these two workshops together also has significantly improved work efficiency and is convenient for production management. In addition, its allowed us to bring the auxiliary facilities together, such as air compressors, lighting, maintenance, etc.. What had been located in two places now moved together, which has saved a large amount of the labour costs (used to waste in travelling between these two workshops).' (C1 Interviewee 9)

It is worth noticing that, based on the representative IDS strategies mentioned by the research participants, IDS strategies normally relate to innovation outputs, including both product and process innovation, in other words, they could be both product- and process-related. Thus, the practical measurements were also product- and process-related.

A case is that a sustainability-oriented innovation is normally supported by cost-saving innovation in processes to control the production costs to achieve marketing advantage and economic benefits (e.g. Interviewees 3 and 9). Thus, when evaluating the strategy from the innovation output aspect, these integrated strategies can and should be reflected in the indicators and measurements from both product and process perspectives.

Another example is that process innovations in technic and equipment are always followed by a product innovation in application to earn profit (e.g. Interviewee 5). The integrated strategy a (in section 4.5) not only combines both product innovation in application and process innovation in processes, and in fact, the product innovation in application can only be succeeded by completing relevant process innovations in technic and equipment. In that case, although process innovations were conducted, their successes were mainly reflected in the indicators in terms of product innovation. For instance, when evaluating the success of the process innovation in technics, Interviewee 5 claimed that:

'Microbial degumming technology is an environmentally friendly production technology, and when this technology needs to be transformed into our market competitiveness, it requires marketing. The transformation of end consumer goods is the most likely way to obtain economic benefits in the transformation of technological achievements, (thus, for the ramie fibre treated by these technology) we registered a trademark, and the home textile fabrics and beddings which were spun and woven with this special treated fibre let consumers experience the superiority of technology, and further help our company gain intangible value in the

industry and the market. It is the driving force and guarantee for the sustainable development of the company.....' (C1 Interviewee 5)

And that:

'--One is our production technology "microbial degumming technology"-- under the high pressure of environmental protection, our various indicators can meet national standards, so when other factories are shutting down (for environmental protection rectification), we can produce normally and continuously. Another example is the development and application of our ramie home textile products. In the home textile industry, the trademark 'ED' is the generation name of the bast fibre products, is the first thing that comes to mind when people looking for home textile fabrics made with bast and leaf fibres.' (C1 Interviewee 5)

Interviewee 7 made a similar statement:

'(How can you say that this technological innovation succeeded?) .....For so many years, it (the biological degumming technology) has not made a major breakthrough, but the orders for raw materials, yarns, and fabrics (processed through this technology) make us overwhelmed, the products are in a situation where demand exceeds supply, and customers urge orders every day. For home textiles, the market has not been particularly good in recent years, however, when the product demand of most companies in the same industry decreased drastically, ours was relatively the same.' (C1 Interviewee 7)

The above quotes revealed a pragmatic method in the context of SME: process innovation, particularly technic innovation, normally results in product innovation and is evaluated by assessing the new or unique products.

As can be seen from the main map (*Figure 4.9.1-1*), most interviewees' responses were similar to the pilot study in that, when managers and employees of CSMEs assess whether a sustainability-oriented innovation (SOI) succeeded, they prefer to evaluate it according to its innovation outputs. In particular, when evaluating a product innovation, the company tend to measure the outputs by asking 'whether it increased number of new products or expanded potential markets', 'whether it optimised product quality (in R&D and/or Production)', 'whether it achieved customer satisfaction' and 'whether it helped the company to gain brand recognition and industry influence'. On the other hand, when evaluating a process innovation, the company prefer to measure the outputs from 'Technology', 'Cost-control', 'Quality-control', 'Be permitted to continue production (environment)' and 'The innovative processes became a written principal' perspectives; however, a new descriptive measurement was emerged according to the primary data, which is 'working environment'.

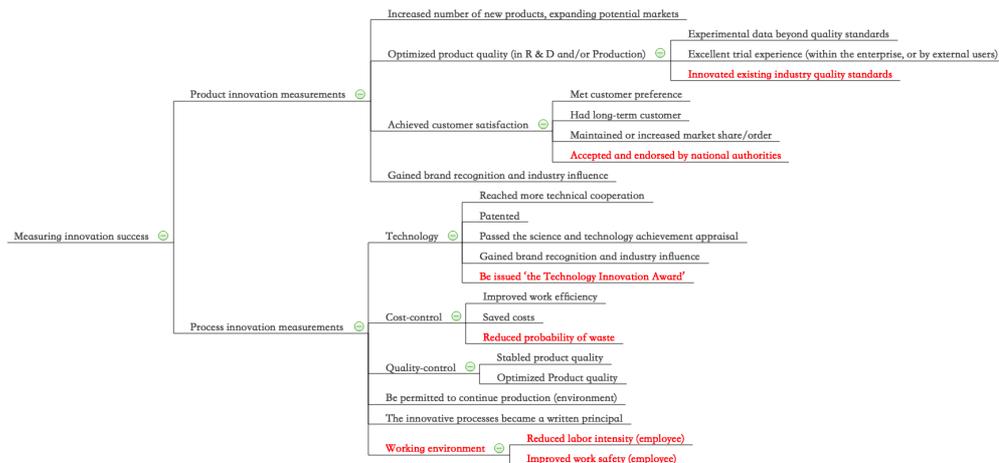


Figure 4.9.1-1 measurements to evaluate the outputs of an IDS strategy

#### 4.9.2 Corporate sustainability performance

Findings revealed that an integrated IDS strategy normally contains not only different product and process innovation strategies but also sustainability-related strategies that target different stakeholders in the supply chain, such as the suppliers, downstream buyers, and consumers. By analysing the measurements for evaluating the economic, environmental and social outcomes(/performance) of these IDS strategies, the researcher found that the influences on these stakeholders were also considered and evaluated.

##### 4.9.2.1 Economic sustainability measurements

After coding paragraph by paragraph, sentence by sentence, the key themes and sub-themes that emerged were double-checked using a keyword search. For instance, to double check 'sales quantity and revenue', keywords such as '销售额', '销售', '订单', '成交', '消费' were searched and analysed again.

Table 4.9.2.1-1 Economic sustainability measurements (pilot study)

Key themes	1	2	3	4	5	6	7	8	9	Secondary data
Sales quantity and revenue	✓	✓		✓			✓	✓		✓
Profit	✓	✓	✓			✓			✓	✓
Taxes										✓

Above were the main economic indicators used for evaluating economic sustainability based on participants' responses. It is worth noting that the indicators that target a regional market instead of in total can also be used to assess the economic outcomes of an IDS strategy. For instance, because Company ED exported abroad largely, besides the sales quantity and revenue for all, the sales quantity (e.g. Export Quantity) and revenue (e.g. Foreign Exchange Earning) for abroad were also used to evaluate the innovation outcome in the economy (e.g. the application for science and technology achievement appraisal, 2012; the feasibility report, 2009). Another example was given by Interviewee 2 that:

'(In our company) The yarns and fabrics produced by chemical degumming cannot be used to produce bedding, which means that the sales of bedding can be used to

measure the rate of return on innovation.’ (C1 Interviewee 2)

In addition, *the ratios* that involve more than one indicator were used to evaluate economic sustainability. For instance, ‘the profit and tax investment ratio’ was used in Company ED’s report for applying science and technology achievement appraisal.

It is worth noting that, the economic benefits, especially the financial indicators that can reveal whether this strategy achieved economic sustainability, are normally used to evaluate whether a sub-innovation in the IDS strategy is successful. In other words, an SME’s economic performance measurements, such as its profit and tax, are always considered intuitive indicators of innovation adoption. For instance, Interviewees 1 and 8 claimed that innovation is successful only when its new products can be demanded and purchased by customers. In particular, Interviewee 8 claimed that:

‘No matter how big or small the item is, as long as it can satisfy customers, and let them pay for it, then this new product development is successful.’ (C1 Interviewee 8)

The quote also briefly explained the reason why financial indicators were commonly used. It is because quantitative indicators, such as sales quantity and revenue, are visual expressions to evaluate the qualitative measurement concerning ‘customer satisfaction’. The reason was further explored in previous articles that financial indicators were used as the common evaluation method to assess innovation because they are numeric and objective, and easier to compare (Bos-Brouwers, 2010). However, unlike previous studies that have generally generalized the indicators used, the researcher clustered these economic indicators, such as orders and sales, in the outcome section instead of the output section because these measurements actually reflect whether the new products or processes can contribute to economic sustainability towards selling and marketing, but not whether the new product is launched or the process is effective.

Not only were the financial measurements used in evaluating both product innovation and economic performance, but a few other measurements were used in evaluating both process innovation and social performance. In detail, benefits related to the employee and downstream users, such as *improving work safety* or *optimising product quality*, were mentioned as evidence for defining process innovation success and achieving social sustainability. This might be because the gap between innovation outputs and outcomes was not well-defined in both literature (Ahlin, Drnovsek & Hisrich, 2014) and the real business world.

No extra themes appear in the main cases compared to the pilot one, which was briefly summarised in the following figure.

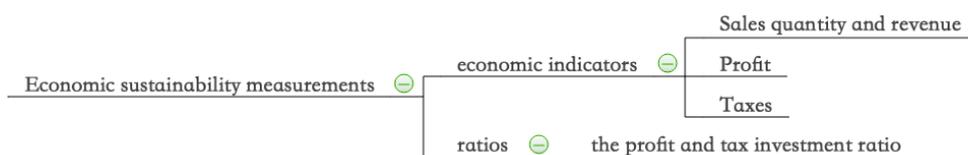


Figure 4.9.2.1-1 economic measurements to evaluate the outcome of IDS strategy (main study)

#### 4.9.2.2 Environmental sustainability measurements

Table 4.9.2.2-1 Environmental sustainability measurements (pilot study)

Key themes	1	2	3	4	5	6	7	8	9	Secondary data
Reduce pollution during production	✓		✓	✓						✓
Turn waste into treasure							✓			
Energy saving	✓		✓					✓	✓	✓
Substitute environmentally unfriendly product (downstream buyer and the end customer)	✓		✓							✓
Promoting suppliers to achieve environmental sustainability (supplier)	✓									✓

The above table revealed that, CSMEs' environmental sustainability can not only be evaluated by assessing the resources used and the pollution discharged, but also regarding how the company can bring positive environmental influence on other members of the supply chain, such as the suppliers, downstream buyers and the end customers.

In all the rest of the case studies, the theme of 'reduce pollution during production', 'turn waste into treasure (cycling and regenerating)', 'energy saving', 'substitute environmentally unfriendly product' and 'promoting suppliers to achieve environmental sustainability' were mentioned as well. Interestingly, one sub-theme emerged in Case 5 (Interviewee 21), which is 'cutting overcapacity'.

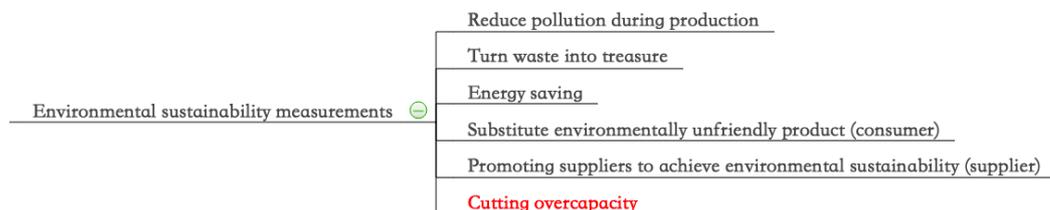


Figure 4.9.2.2-1 environmental measurements to evaluate the outcome of IDS strategy (main study)

#### 4.9.2.3 Social sustainability measurements

Table 4.9.2.3-1 Social sustainability measurements (pilot study)

Key themes	1	2	3	4	5	6	7	8	9	Secondary data
employee	Work happy							✓		
	Innovativeness is improved				✓			✓		✓
	Feel belonging and recognized					✓				✓
	Welfare and salary are maintained or increased								✓	✓
	Skill is improved								✓	✓
Consumer (the end customer)	Enjoy personalized demand	✓					✓			
	Enjoy quality products or services		✓	✓						✓

	Improved quality of life					✓		✓			✓
	Pay less	✓									✓
Customer/downstream buyer	alleviate the pressure on customers' funds										
	Improve the quality of product		✓								✓
Local community	Charity	✓				✓					✓
	Promote regional industrialization, employment and income growth	✓	✓	✓						✓	✓
	Have a positive impact on local culture and education		✓	✓				✓			✓

According to the table above, an interesting finding was that, the IDS strategy could directly influence the local community and achieve social sustainability by promoting regional industrialisation, employment and income growth, or indirectly influence the local community and achieve social sustainability by actively participating in charity such as helping unemployed or poor students, or positively promoting relevant culture, technics and history.

In all the rest of the case studies, the themes identified in the pilot study were also mentioned. Interestingly, regarding employees, downstream buyers and the local community, a few sub-themes emerged, which were highlighted in red and can be seen in the following mind map. It should be noted that reducing the traffic congestion caused by construction was only mentioned by Case 9 as a social responsibility commitment and contribution. It might be because the main business of other companies will not cause potential problems in this regard. Thus, this unique sub-theme could be expanded to 'reduce any potential inconvenience caused by the company's main business'. In addition, 'work safe' as a measure from employees' perspective was emphasised in Cases 6 and 11, but it was treated as a fundamental requirement in all cases. The reason why these two companies emphasised this specific measurement and performance in this research and their corporate culture might be related to their industry background and working environment. In detail, these two CSMEs were particularly proud of the achievement that, by adopting their IDS project based on technological and processes innovations, employees enjoy work safety that far exceeds industry standards, and their successful practices even drove the industry to raise standards in this regard.

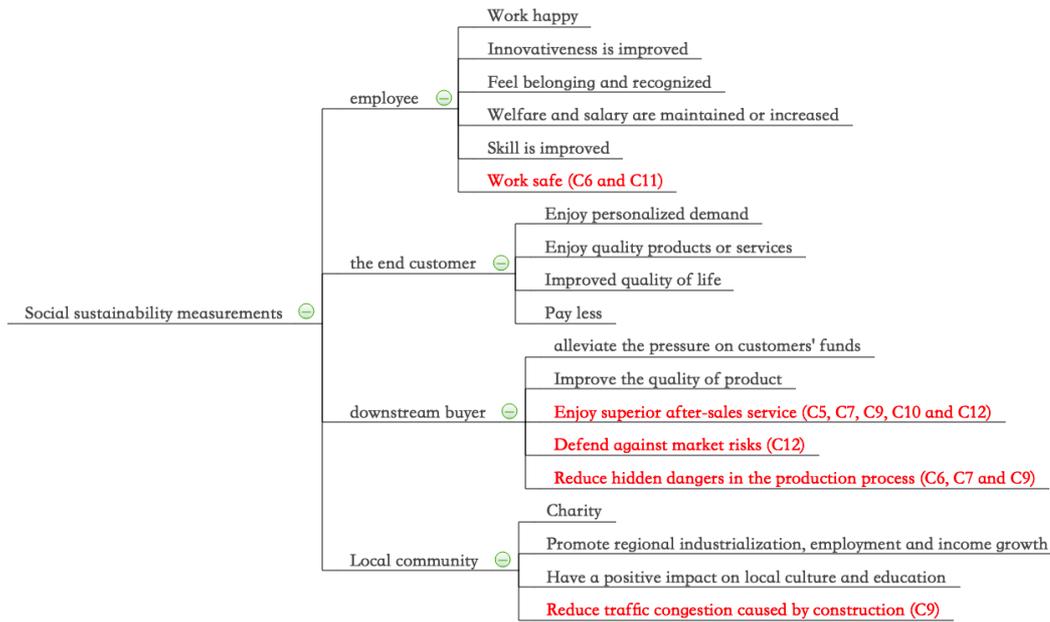


Figure 4.9.2.3-1 social measurements to evaluate the outcome of IDS strategy (main study)

## 5 Discussions and Conclusions

### 5.1 Introduction

This chapter summarised the key findings of this research and then discussed them by comparing them to prior literature. It then highlighted the contributions and implications for researchers and practitioners. Finally, limitations and future recommendations were made.

#### 5.1.1 Definitions of CS in the Chinese SMEs context

In prior literature (e.g. Beise & Rennings, 2005; Bos-Brouwers, 2010; Henriques & Catarino, 2015), the definition and nature of CS have been presented and understood in different ways by reflecting various industrial, organizational, and individual characters; however, all these definitions reflected three pillars of CS: Economy, Society and Environment. In other words, these definitions reflected the SMEs' concern in both economic, environmental, and social sustainability. The researcher's findings agree with the prior findings; for instance, the key themes 'profitable business performance' and 'business continuity in challenge time' reflected SMEs' concern in economic sustainability. And sub-themes such as 'guarantee and improve the rights and interests of employees', 'improve customer experience and satisfaction', 'contribute to local communities and society' under the key theme 'social expectations and responsibilities' were related to CSR while the sub-theme 'protect the environment' was linked to environmental sustainability.

Emerging from the multiple-case study, another sub-theme under the 'social expectations and responsibilities' was summarised as 'develop a responsible supply chain'. In detail, the SME can achieve CS by not only focusing on the company itself, its resources and capabilities, but also encouraging other supply chain participants to be sustainable and responsible. This finding was identified by several researchers recently; for instance, Boström, Jönsson, Lockie, Mol and Oosterveer (2015) emphasised that responsibility requires moving beyond narrow organizational borders, and multi-actor collaborations are essential to developing a sustainable and responsible supply chain. Sancha, Gimenez and Sierra (2016) agreed with this idea and further claimed that the two most effective practices to achieve a socially responsible supply chain are assessing suppliers and collaborating with them. However, the researcher's findings further indicated another effective and practical effort to form a responsible supply chain, which is offering green components, products or skills to responsible downstream buyers. By doing so, the downstream buyers could offer eco-products to substitute their irresponsible competitors' products or be able to manufacture products in a more energy-efficient and environmentally friendly way.

Another interesting finding was that the definitions given by interviewees indicated that Chinese companies' understandings of CS have been significantly influenced by traditional Chinese beliefs and culture, and reflected thoughts and theories such as the hierarchy of human needs and engaged sustainability stakeholders. When researchers supported the opinion that the global sustainability standards must develop recognition of local contexts (e.g. Boström et al., 2015), this finding is able to identify and interpret what traditional philosophy and cultures were inherited by CSMEs in understanding and practising

sustainability, and could further contribute to enriching the global sustainability definitions and practices.

#### 5.1.2 Relationship between innovation and CS

The findings of this research supported the statement that the connections between innovation and sustainability are inevitable and positive (MacGregor et al., 2010). However, while the documented relationship had been described as a simply straight and flat path, the findings of this research revealed a comprehensive ecosystem and identified eight sub-connections between innovation and corporate sustainability. In detail, from the 'innovation to CS' aspect, product innovation and process innovation drive an SME's economic sustainability, but sustainability-oriented innovation and business model innovation could help the SME achieve both economic, social and environmental sustainability. Furthermore, from the 'CS to innovation' aspect, the economic sustainability of the SME offers funds for innovation, and CS can further support the adoption and success of innovation by attracting and maintaining talent. In addition, the economic sustainability of the SME offers funds for environmental and social sustainability, and the achieved IDS wins the acknowledgement of the staff, which motivates the SME to pursue CS further.

#### 5.1.3 Sustainability strategies adopted by CSMEs

According to the interviewed cases, preferred innovations to achieve IDS include product innovation in *design* and *development and application*, and process innovation in *environmentally friendly technology*. Furthermore, incremental innovation was used frequently because it was less risky by considering the costs in funds and time. Product innovation and incremental innovation were also identified in prior research as the preferred innovation adopted by SMEs, For instance, by Bos-Brouwers (2010).

However, through in-depth analysis of the data collected, the researcher found that neither of the practical and representative sustainability strategies is limited to adopting the SME's preferable product innovation or incremental innovation but is more radical, integrated and continuously innovated. In other words, CSMEs prefer to conduct integrated and continuously innovated sustainability strategies that contain various sub-innovations. For future studies, this finding could be tested by analysing a large scale of samples, and the reasons behind this preference should be further explored.

#### 5.1.4 Motivation

According to the empirical evidence, four main motives were identified in both the pilot and main study. First, as an important external stakeholder, the government's integrated policies in environment protection and technology innovation force and guide SMEs to be more sustainable and innovative. Another important motive for pursuing IDS is because a relevant sustainability commitment and the following innovations can satisfy customers and even create a new demand, which can further create profitability currently or in the future. Third, pursuing economic benefit by decreasing cost or increasing added value is also a motive to consider and adopt IDS strategies. And fourth, motives that were driven by and can reflect the core values of the organizational culture were cherishing and protecting

nature, being grateful and repaying, having senses of crisis and risks and acting proactively. However, a few themes emerged in the main study, including key themes such as being the spearhead of the industry transformation, pursuing sustainable development by respecting stakeholders, and (at the individual level) meeting top managers' self-actualization needs. These motivations are not individual-driven but combined-multiple-motives-driven; this was supported by Gisbert-Lopez, Verdu-Jover and Gomez-Gras (2014), who stated that the drivers for sustainability-related innovation are mutually and dynamically interacting with each other.

In prior literature (e.g. Biondi, Iraldo & Meredith, 2002; Bos-Brouwers, 2010; Cuerva, Triguero-Cano & Corcoles, 2014; Hansen et al., 2002), by focusing on external and internal stakeholders, these themes of motives also were identified as the market and customer demands, regulation and cost-saving, forces from the supply chain, and the internal strategic consideration to achieve potential benefits such as financial benefits, competitive advantage or expectation to be an innovative frontrunner in the sector.

#### 5.1.5 Influencing factors in adopting IDS strategy

Because there was not enough empirical research on innovation management and practice of the corporate sustainability, the knowledge from innovation studies was obtained for the researcher to understand the adoption process and the categories of the influencing elements.

By conducting a multiple-case study, it was revealed according to the empirical data that, although in the real business world there are plenty of actions involved in the process to adopt IDS strategy, in each sub-innovation or view them as an integrated process, these actions can be classified into three different stages: strategy design, strategy implementation and commercialisation. These stages and the detailed actions were partly identified in published (eco-)innovation articles (e.g. Ahlin, Drnovsek & Hisrich, 2014; Audretsch & Vivarelli, 1996; Bradley et al., 2012), and offered the researcher empirical evidence from a systematic IDS perspective.

In each stage, by using different levels of analysis, several influencing factors were identified. And it gave the researcher a comprehensive understanding of how factors acted as combined driving forces to help CSMEs implement their IDS strategy successfully. This was supported by prior articles that the IDS strategy adoption was mainly influenced by environmental, organizational and personal factors (Damanpour & Schneider, 2006), and the influences of these external and internal forces appeared to be critical and complex (Vega, Brown & Chiasson, 2012).

It is worth noting that the key influencing elements of SMEs to conduct their IDS strategy successfully were related to maintaining the strengths of SMEs, such as effective communication, whilst conquering the widely acknowledged constraints of SMEs, such as knowledge, talent and finance. Emergent key themes such as raw materials and components can also be traced back to specific constraints of CSMEs. Thus, to adopt an IDS strategy systematically and efficiently, from a company's characteristic perspective, the method is to sustain SMEs' advantages but overcome SMEs' constraints.

### 5.1.6 Measurement and evaluation of IDS strategy

A gap identified by systematically reviewing prior literature was that the indicators or measuring criteria for assessing the success of (eco-)innovations or the outcomes of sustainable strategy are difficult or even impossible to generalize. The reason was that, in prior innovation articles, each group of authors focused on different types of innovations and used different measures of performance (Crossman & Apaydin, 2010), and in sustainability studies, the cases were normally selected either by conducting eco-innovations or CSR practices (e.g. De Marchi, 2012, Pinget, Bocquet & Mothe, 2015). However, prior literature gave a clue that researchers could design them from both sustainability and innovation perspectives.

Another gap was that, when evaluating and assessing the success of eco-innovation or the sustainability performance, researchers normally focused on either qualitative or quantitative aspects. Furthermore, they tended to introduce the measuring criteria without specifying it was designed to evaluate innovation outputs or outcomes. This might be due to the fact that the gap between innovation outputs and outcomes was not well-defined in the literature (Ahlin, Drnovsek & Hisrich, 2014).

The researcher clustered and summarised practical indicators and measuring criteria that CSMEs had used to evaluate the innovation outputs and the strategy outcomes, separately. In details, a successful product innovation would lead to: 'the innovation process became a written principal', 'increased number of new products, expanding potential markets', 'optimized product quality', 'achieved customer satisfaction' and 'gained brand recognition and industry influence'. On the other hand, a successful process innovation strategy would be evaluated from 'technology', 'cost-control', 'quality-control' and 'be permitted to continue production', 'became a written principal' and 'working environment' aspects. In addition, quantitative indicators and qualitative measurements were given to evaluate SMEs' sustainability performance from both economic, social and environmental perspectives. These findings enrich the theoretical understanding of IDS measurements, and offer SMEs a practical and comprehensive method to monitor and assess their IDS practices.

## 5.2 Conceptual model

First of all, the main findings are related to the CSMEs' understanding of CS. In this theme, the researcher found 4 key sub-themes, including profitable business performance, business continuity in challenging times, social expectations and responsibilities, and considerations in China's context. Among these sub-themes, developing a responsible supply chain with suppliers and buyers under social expectations and responsibilities, and the Chinese traditional philosophy and principles under consideration in China's context are the emerging interesting findings from Chinese SMEs.

Secondly, regarding the motives for SMEs to achieve IDS, the researcher found 7 key sub-themes, including 1) catering to government police, 2) satisfying customers, 3) pursuing economic benefit, and 4) practising core values of organizational culture from the pilot study, and 5) pursuing long-term competitive advantage, and 7) (at the individual level)

meeting top managers' self-actualization needs from the main study. And the findings show that IDS is not driven by individual but combined multiple motives. Among these sub-themes, instead of only focusing on stakeholders and their forces, the researcher also focused on the particular core value of the organizational culture that drove the SME to be innovative and sustainable in the context of China, including 1) cherishing and protecting the nature, 2) being grateful and repaying, 3) having senses of crisis and risks and 4) being responsible, to human beings, society, customers and employees in particular.

The third main finding concerns the representative actions and influencing factors in crafting, implementing and commercializing IDS strategy. The researcher found a set of influencing factors that can be classified into four main levels: contextual level, organizational level, team level (not usually targeted) and individual level. Among these influencing factors, at the contextual level(/industry level), raw materials' quality and quantity, and components' compatible level are the new findings in the context of China. Another interesting finding is about the commercialization stage and its influencing factors. Data from the researcher's study indicated that the commercialization stage is unescapable, and there are representative actions such as 'marketing and selling'. Two key influencing factors were discovered: cost control and (IDS-related) marketing strategies.

Finally, data regarding measurement. This is a very interesting finding because prior research did not have enough or in-depth exploration about the measuring criteria being utilised by SMEs. However, to measure the success of innovation, Chinese SMEs actually measure the success of the product innovation from if 'the innovation process became a written principal', 'increased number of new products, expanding potential markets', 'optimised product quality', 'achieved customer satisfaction' and 'gained brand recognition and industry influence'. On the other hand, a successful process innovation strategy would be evaluated from 'technology', 'cost-control', 'quality-control' and 'be permitted to continue production' aspects. And both quantitative indicators and qualitative measurements were utilised to evaluate whether these SMEs' IDS strategies and their sub-innovations actually impact their economic, environmental and social sustainability performances.

In addition, one of the most interesting aspects of this research is identifying IDS systematically and comprehensively. By analysing SMEs' and the government's understandings of CS, the relationship between innovation and sustainability, and the adopted strategies in IDS, the researcher first articulated the true corporate 'IDS' in China's context as 'the integrated strategy and its outcomes related to the company who is seeking TBL towards various SOIs and other sub-innovations'. By clarifying this definition, researchers can effectively define and contrast IDS and SOI in future studies.

Another most interesting aspect of this research is the impact of Chinese values on Chinese SMEs' enterprise and entrepreneurial behaviours. More specifically, the fables the interviewees used to explain their ideas in relation to every stage and aspect of the IDS, such as the CS understandings and measurements, IDS motivations and IDS adoption. For instance, when explaining the IDS motives, '知恩图报 (being grateful and repaying)', '居安思危 (having a sense of crisis and risks)', '未雨绸缪 (being proactive)' were well-known traditional principals and spirits of the Chinese nation. And according to the researcher's

memo, during and after the interviews, proverbs such as ‘滴水之恩，当涌泉相报’，‘鸦有反哺之义，羊知跪乳之恩’ that can be summarised as ‘being grateful and repaying’，‘生于忧患 死于安乐’，‘如逆水行舟，不进则退’，‘宜未雨而绸缪，勿临渴而掘井’ that can be summarised as ‘having a sense of crisis and risks’，were frequently quoted by interviewees or presented in the bulletin board to cultivate the specific corporate culture in innovation and CSR. Furthermore, to interpret why both the strategic orientation of the top managers and the practice of the employees matters, interview participants such as Interviewee 8 used ancient Chinese fables such as ‘the water that carries the boat can bury it as well (水能载舟，亦能覆舟)’，which was first introduced by philosopher Xunzi (荀子) to interpret the relationship between the ruler and his people. It was interesting to explore why they chose these specific fables in their answers and how these answers reflected the influence of Chinese philosophy, beliefs and culture. The fact that the national culture can influence corporate culture has been studied by previous researchers such as Khan and Law (2018)，but none of them focused on how these relate to the IDS study or in the particular context of China.

Based on these findings, a conceptual model was designed and developed. More specific sub-themes under each key theme can be seen in Appendix E3.

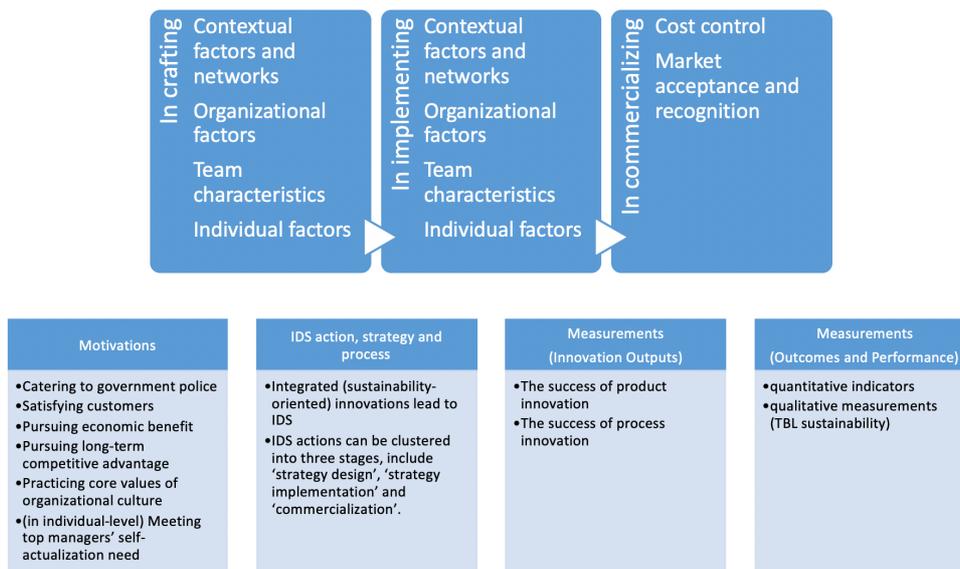


Figure 5.2-1 Conceptual model to pursue IDS and its sub-innovations

### 5.3 Theoretical contributions and implications

Theoretically, this research brought great value and added new insights of SMEs' sustainability and innovation theories from emerging market and economy transition perspectives.

First, this study contributed to the understanding of corporate sustainability (CS) in China's context. In detail, the existing literature (e.g. Beise & Rennings, 2005; Bos-Brouwers, 2010; Henriques & Catarino, 2015) argued that the three aspects should be considered when defining CS: economic, social and environmental perspective. The researcher's findings supported the idea that the CS can be interpreted based on these three well-known pillars of sustainability. In addition, the researcher's findings added the 'responsible supply chain' concept when understanding CS from the CSME perspective. In other words, only by selecting and supporting the responsible suppliers and downstream buyers can the CSME better fulfil its CS. For example, the study found out that it is no longer the case for SMEs if they only exclusively relied on themselves, or only consider how to use their own resources and capabilities to tackle the environment and social issues; instead, they mentioned how firms could form a sustainability ecosystem by encouraging other participants in the supply chain, such as upstream suppliers or downstream buyers, to be sustainable and responsible. According to their knowledge and experience, using the firms' power position to influence other participants in the whole business network is also crucial in CS studies.

This 'sustainability ecosystem' mindset is influenced by traditional Chinese philosophy and values about 'a community of shared destiny (命运共同体)' (Harmony approach). Moreover, in section 4.2.4, besides focusing on *the hierarchy of human needs* and *the engaged sustainability stakeholders*, the researcher identified and interpreted *the harmony approach* and other representative traditional beliefs and cultures that were inherited by CSMEs in understanding and practising sustainability, including *De from Taoism*, *Chengfu Doctrine* and *Confucianism*, which were not summarised and emphasised by any high-quality articles previously. In sum, the researcher's contribution to the existing literature of CS is that this concept must be interpreted by taking contextualisation into consideration. And it can further contribute to building standards of CS in China's context, speeding CS to become more understandable and practical, and enriching the global sustainability definitions and practices.

Second, this study contributed to the motivations of sustainability-oriented and innovation-driven theories from different perspectives. Existing literature in relation to IDS largely used stakeholder theory (e.g. Biondi, Iraldo & Meredith, 2002; Bos-Brouwers, 2010; Demirbas, Hussain & Matlay, 2011; Pinget, Bocquet and Mothe, 2015), and their studies highlighted the roles of external stakeholders such as the government or customers. To the researcher's best knowledge, only a secondary data research conducted by Shevchenko, Levesque and Pagell (2016) emphasised the opinion that, for small innovative firms, the decision to engage in sustainability largely depends on their internal willingness due to they are less visible and under considerably lower stakeholder pressure. In this study, instead of only focusing on stakeholders and their forces like prior research, the researcher discovered the particular core value of the organizational culture that drove the SME to be innovative and

sustainable in the context of China, including 1) cherishing and protecting the nature, 2) being grateful and repaying, 3) having senses of crisis and risks and 4) being responsible, to human beings, society, customers and employees in particular. These core values of the organizational culture not only influence the manager's values and motives at the strategic level, but also actively encourage employees to participate in IDS since the beginning of idea generation. Therefore, the researcher's findings support and expand Shevchenko et al. (2016)' theory and offer valuable empirical evidence. In addition, by exploring "ethical cultures that also generate sustained excellent performance instead cultures that only provide above average spiritual returns" (Barney, Wright & Ketchen, 2001, p636), this research contributes to RBV in the field of innovation and CS.

Third, this study contributed to the literature on innovation and sustainability commercialisation. To the researcher's best knowledge, the prior studies in innovation and CS domains have mainly focused on the antecedents of SMEs' sustainable behaviours, like barriers and drivers (e.g. Parker, Redmond & Simpson, 2009; Hsu & Cheng, 2012), whereas it is assumed that innovation-led behaviours certainly lead to sustainability for SMEs (Burke & Gaughran, 2007). Kesting et al. (2016) was the one who noticed that, after idea generation, the commercialisation of innovations matters. The findings in this study strongly suggested that the commercialisation stage was unescapable, and there were representative actions, such as 'marketing and selling', that must be taken into account when studying IDS and its sub-innovations. And two key influencing factors were discovered, including cost control and (IDS-related) marketing strategies.

Fourth, this study contributed to the literature on innovation and sustainability measurements. By reviewing prior literature, there was not enough or in-depth exploration about the measuring criteria being utilised by SMEs; furthermore, existing knowledge has been largely derived from existing innovation studies (e.g. Bos-Brouwers, 2010; xx; xx; xx), while the topic on sustainability remains unnoticed and lightly touched (e.g. De Marchi, 2012; Pinget, Bocquet & Mothe, 2015). This research clustered and summarised the practical indicators and measuring criteria that had been used by CSMEs to evaluate whether the innovation succeeded and whether this strategy has an impact on SMEs' sustainability performance. These findings enrich the theoretical understanding of IDS measurements and offer SMEs a practical and comprehensive method to monitor and assess their IDS practices.

In addition, the findings of this research expanded the existing theory of influencing factors; for instance, it specified why the material possibility influences IDS adoption and how. The material possibility was briefly mentioned by Bos-Brouwers (2010) from a resource-based view (RBV) but lacked in-depth discussion and evidence. Such findings offered valuable empirical evidence and discussion in RBV theory from developing country's perspective.

Finally, this study expands the existing innovation and sustainability theory by applying an inductive approach, cross-case study, multiple theories, and multi-level analysis in understanding the IDS definition and practice comprehensively and systematically. In detail, the debate on companies directing their business activities toward sustainability through innovation was initially focused on cleaner technology, eco-efficiency, or green innovation from environmental sustainability perspective, or ethical business practice and social

entrepreneurship from a CSR perspective. Although, gradually, researchers began to focus on SOI and few publications even mentioned IDS, they failed to make a clear and strong argument on whether every dimension of the TBL sustainability should be fulfilled, particularly in sample selection and data analysis sections. Moreover, to the researcher's best knowledge, IDS studies are significantly under-researched, and it is even hard to draw more literature to define, compare, and contrast IDS and SOI. The researcher first identified this gap in 2015, and by conducting years of research with an inductive spirit, she 1) identified a triangular structure in the innovation-sustainability relationship, 2) concluded an integrated IDS strategy process framework with various (sub-)innovations, and 3) argued that, although in the real business world there are plenty actions involved in the process to adopt IDS strategy, in each (sub-)innovation or view them as an integrated process, these actions can be classified into three different stages: strategy design, strategy implementation and commercialization; these stages can be re-experienced, and actions within each stage can be re-conducted, simplified, and even skipped. By claiming that, a comprehensive understanding of the IDS and its process was achieved. Furthermore, previous researchers studied innovation and sustainability by examining one or two aspects, for instance, the study into barriers, motives or required resources. These studies only use a single theory or conduct a single level of analysis. It was argued by Epstein, Buhovac and Yuthas (2010) that these researchers from a single theoretical perspective or applied single-level analysis were incapable of explaining a strategy effectively and comprehensively. In response to Epstein et al. (2010)' statement, my research examined IDS from motives to influencing factors, from the strategy crafting to the implementation and then the commercial stage, and finally how to measure the IDS outcomes, and it applied multiple theories and multi-level of analysis to interpret. By doing so, this study offered a comprehensive and systematic understanding of the IDS.

Besides the theoretical contributions mentioned above, this study has several practical contributions. Because the value and originality of this research, for instance, its conceptual model has never been proposed in either innovation or CS literature, while it seems to explain the systematic and comprehensive method to achieve IDS towards sub-innovations by applying multi-theories and multi-level of analysis; thus, the findings of this study could benefit practitioners such as SMEs in unfavourable regions and policymakers such as the Chinese Government. In detail, due to the researcher achieved an in-depth understanding of how central-zone manufacturing SMEs obtain their systematic IDS, an innovative, systematic and practical IDS model has been developed particularly for SMEs located in underdeveloped areas to obtain their sustainability and for other stakeholders who want to engage in this process in the future actively. For instance, the findings may provide a benchmark for SME managers to evaluate how well their own firm meets the success criteria (Forsman, 2008; Parry, Jones, Rowley & Kupiec-Teahan, 2010). While they can use it as a compass for directing their IDS behaviours, other researchers can use it as a starting point in the investigation of IDS.

More specifically, by reviewing the governments' roles and practices and the institutional influence in different IDS adoption stages, public policymakers and practitioners should focus on the following areas in order to enhance and encourage IDS:

1. In motivating, the most effective political approach to encourage an SME to become innovation-driven and sustainability-oriented is to announce increasingly strict regulations and standards in the environment, as well as offer financial rewards for new techniques. However, it was noticed by the owner of Case GY, the top manager of Case HC and all government interviewees that, there is a gap between policy formulation and effective implementation. One emphasised reason was that the local authorities, particularly rural and outlying ones in the Central Zone, may lack professional supervision, inspection and testing personnel in sustainable development and technic innovation. The local authority may therefore consider working with third-party testing agencies, environmental organizations, industry experts and local communities to strengthen policy implementation and regulation.

2. In crafting, ensure that alternative money supports really exist, such as project funds, taxation reduction or R&D bank loans, and offer specific regulation and guidance that can truly force and encourage SMEs to pursue IDS-related innovations. According to Autant-Bernard et al. (2013), innovation policy includes far more than providing R&D subsidies; its most significant role is to develop mechanisms that facilitate the capture and assimilation of knowledge. Policies in IDS function the same, through financial and non-financial regulations, the most significant outcome is to establish a mechanism and culture that facilitate the orientation and cultivation of IDS and SOI.

3. In implementing, support and improve talent attraction as well as provide platforms for resource sharing and knowledge sharing. The importance of talent, resources and knowledge was also emphasised in innovation studies (e.g. Autant-Bernard et al., 2013; Mohnen & Röller, 2005; Smits & Kuhlmann, 2004). And compared to SMEs in developed regions or larger competitors, SMEs in rural and underdeveloped areas can get even less; it is important for the government to increase SMEs' bargaining power to have advanced materials for R&D, and encourage technology development in material, components and the automatic system.

4. In marketing, act as a representative buyer and showcase for advanced technology; provide or encourage branding certification, exhibition, B2C channel and logistics. The government should also provide infrastructure (Chatzoglou & Chatzoudes, 2017), such as through road build and maintenance. The importance of infrastructure was also emphasised by a well-known Chinese vibe: 'If you want to be rich, build the road first' ('要想富 先修路').

5. In assessing, act as a trustworthy third party; promote updated national standards; ensure intellectual protection, particularly regulation in patent certification and protection; and ensure tracking and monitoring until project closure.

However, according to the seminal study of Tödting and Tripl (2005), a 'best practice' innovation policy which could be applied to every region does not exist. The same as IDS policy. Thus, policymakers should customise their initiatives in order to fit the characteristics of each different region.

## **5.4 Limitations and future recommendations**

### **5.4.1 Limitations**

Limitations represent weaknesses within the study that may influence outcomes and conclusions of the research (Ross & Zaidi, 2019). It ensures transparency of both the research and the researchers (Chasan-Taber, 2014), as well as provides transferability (Eva & Lingard, 2008) and reproducibility (Ross & Zaidi, 2019) of methods. Presenting limitations also supports proper interpretation and validity of the findings (Ioannidis, 2007). A study's limitations should place research findings within their proper context to ensure readers are fully able to discern the credibility of a study's conclusion, and can generalize findings appropriately (Ioannidis, 2007).

From a study design perspective, a systematic bias may originate from conscious choices made by the researcher during the development of the study plan, although the initial intention was to narrow the scope of the study (Creswell, 2014; Price & Murnan, 2004). Such limitation is also known as delimitation (Price & Murnan, 2004). For instance, the researcher may have designed the study for a particular age group, sex, race, ethnicity, geographically defined region, or some other attribute that would limit to whom the findings can be generalized (transferability). In particular, this study consciously targeted manufacturing SMEs located in central China to ensure data richness and in-depth as well as credibility. However, this transferability (also known as external validity in quantitative study) challenge that accompanies non-probability samples is inevitable; but, the transferability was enhanced because the research question, case background and the choices being made in the research design were recorded and presented honest and in detail (Bloor & Wood, 2006). And, a clear description and delineation of this delimitation could assist editors and reviewers in understanding any methodological issues in the future (Ross & Zaidi, 2019).

Another specific challenge during the research, in particular, the data analysis, was the conflicts between data richness and time-consuming. In detail, template analysis was encouraged to be used to explore in most depth those areas which seem particularly rich in terms of the insight they provide into the topic area of interest, rather than stipulate a set number of coding levels (King & Brooks, 2017). However, it was challenging to keep this aim in mind, even in the early stages of analysis, because a mass of qualitative data was obtained. To conquer this obstacle, the researcher had to remember that template construction and templates themselves are a means to an end, rather than the final goal of work, as King and Brooks (2017) suggested.

#### 5.4.2 Future study

Several future studies were recommended based on the findings of the literature review and empirical study. First, there is scope for further research that explores influencing factors between incremental and radical sustainable innovations, between SOIs and other sub-innovations within the IDS practice, and between mini, small and medium-sized companies. According to some of the prior literature, a few factors and their importance are different between incremental and radical sustainable innovations (Triguero, Moreno-Mondejar & Davia, 2015), between SOIs and other innovations (e.g. technology-oriented innovation) (e.g. Hansen et al., 2002), and between small firms and medium-sized firms (Triguero et al., 2015). For instance, the main results of Triguero et al. (2015)' research show similarities and differences among the drivers explaining incremental and radical sustainable innovations in small and medium-sized companies. In detail, technological and managerial capabilities, as well as network involvement, are key driving forces for small firms' incremental and radical eco-innovation but not for medium-sized firms' incremental eco-innovation; however, an increase in demand for green products is crucial for incremental mechanisms (e.g. EOP) and for radical changes (e.g. cleaner technologies) in any size of SMEs. Thus, comparative studies between incremental and radical sustainable innovations, between SOIs and other sub-innovations within the IDS practice, and between mini, small and medium-sized companies, can be conducted in future.

Second, there is scope for further research that explores the impact of Chinese values, cultures and philosophy on CS interpretation and practices in depth. According to the empirical evidence, the researcher found that Chinese philosophy influences not only the definition and interpretation of CS, but also the adoption of CS. For instance, when talking about why both the strategic orientation of the top managers and the practice of the employees matters, Interviewee 8 used an ancient Chinese fable, 'Although the water can carry the boat, it can bury the boat as well', which was first introduced by philosopher Xunzi. Because of time-consuming and word limits, the researcher has not well discussed Chinese culture and its impact on IDS practices; however, exploring the impact of Chinese values, cultures and philosophy on CS interpretation and practices in-depth could be a contributed, meaningful and interesting orientation of the future study, and may offer new insight in designing an innovative template to promote China's entrepreneurship and enterprise education.

Third, there is scope for further research that explores whether these elements of good and bad practice apply solely to other industry sectors or whether they are appropriate to SMEs in the service. In detail, based on the findings of prior studies, different operating business environments and distinguished value chain activities between manufacturing SMEs and service SMEs affect companies' innovation outcomes (O'Dwyer et al., 2009; Rosenbusch et al., 2011). Considering one interesting finding of this research was that the IDS was achieved towards integrated sub-innovations, thus, a future study exploring service SMEs from undeveloped regions in China would be very meaningful.

In addition, deductive research to test whether the newly emerged findings can be empirically proved in other underdeveloped regions and countries could be recommended for future study. Propositions which could be examined by future research are:

P1. IDS motivation

P1a: The most influential stakeholders include government, customers, and shareholders.

P1b: Top managers' self-actualisation needs drive the government to pursue IDS.

P2. IDS action, strategy, and process

P2a: Innovations in product design, product development and application, techniques, equipment, processes, and strategic supply chain are comprehensively used and continuously developed in SMEs.

P2b: Neither of the successful IDS strategies is limited to adopting the SME's preferable product innovation or incremental innovation, but is more radical, integrated and continuously innovated.

P2c: IDS actions can be clustered into three stages: 'strategy design', 'strategy implementation' and 'commercialisation'. Stage can be re-experienced, and actions in each stage can be re-conducted, simplified, and even skipped.

P3. IDS influencing factors in adoption

P3a: Multi-level factors influencing IDS design and implementation.

P3b: In the commercialisation stage, the two most influential factors are cost control and market acceptance and recognition.

P3c: National and cultural characteristics influence not only the definition and interpretation of CS, but also the adoption of IDS.

P4. IDS measurements

P4a: IDS-related (sub-)innovation outputs can be evaluated from product and process innovation perspectives.

P4b: IDS-related outcomes and performance can be evaluated from a qualitative measurement perspective, in particular, from TBL sustainability perspectives.

## Appendices

### Appendix A Systematic literature review documents

Appendix A1 Systematic literature review and its descriptive analysis results

*[part of the researcher's systematic reviewing report in 2017, which was drafted and developed for her 1<sup>st</sup> annual progression and her 2017 publish plan]*

" .....

#### 3. Method

Systematic review aims at "synthesizing research in a systematic, transparent, and reproducible manner" (Tranfield et al., 2003, p207). The rationale behind systematic reviews is characterized as: being transparent, focused, equal, and accessible, providing clarity, allowing for unification of research and practitioner communities, and overall leading to synthesis (Thorpe et al., 2005). Therefore, the diversity of knowledge is systematically managed (Thorpe et al., 2005; Tranfield et al., 2003).

The aim for the researcher to conduct a systematic review is to structure the research field on innovation and sustainability in the context of SMEs, identify emergent themes and point out the most important gaps (Tranfield et al., 2003). With reference to the process used by Fink (2014) and Klewitz and Hansen (2014), the on-going literature review will consist of six procedural steps, which can be seen in Table 3-2. Each step is described in further detail below.

Step 1: The keywords for the search should be deduced from the definition of SMEs, SOI and IDS (MacGregor, Fontrodona & Hernandez, 2010). The domains of these terminology were operationalized through three clouds of keywords, including innovation (e.g. product development, process improvement, diffusion, eco-innovation), sustainability (e.g. environment, green, societal, competitive advantage, survive), and SMEs (e.g. small businesses, medium-sized firm). While reviewing the relevant articles which fitted those three clouds of keywords, the researcher critical recognized the similar expression belongs to each one of them, and recorded emerging synonym. After combing and comparing the researcher's recorded keywords with keywords were used by prior reviewing papers, to guarantee quality and to reduce the sample to a manageable amount, the researcher followed other scholars and concentrated on keywords which are concluded by ABS listed journal papers in English language (e.g. Walker et al., 2008; Klewitz and Hansen, 2014). Overall, 35 keywords summarised by prior researchers were used (Table 3-1). Target articles needed to match at least one keyword in each cloud. These clouds demonstrate again the researcher's objective to cover research dealing with innovation practices in SMEs linked to distinct strategic sustainability behaviors and sustainability performance improvements.

Table 3-1 Keywords operationalized for search

Search clouds			Exemplary search string
Sustainability	Innovation	SMEs	
Sustainability, eco-, environmental-, green, social, ethical-, eco-efficiency, corporate sustainability, sustainable development, CSR, cleaner-, sustainable entrepreneurship	Improvement, enhancement, diffusion, innovation, product stewardship, cleaner productiona, ecopreneur*, bioneer, sustainable entrepreneurship, process improvement, corporate sustainability innovation, eco* innovation, sustainability oriented innovation, environ* strategy, R&D, research and development	Small business, medium business, small and medium sized business, SME, small firm, medium firm, SMEs	Topic: (innovation OR improvement OR enhancement OR eco-efficiency OR cleaner production OR ecopreneur* OR sustainable entrepreneurship OR environmental strateg*) AND Topic: (sustainab* OR environm* OR eco* OR green OR CSR OR social OR ethic* OR corporate sustainability OR sustainable development OR sustainability oriented) AND Topic: (small and medium sized enterprise* OR SME OR medium business OR small business OR small firm OR medium firm)

Step 2 and 3: Though reviewing paper should include different types of publications, to guarantee quality and to reduce the sample to a manageable amount, after discussed with her supervisors, the researcher chose to focus on article, proceedings paper, book chapter or review that is recorded by the following research database: Web of Science. The scope of this database supported the author’s interdisciplinary goal of covering literature from sustainability, innovation and SMEs. This database and related search engine works with the key terms as search string. The results are achieved by defining content and categories covered, years searched, languages, document types, timespan and Indexes. With regard to the timeframe covered, the researcher find out that the earliest publication date start from 1987, it might be because sustainable development has received prominent attention within practice and international research since the publication of the Brundtland report “Our common future” (WCED, 1987) (Klewitz and Hansen, 2014). Therefore, although the researcher searches the publications all years, this review actually covers academic publications in the period between 1987 and 2016. Taking into account the economic sustainability of SMEs, the researcher is interested in SMEs beyond the start-up phase.

Step 4: Originally, the researcher started out with a database of 1499 publications which she categorized into A (highly relevant), B (most relevant), C (less relevant) and D (not relevant). The initial D-list of 1499 publications was first reduced on the basis of title and abstract analysis to 593 relevant articles (C-list). For instance, articles focus on national innovation or industry innovation will not be targeted in this reviewing paper. This C-list was analyzed in-depth (title, abstract, part of the full text) in an iterative process and the author had to eliminate another 295 articles. The

most common reasons for eliminating publications from the initial C-list include belongs to general knowledge of one search cloud, a dominant practitioner’s focus (e.g. training guidelines, management principles, program tools; the adoption of a particular innovation system or environmental management tools, specific suggestions for government, industry, SMEs or any other stakeholders) or particularly targeted Start-up SMEs (a lack of established SME focus). Only 108 publications were selected to Rank A to review in detail, include publications particularly targeted SMEs and how they achieve sustainability towards innovation (15 publications), high quality articles only targeted two clouds in detail (the rest RankB publications) that belong to ABS listed 3\* or 4\* journals (e.g. article which mentioned sustainable development in general but did not targeted corporate sustainability in the research) (70 publications related to SMEs and innovation, 15 publications related to SMEs and corporate sustainability, 8 publications related to innovation and corporate sustainability). 17 additional articles were found by using snowballing method and hand search. The author manually added 2 of them as highly relevant articles (include Cuerva, Triguero-Cano & Corcoles, 2014; Klewitz & Hansen, 2014) to the A-list. The resulting A-list with 110 articles was then further pursued in both the descriptive and thematic analysis.

Step 5: For the descriptive analysis, the researcher selected categories that describe the papers in terms of e.g. Top journals covered, publication years, countries, methods applied, level of analysis.

Step 6: For the thematic analysis, the researcher used deductive categories which she gained from prior literature reviews and then the inductive categories that emerged during the critical review. The aim is to systematically categorize the content of the papers and identify relationships (Klewitz & Hansen, 2014).

In other words, the results and discussions are structured in two parts: first, a quantitative descriptive (bibliographical) analysis is provided to get an overview on the research agenda on innovation and sustainability of SMEs. Second, a qualitative thematic analysis is presented to provide an in-depth analysis of SMEs’ innovation practices concerning their strategic sustainability behavior.

Table 3-2 Individual steps of the systematic literature review

Overall process	Individual steps	Analysis	Resulting #no articles
Search process	Step 1: Identification of keywords (35 key words)	Previous research and reviews	N/A
	Step 2: Development of exclusion and inclusion criteria (e.g. cleaner production, eco-design, CSR innovation, diffusion, life-cycle-analysis)	Title and abstracts (automated based on keywords)	N/A

Overall process	Individual steps	Analysis	Resulting #no articles
	Step 3: Specification of relevant search engine and execution of search (Web of Science)		1,499
	Step 4: Development of A, B, C and D list		
	D-list		1499
	C-list	Title and abstracts (manual)	593
	B-list	Title, abstracts and part text	298
	A-list	Full text	108
	Additional articles (e.g. Cuerva et al., 2014; Klewitz & Hansen, 2014)	Full text	+2
Descriptive and Thematic Analysis	Step 5: Descriptive categories (e.g. journals covered, methodologies applied)		
	Step 6: Deductive and inductive categories to identify central themes and interpret results (e.g. EMS, life cycle analysis)		

### 3.1 NVivo and EndNote

NVivo can import bibliographical data, notes and article attachments from reference management software, EndNote, Zotero, RefWorks and Mendeley. And researchers can take advantage of NVivo's advanced querying grouping and analysis tools to explore articles and complete robust research papers faster. For instance, the researcher can save time by utilizing auto coding and auto classification functionality based on the researcher's set criteria.

In the literature review chapter, the author utilized NVivo and imported data from EndNote in order to enjoy following benefits.

First, keep data organized. By using NVivo, the researcher can store ideas, assumptions and future plans in memos so she can prepare reports faster, and increase transparency and reliability. Furthermore, the researcher can use annotations to make notes about information in documents and PDFs so she doesn't lose ideas that she wants to explore later.

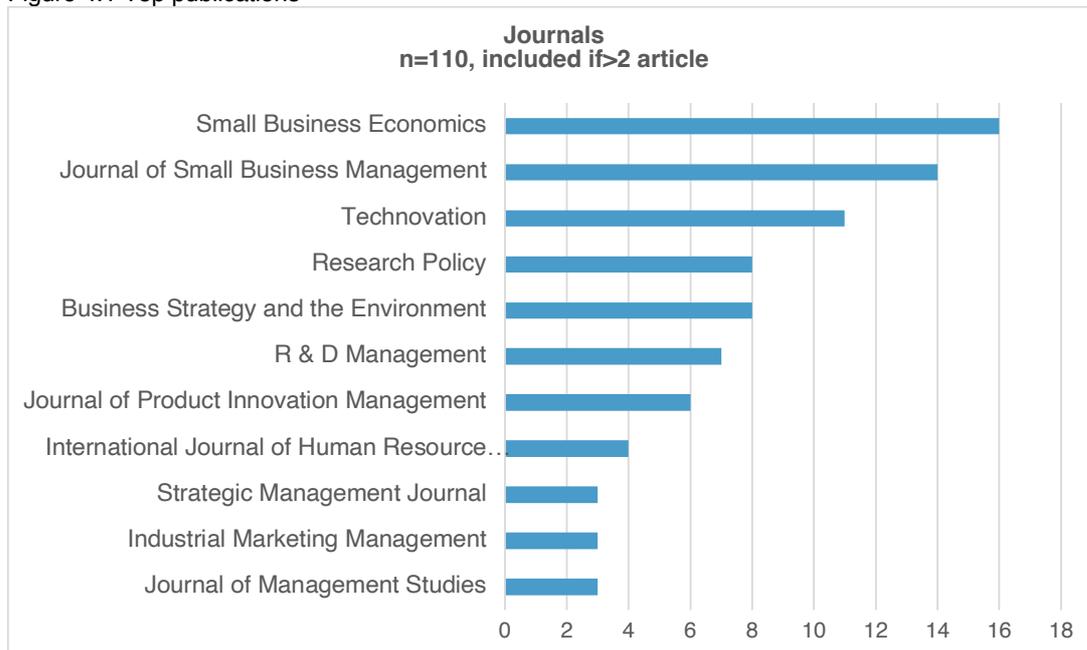
Second, categorize and analyze data. NVivo offers powerful tools to search, categorize and classify data. For instance, 'Classifications' provides a way to record descriptive information about the sources in the researcher's project; 'Nodes' can allow the researcher to explore emerging themes, and collect all the references about each specific theme in one place. And there are other functions such as text search, word frequency queries and matrix coding query, the researcher can even build in-depth personal queries based on attributes to test ideas, explore patterns and see connections between themes, topics, people and places in her project. By using NVivo, it's easier to search, compare and identify patterns in reviewed articles.

Third, visualize the research. The researcher can export her visualizations and use them to support the findings of her research in reports and presentations. In this literature review chapter, the summary of 'Visualizations' are exported as Excel worksheets to produce figures in Section 4.

#### 4. Results of the Descriptive Analysis

The top publications can be seen in Figure 4.1.

Figure 4.1 Top publications



With regard to the timeframe covered, the researcher finds out that the earliest publication date start from 1987, it might be because sustainable development has received prominent attention within practice and international research since the publication of the Brundtland report "Our common future" (WCED, 1987) (Klewitz and Hansen, 2014). Therefore, although the researcher searches the publications all years, this review actually covers academic publications in the period between 1987 and 2016. The growth of published researches on innovation and sustainability in business and management perspective can be seen in Figure 4.2.

Figure 4.2 Growth of published researches on innovation and sustainability in business and management perspective

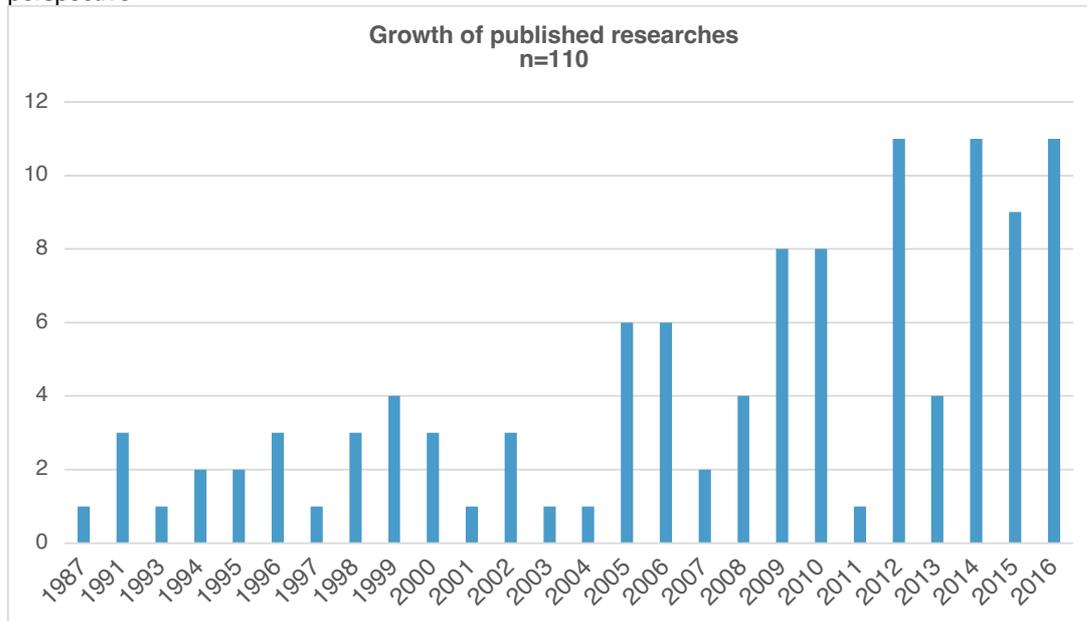
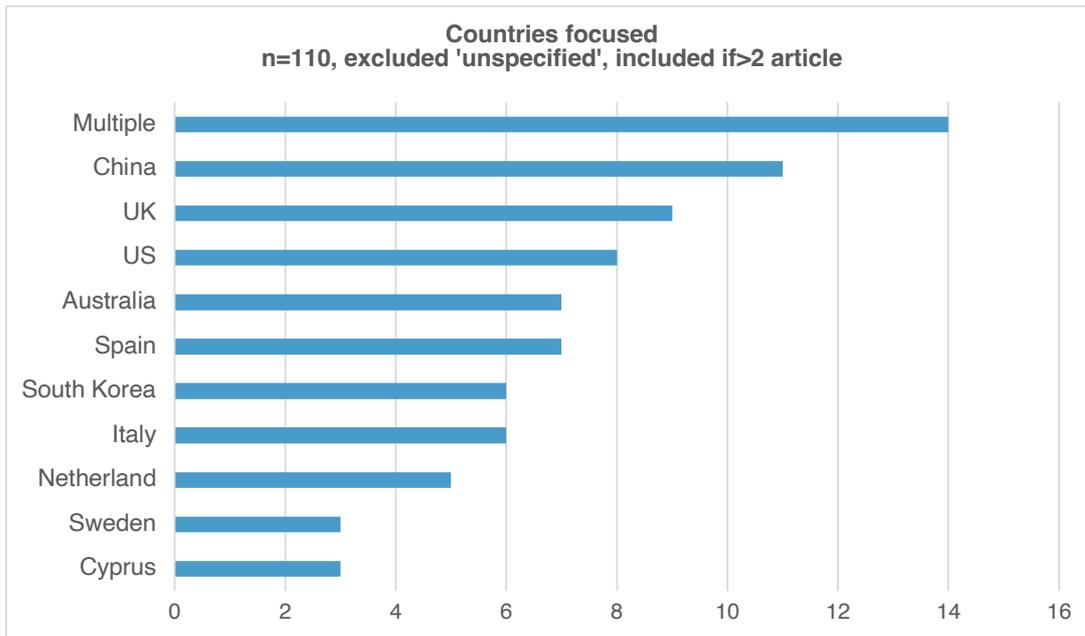


Figure 4.3 presents countries focused. It indicates that the researches targeted developing countries like China and Cyprus are increased. However, most of researches are targeted developed countries. Among these regional studies, two interesting facts should be noticed. First, most multiple studies targeted countries within EU. This might be because these countries share the same definition of SMEs, which makes comparative studies easier. A few multiple researches targeted both developed and developing countries, and they reported different empirical evidences about influencing elements of innovation, which will be discussed in the following section. Second, researches about Chinese innovation are growing fast and account for the second largest percentage of relevant regional studies, however, among them, only one quantitative research is truly focusing on testing barriers of environmental innovation. The qualitative, in-depth studies about the practices and processes of IDS are required.

Figure 4.3 Countries focused (excluded 'unspecified' or 'not applicable' articles)



Although some articles only focusing on examining whether innovation (or in particular the sustainability-related innovation) contribute to profitability or success (e.g. Bradley, McMullen, Artz & Simiyu, 2012), increased researches have been conducted to explore the practices and influencing elements in adopting innovation- and sustainability-related strategies. The breakdown of articles by theoretical perspectives and level of analysis can be seen below (Figure 4.4, Figure 4.5).

The results are in line with Crossan and Apaydin's argument that resource-based view, knowledge-based view, organizational learning, and network theory are usually utilized separately when interpretive a conducted corporate strategy (2010). In addition, most of the existing researches only applied either macro, organizational or micro level of analysis (Crossan & Apaydin, 2010). However, most researchers from a single theoretical perspective or applied single level analysis are incapable to explain a strategy effectively, because resource investments and structure enable a strategic cycle, while external institutional rules and internal focus draw the boundaries of the activities (Epstein, Buhovac & Yuthas, 2010). In order to achieve a comprehensive and systemic understanding of IDS of SMEs, multiple theoretical perspectives and multilevel analysis should be applied. For instance, a stakeholder and institutional theory will be utilized while understanding the institutional determinants of whether and in what forms SMEs take on social and environmental responsibilities (Bos-Brouwers, 2010; Brammer, Jackson & Matten, 2012), because all size of companies are embedded in a broad set of historical, political and economic institutions that affect their behaviors (Campbell, 2007). And to attain comprehensive understanding of the determinants behind the formulation of IDS strategies and the key influencing elements during the implementation process, organizational resources and capabilities such as the corporation's culture, structure, leadership, managerial compensation schemes and other factors should also be considered (Hansen et al., 2002).

Figure 4.4 Breakdown of articles by theoretical perspectives

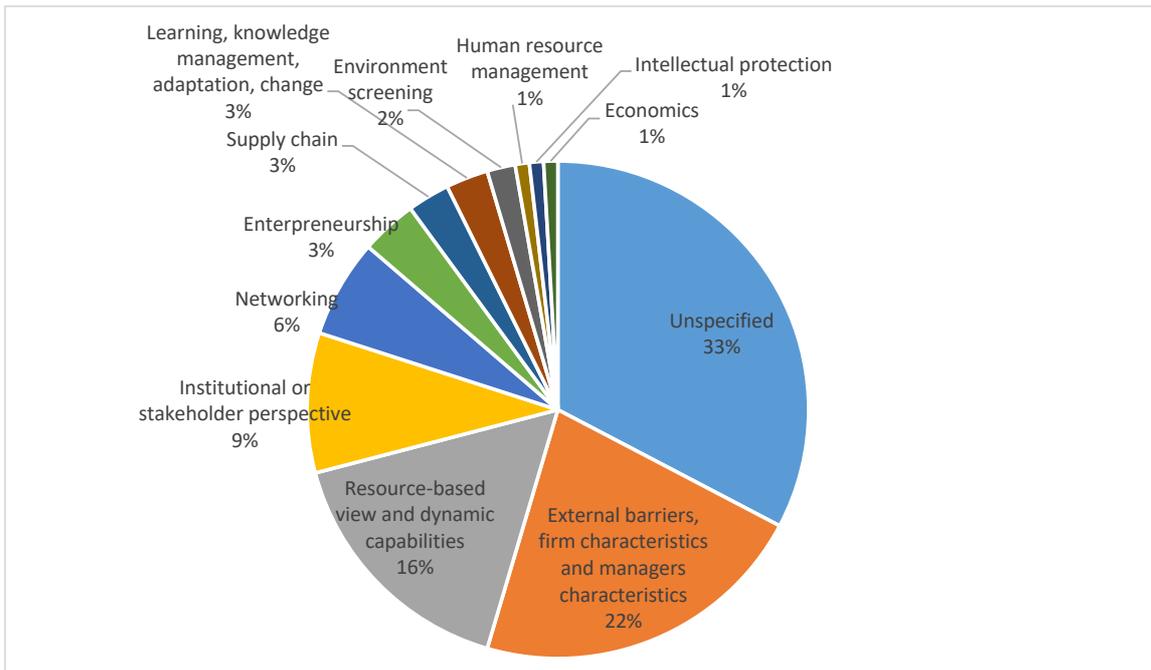


Figure 4.5 Breakdown of articles by level of analysis

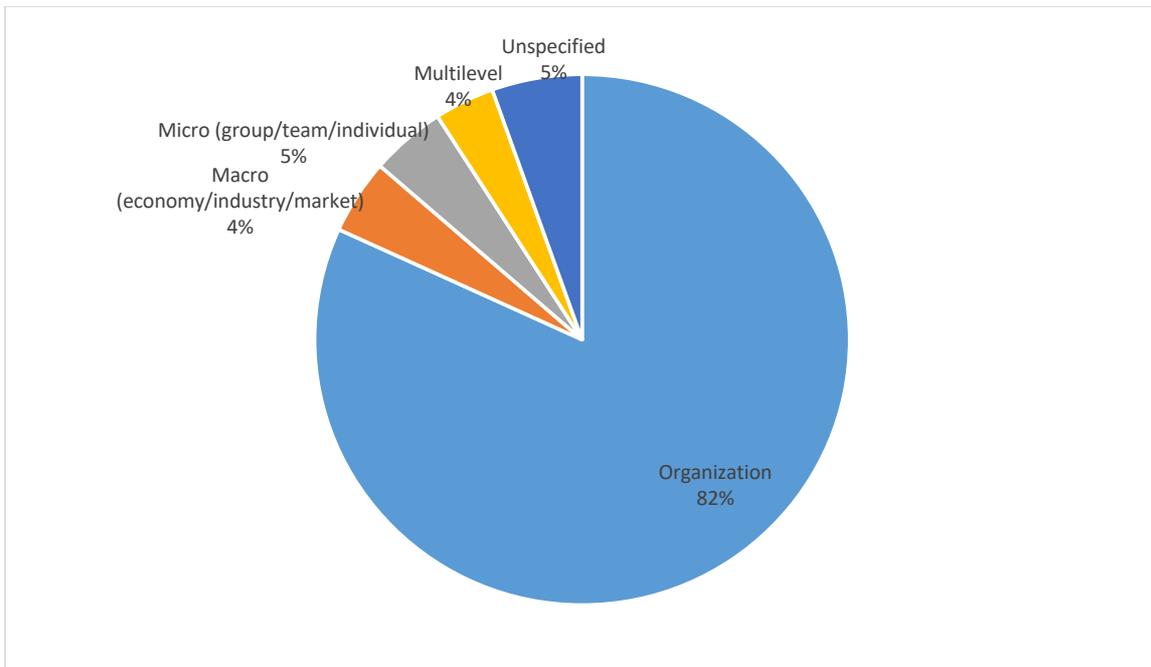
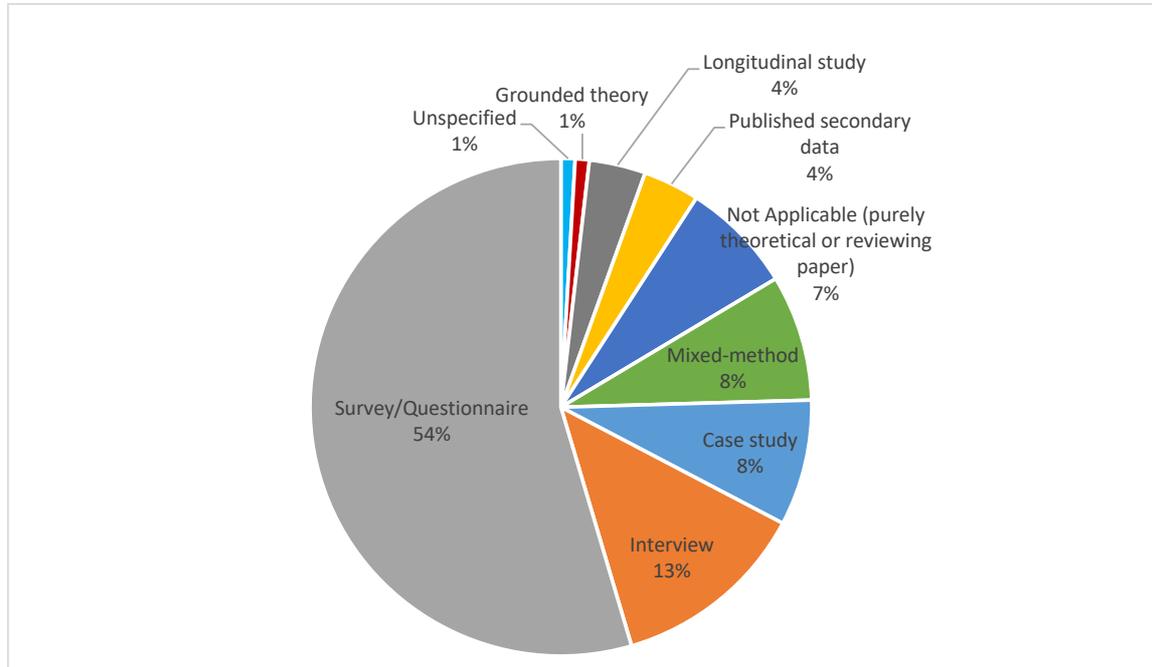


Figure 4.6 indicates that survey/questionnaire is still the data collection method used most frequently. However, by analysing their collected mail questionnaires, Frishammar and Horte (2005) claim that observing actions and motives in detail with survey data is difficult and awkward, and sorting out correct explanations from incorrect ones becomes troublesome. Therefore, they state that more research in innovation is needed, especially in the form of in-depth case studies or studies of ethnographic design. Gronum, Verreyne and Kastle (2012) and Gumusluoglu and Ilsev (2009) also aware the disadvantage of conducting questionnaire and suggest that longitudinal

data enables researchers to understand the fine-grained details of the relationship in capturing the “intertemporal” behavior of firm performance (Roberts 1999, p. 657).

Figure 4.6 Breakdown of articles by data collection method

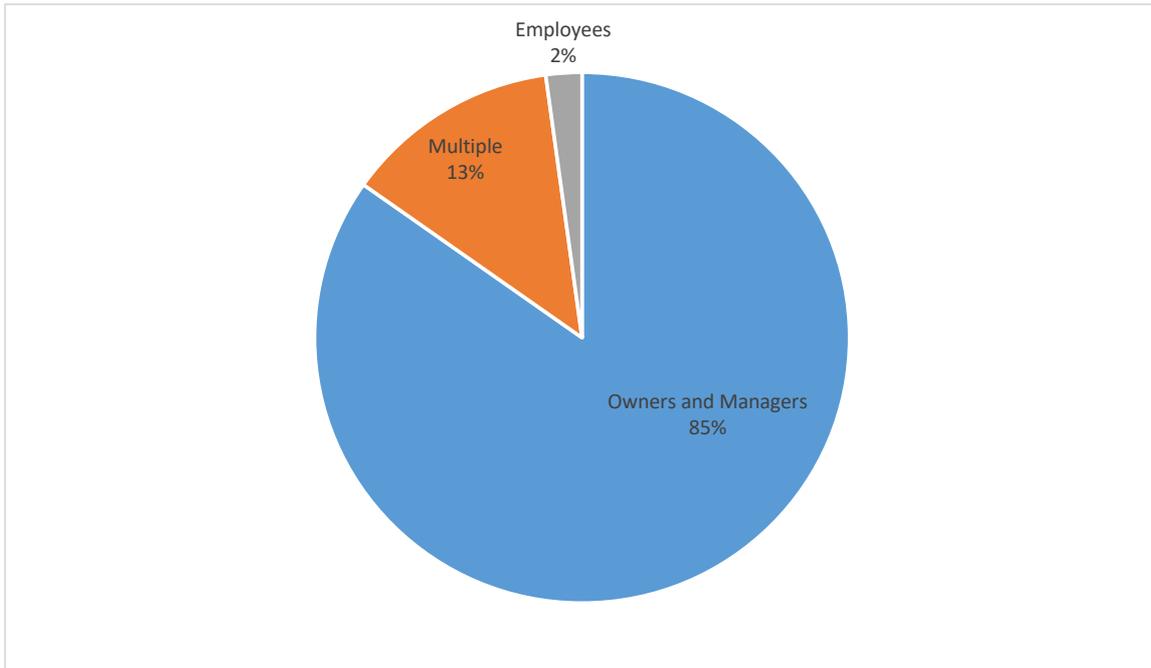


Participants specified in prior researches are mainly owners and managers of the SMEs (Figure 4.7). This might be due to the fact that individuals who held a managerial position are more familiar with the strategic and operational decisions made with regard to innovation in their firms (Pfarrmann, 1994; Prajogo and McDermott, 2014). Also, these people are the ones who assess the business environment surrounding their firms; indeed, scholars have argued that the business environment is filtered through the managers’ perceptions rather than discerned through objective measurement (Freel 2005; Pfarrmann, 1994).

However, increased studies are targeted multiple stakeholder includes not only managers but also the policy maker and practitioners. This might be due to government always acts as an important observer, participant or even a commentator in the researched area, according to the institutional theory (Brammer, Jackson & Matten, 2012).

The employees of the company are also investigated by some scholars. This is because the employees’ involvement in the idea generation and the innovation implementation are noticed by some scholars (e.g. Bos-Brouwers, 2010; Ki-Hoon, 2009; Kumar, 2015).

Figure 4.7 Breakdown of articles by participants (excluded ‘unspecified’ or ‘not applicable’ articles)



In sum, three recommendations can be gave based on descriptive results and the above analysis. First, qualitative, in-depth studies about the practices and processes of IDS are required. Second, multiple theoretical perspectives and multilevel analysis should be applied. And third, not only managers, but also employees and even policy makers, should be targeted in future research.

.....”

Appendix A2 Thematic codes and memos of the systematic literature view  
 [the codebook/templates that support the researcher's systematic reviewing report in 2017  
 and her literature review chapter, the first version was wrote to support her project approval  
 in 2016]

“ .....

### Appendices A

Subthemes of stakeholders and motivations for Sustainability towards  
 Innovation/awareness and interests

Emergent key subthemes	Topics	No. of articles	Exemplary authors
<b>The market and customer demands/public concern</b>	a	5	Biondi, Iraldo and Meredith, 2002; Bos-Brouwers, 2010; Cuerva, Triguero-Cano and Corcoles, 2014; Hansen, Sondergard and Meredith, 2002; Pinget, Bocquet and Mothe, 2015
	b	1	Banbury and Mitchell, 1995
	c	3	Brammer, Hoejmose and Marchant, 2012; Hoogendoorn, Guerra and van der Zwan, 2015; Lee, 2008;
	d		Brouwer and Kleinknecht, 1996; Harrison and Hart, 1987; Pavia, 1991; Sok, O'Cass and Miles, 2016;
<b>Regulation/government's involvement/legislation and Cost-saving (through avoid fines, reduction and improved efficiency)</b>	a	4	Biondi, Iraldo and Meredith, 2002; Bos-Brouwers, 2010; Hansen, Sondergard and Meredith, 2002; Pinget, Bocquet and Mothe, 2015
	c	7	Brammer, Hoejmose and Marchant, 2012; Darnall, Henriques and Sadorsky, 2010; Hoogendoorn, Guerra and van der Zwan, 2015; Lee, 2008; Leonidou,

			Christodoulides and Thwaites, 2016; Llach et al., 2015; Madsen and Ulhoi, 2016
	d		Harrison and Hart, 1987;
<b>The supply chain (involvement, position, bargaining power)</b>	a	2	Hansen, Sondergard and Meredith, 2002; Noci and Verganti, 1999
	b	1	Lo, 2014
	c	3	Brammer, Hoejmosé and Marchant, 2012; Darnall, Henriques and Sadorsky, 2010; Pedersen, 2009
<b>The environmental authorities</b>	a	2	Biondi, Iraldo and Meredith, 2002; Hansen, Sondergard and Meredith, 2002
	c	1	Leonidou, Christodoulides and Thwaites, 2016;
<b>Internal strategic consideration to achieve potential competitive advantage / strategic imperative/adopted strategic orientation/ businesses strategic intent/ perceived market and financial benefits</b>	a	7	Cuerva, Triguero-Cano and Corcoles, 2014; Biondi, Iraldo and Meredith, 2002; Bos-Brouwers, 2010; Cuerva, Triguero-Cano and Corcoles, 2014; Hansen, Sondergard and Meredith, 2002; Ki-Hoon, 2009; Kumar, 2015;
	b	1	Banbury and Mitchell, 1995
	c	5	Brammer, Hoejmosé and Marchant, 2012; Darnall, Henriques and Sadorsky, 2010; Leonidou, Christodoulides and Thwaites, 2016; Llach et al., 2015; Madsen and Ulhoi, 2016
	d		Harrison and Hart, 1987;
<b>Others</b>			
a	<ul style="list-style-type: none"> <li>waste reduction and risk avoidance (Biondi, Iraldo and Meredith, 2002)</li> </ul>		

	<ul style="list-style-type: none"> <li>• funds(Cuerva et al., 2014)</li> <li>• Share of employees with university degree(Cuerva et al., 2014)</li> <li>• having a QMS (Cuerva et al., 2014)</li> <li>• new material (Bos-Brouwers, 2010)</li> <li>• firm size but not age (Cuerva et al., 2014)</li> <li>• readiness to change (Shevchenko, Levesque and Pagell, 2016)</li> </ul>
<b>b</b>	<ul style="list-style-type: none"> <li>• Funds (Klassen, 2000)</li> <li>• Firm size and industry (pollution-intensive or not) (Woo et al., 2014)</li> </ul>
<b>c</b>	<ul style="list-style-type: none"> <li>• firm size (Brammer, Hojmosse &amp; Marchant, 2012; Hoogendoorn, Guerra and van der Zwan, 2015; Lee, 2008; Pedersen, 2009)</li> <li>• Institutional/ external stakeholders' supports and pressures (Darnall, Henriques and Sadorsky, 2010; Leonidou, Christodoulides and Thwaites, 2016; Llach et al., 2015)</li> <li>• Resources (Pedersen, 2009)</li> <li>• owners, shareholders and employees (Madsen and Ulhoi, 2016)</li> </ul>
<b>d</b>	<ul style="list-style-type: none"> <li>• Firm size (Harrison &amp; Hart, 1987; Thong and Yap, 1995;)</li> <li>• Funds (Harrison &amp; Hart, 1987)</li> <li>• The Owner/CEO characteristics: education, knowledge, experiences and attitudes (towards innovation, risks, conflict) (Hausman, 2005; Thong and Yap, 1995; )</li> <li>• industry competitive environment (Hausman, 2005)</li> <li>• external knowledge (Rose, Jones &amp; Furneaux, 2016)</li> <li>• leadership (Rose, Jones &amp; Furneaux, 2016)</li> <li>• team processes (Rose, Jones &amp; Furneaux, 2016)</li> <li>• organizational form/structure: a decentralised, formal structure (Cosh, Fu &amp; Hughes, 2012; Hadjimanolis, 2000)</li> <li>• having written plans (Cosh, Fu &amp; Hughes, 2012; Hadjimanolis, 2000)</li> <li>• top managerial characteristics (risk-taking propensity and tolerance for ambiguity), environmental heterogeneity, environmental scanning strategy, and professionalization of organizational structure (Kim, Song &amp; Lee, 1993)</li> </ul>

*Notes: Subthemes only mentioned by one author will not be included in this Appendices. An article could qualify for more than one subtheme. Topics a, b, c and d represent 'Innovation+Sustainability+SME', 'Innovation+Sustainability', 'Sustainability+SME' and 'Innovation+SME'.*

Repeating patterns in the prior literature revealed through content analysis show that the most important drivers for SMEs are: market preferences and customers' demands, regulation and cost-saving, forces from supply chain, forces from environmental authorities and firm's internal strategic consideration. These perceived forces and the relevant stakeholders can be classify into external and internal dimension (Brammer, Hojmosse & Marchant, 2012).

It can be aware from empirical findings of prior articles that the external forces not only have direct effects on SMEs' decisions, but may also influence in an in-direct way by

impacting the internal strategic orientation of the SME. Moreover, firm's internal strategic orientation might lead to different perceived pressures and supports instead aware and analyse driving forces according to the actual level of stakeholders. Thus, external forces can also be grouped by considering the corresponding internal strategic orientation of the SME. In Harrison and Hart' early innovation study, these categories are briefly mentioned as reduce costs, non-price competition factors and market pressure (1987). However, to the author's best knowledge, no prior researchers explore the empirical interaction between those motives precisely, at least, not in the 'awareness and interest' stage of strategy process.

Among the identified important drivers or motivations, debates are widely exist. For instance, Hausman (2005) claim industry competitive environment has effects on innovation but Thong and Yap (1995) thought no significant direct effects was occurred. According to them, both innovators and non-innovators are actually operating in similar environments; thus, competitiveness of environment does not really provide any direct 'push' for businesses to make their decisions. Further testing are required to explore whether this factor could be important in a particular industry or in specific social or cultural contexts. Furthermore, Harrison and Hart (1987) aware that the motives for product and process innovation are different. In detail, the need to develop new markets and improve the quality of existing products/services were the most commonly cited motives for the introduction of new or improved product innovation; while the need to reduce costs and improve the quality of existing products were the most important motives for undertaking process innovation (Harrison & Hart, 1987). Therefore, future authors might have to explore the motives and their intensity in each particular form of innovation.

## Appendices B

Categories for Preferable Innovation- and Sustainability-related Strategies and activities adopted by SMEs

<b>a. Innovation+Sustainability+SME</b>	
Key Authors	Categories
Biondi, Iraldo and Meredith (2002)	<ol style="list-style-type: none"> <li>1. integration of environmental innovations in the production process;</li> <li>2. saving raw materials, energy, water, or by recycling waste;</li> <li>3. the implementation of waste management systems</li> </ol>
Bos-Brouwers (2010)	<ol style="list-style-type: none"> <li>1. Environmental Sustainability;</li> <li>2. Social Responsibility</li> </ol>
Cuerva, Triguero-Cano and Corcoles (2014)	<ol style="list-style-type: none"> <li>1. green process</li> <li>2. and green product innovations</li> </ol>
Halme and Korpela (2014)	<ol style="list-style-type: none"> <li>1. technological,</li> <li>2. design</li> <li>3. or business model innovation</li> </ol>
Hansen, Sondergard and Meredith (2002)	<ol style="list-style-type: none"> <li>1. radical innovation to the industry;</li> <li>2. radical innovation to the enterprises;</li> <li>3. incremental innovation to industry and enterprise;</li> <li>4. and mature technology to industry but incremental innovation to enterprise</li> </ol>

Ki-Hoon (2009)	<ol style="list-style-type: none"> <li>1. installation of wastewater treatment facility;</li> <li>2. organizing the task force team (TFT);</li> <li>3. conducting changes in organizational structure</li> </ol>
Klewitz and Hansen (2014)	<ol style="list-style-type: none"> <li>1. Product innovations;</li> <li>2. Process innovations;</li> <li>3. Organizational innovations</li> </ol> <p>OR</p> <ol style="list-style-type: none"> <li>1. radical</li> <li>2. incremental innovations</li> </ol>
Kumar (2015)	<ol style="list-style-type: none"> <li>1. Marketing compliance;</li> <li>2. Strategic partnership (environmental stewardship);</li> <li>3. Environmental commitment;</li> <li>4. Marketing green team;</li> <li>5. Marketing benchmarking;</li> <li>6. Marketing (environmental) ethical behavior</li> </ol>
Triguero, Moreno-Mondejar and Davia (2015)	<ol style="list-style-type: none"> <li>1. incremental green innovation (EOP/recycling)</li> <li>2. and radical green innovation (cleaner technologies)</li> </ol>

<b>b. Innovation+Sustainability</b>	
Key Authors	Categories
Klassen, 2000	<ol style="list-style-type: none"> <li>1. Pollution prevention</li> <li>2. and advanced process technologies</li> </ol>
Lo, 2014	<ol style="list-style-type: none"> <li>1. the practices of green design, purchase, and internal environmental management;</li> <li>2. the practice of green manufacturing and logistics</li> </ol>
Woo et al., 2014	<ol style="list-style-type: none"> <li>1. firm-oriented (e.g. the reduction of polluting emissions and waste during the manufacturing process)</li> <li>2. and customer-oriented green innovation</li> </ol>

<b>c. Sustainability+SME</b>	
Key Authors	Categories
Brammer, Hojmosse and Marchant, 2012	<ol style="list-style-type: none"> <li>1. Manufacturing-focused environmental efforts;</li> <li>2. employee-focused environmental initiatives;</li> <li>3. corporate-focused environmental practices;</li> <li>4. marketing focused environmental activities.</li> </ol>
Darnall, Henriques and Sadorsky, 2010	Defined proactive environmental practices as intangible managerial innovations

Hofmann, Theyel and Wood, 2012	<ol style="list-style-type: none"> <li>1. Environmental practice;</li> <li>2. Environmental Collaboration (with customers and suppliers)</li> </ol>
Hoogendoorn, Guerra and van der Zwan, 2015	<ol style="list-style-type: none"> <li>1. engagement in green products and services;</li> <li>2. involvement in greening processes</li> </ol>
Madsen and Ulhoi, 2016	<ol style="list-style-type: none"> <li>1. A reactive attitude, to meeting legislation, cost savings through reductions, and improved efficiency;</li> <li>2. specific initiatives relates to the working environment;</li> </ol>
Pedersen, 2009	<ol style="list-style-type: none"> <li>1. Workforce initiatives</li> <li>2. and environmental activities</li> </ol>
Wang, Cui and Liang, 2015	environmental labeling

<b>d. Innovation+SME</b>	
Key Authors	Categories
Bradley, McMullen, Artz and Simiyu, 2012	<ol style="list-style-type: none"> <li>1. novelty-related innovation</li> <li>2. differentiation-related innovation</li> </ol>
Brouwer and Kleinknecht, 1996	<ol style="list-style-type: none"> <li>1. new to the industry/sector ("true" innovations)</li> <li>2. new to the firm (imitative innovations)</li> </ol>
Ceci and Lubatti, 2012	<p>Innovation activities are:</p> <ol style="list-style-type: none"> <li>1. Product – Process Innovations;</li> <li>2. Organizational Innovations;</li> <li>3. ITs-related Innovations</li> </ol>
Harrison and Hart, 1987	<ol style="list-style-type: none"> <li>1. technological innovation (product or process innovation; incremental or radical innovation)</li> <li>2. marketing innovation</li> </ol>
Hausman, 2005	<ol style="list-style-type: none"> <li>1. product innovations</li> <li>2. ideological innovations (e.g. new management practices)</li> </ol>
Keizer, Dijkstra & Halman, 2002	<p>product innovations:</p> <ol style="list-style-type: none"> <li>1. low innovative,</li> <li>2. moderate,</li> <li>3. highly innovative</li> </ol>
Madrid-Guijarro, Garcia and Van Auken, 2009	<ol style="list-style-type: none"> <li>1. product,</li> <li>2. process,</li> <li>3. and management innovation</li> </ol>
Madrid-Guijarro, Garcia-Perez-de-Lema, and Van Auken, 2013	<ol style="list-style-type: none"> <li>1. product innovation,</li> <li>2. process innovation,</li> <li>3. and management innovation</li> </ol>
Nooteboom, 1994	<ol style="list-style-type: none"> <li>1. Process innovation</li> <li>2. Product innovation</li> </ol>
Rothwell, 1991	<ol style="list-style-type: none"> <li>1. Radical/major innovation</li> <li>2. Incremental innovation</li> </ol>
Thai Thi and Hjortso, 2015	<ol style="list-style-type: none"> <li>1. Product development</li> <li>2. Process development</li> <li>3. Organizational and management Development</li> </ol>

	4. Market development and marketing organization OR 1. cash flow-oriented incremental and process-oriented innovations 2. more explorative product-oriented innovations
Prajogo, McDermott & McDermott, 2013	1. exploitative innovation 2. exploratory innovation
Prajogo and McDermott, 2014	1. exploitative innovation 2. exploratory innovation

It should be noticed that, in the innovation studies, Bradley et al. (2012) recognized that each type of innovation had different antecedents and outcomes. Similarly, Madrid-Guijarro, et al. (2009) claim that product, process, and management innovation are affected differently by the different barriers. However, to the researcher's best knowledge, there is a few researches explore the influencing elements of innovations, especially sustainability-related innovations, by particularly targeted each forms of innovation, further researches in this area should be conducted.

### Appendices C

Key influencing elements when crafting IDS Strategies

<b>a. Innovation+Sustainability+SME</b>	
<b>Key subthemes</b>	<b>Exemplary authors</b>
Strategic Orientation	Bos-Brouwers, 2010; Hansen, Sondergard and Meredith, 2002; Klewitz and Hansen, 2014; Noci and Verganti, 1999
The resources and internal Competencies of the Firm	Cuerva, Triguero-Cano and Corcoles (2014); Hansen, Sondergard and Meredith, 2002
Network	Bos-Brouwers, 2010; Halme and Korpela, 2014; Hansen, Sondergard and Meredith, 2002; Noci and Verganti, 1999
TFT and top managers' support	Ki-Hoon, 2009
Firm Size	Triguero, Moreno-Mondejar and Davia, 2015;

<b>b. Innovation+Sustainability</b>	
<b>Key subthemes</b>	<b>Exemplary authors</b>
managers capability and efforts	Klassen, 2000
firm's position in the supply chain (located in the downstream or midstream)	Lo, 2014

<b>c. Sustainability+SME</b>		
<b>Categories</b>	<b>Key subthemes</b>	<b>Exemplary authors</b>
<b>Industry- and market-level</b>	Buyers (individual and large firms) environmental	Lee, 2008; Lefebvre, Lefebvre and Talbot, 2003

	requirements, support, processes and activities	
	Suppliers processes and activities	Lefebvre, Lefebvre and Talbot, 2003
	Governmental direct and/or indirect supports	Lee, 2008; Madsen and Ulhoi, 2016
	global environmental regulations	Lee, 2008
	Supply chain position	Hofmann, Theyel and Wood, 2012;
<b>Organizational level</b>	strategic orientation/vision	Hofmann, Theyel and Wood, 2012; Madsen and Ulhoi, 2016
	financial resources	Brammer, Hoejmosse and Marchant, 2012;
	Human resources	Lee, 2008
	Technical reserves	Lee, 2008
	managerial and technological expertise	Lefebvre, Lefebvre and Talbot, 2003;
<b>Individual level</b>	managers' values and knowledge	Brammer, Hoejmosse and Marchant, 2012; Madsen and Ulhoi, 2016
	Managers' perceived stakeholder pressures (instead the actual levels of stakeholder pressures)	Darnall, Henriques and Sadorsky, 2010; Madsen and Ulhoi, 2016
	cross-functional communication and pervasive environmental awareness among managers	Lee, 2008
	Employees	Madsen and Ulhoi, 2016

<b>d. Innovation+SME</b>		
<b>Categories</b>	<b>Key subthemes</b>	<b>Exemplary authors</b>
<b>Industry- and market-level</b>	Buyers (individual and large firms) environmental requirements, support, processes and activities	Harrison and Hart, 1987; Luo, 1999
	Local specialization of an industry	Li and Mitchell, 2009
	Governmental policy	Luo, 1999
	Lending group weak ties	Bradley et al., 2012
	Competitive environment/business environment	Deng, Hofman & Newman, 2013; Li and Mitchell, 2009; Luo, 1999; Van Den Bosch and Volberda, 2006

<b>Organizational level</b>	strategic orientation/vision	Harrison and Hart, 1987; Terziovski, 2010
	Ownership (single or multiple owners)	Deng, Hofman & Newman, 2013
	Organizational structure	Terziovski, 2010; Van Den Bosch and Volberda, 2006
	a staff person that systematically scans the environment	Pavia, 1991
	the annual strategic plan	Pavia, 1991
	absorptive capacity	Madrid-Guijarro, Garcia-Perez-de-Lema, and Van Auken, 2013
	Organizational culture	Madrid-Guijarro, Garcia-Perez-de-Lema, and Van Auken, 2013
	Time consuming	Madrid-Guijarro, Garcia-Perez-de-Lema, and Van Auken, 2013
	financial resources	Bradley et al., 2012; Madrid-Guijarro, Garcia-Perez-de-Lema, and Van Auken, 2013
	R&D intensity	Brouwer and Kleinknecht, 1996;
	Skills and knowledge of staff's involvement	Cosh, Fu and Hughes, 2012
<b>Individual level</b>	Entrepreneurs' vision and intentions	Bradley et al., 2012; Lehtimaki (1991).
	managers' values and knowledge (education)	Romero and Martinez-Roman, 2012
	Employees participation (given a voice, autonomy and decision-making power)	Kesting et al., 2016

Hewitt-Dundas (2006) claim that inherited constraints have a greater influence on current innovation activity than current perceived constraints. Moreover, constraints to innovation tend to persist from one period to the next. In other words, if a resource or capability was identified as a significant constraint to innovation previously, this constraint would remain, and act more important than constraints which are currently occurred. The potential impact of the 'age' of constraints represents a new and interesting avenue for further testing, since these issues have not been well studied in this context previously. Longitudinal research are required.

Key influencing elements when putting IDS strategies into actions

<b>a. Innovation+Sustainability+SME</b>		
<b>Categories</b>	<b>Key subthemes</b>	<b>No. of articles</b>
<b>Industry Level</b>	Industry Knowledge (or linked to knowledge and the interactive learning skills in organizational level)	1

	Network cooperation with stakeholders (or linked to networking capability in organizational level)	8
<b>Organizational Level</b>	the adopted strategic orientation	1
	the structure/internal network of the SME	1
	technology, and the core technical capabilities (such as R&D, resources allocation, manufacturing, marketing and strategic planning).	1
	financial capital	4
	knowledge and the interactive learning skills	2
<b>Individual Level</b>	Top managers' value	2
	Employees' participant	6

<b>b. Innovation+Sustainability</b>		
<b>Categories</b>	<b>Key subthemes</b>	<b>No. of articles</b>
<b>Industry Level</b>	Industry Knowledge	n/a
	Network cooperation with stakeholders	1
<b>Organizational Level</b>	the adopted strategic orientation	n/a
	the structure/internal network of the SME	n/a
	Technology (imported hard technology)	1
	financial capital	n/a
	knowledge and the interactive learning skills	n/a
	The resources allocation capability/concerted management effort	2
	strategic planning capability	1
	The R&D capability	1
Marketing capability	1	
<b>Individual Level</b>	Top managers' value	n/a
	Employees' personal interests and participant	1

<b>c. Sustainability+SME</b>		
<b>Categories</b>	<b>Key subthemes</b>	<b>No. of articles</b>
<b>Industry Level</b>	Industry knowledge and characteristic	2
	Network cooperation with stakeholders	5
	Political sphere/government support, policies, subsidies	2
<b>Organizational Level</b>	the adopted strategic orientation	1
	Firm size	2
	Firm's age	1
	the structure/internal network of the SME	n/a
	Technology (imported hard technology)	n/a
	financial capital	2
	Human resource	2
	knowledge and the interactive learning skills	2
Strategic management tools	1	

	The resources allocation capability/concerted management effort	n/a
	strategic planning capability	1
	Time	1
	The R&D capability	n/a
	Marketing capability	n/a
<b>Individual Level</b>	Top managers' value/attitudes	1
	Managers awareness and operational knowledge about the relevant sustainability management tools	1
	Owner-manager characteristics	1
	Employees' personal interests and participant	2

For categories, external and internal (e.g. Hadjimanolis, 1999; McKeiver & Gadenne, 2005; Weterings and Koster, 2007); strengths and constraints; industry, organizational and individual level are appeared in prior researches targeted 'Determinants of innovation adoption', these authors either group determinants based on level of analysis, or by evaluating whether they are belong to positive or negative dimension. However, in the researcher's opinion, one factor might have complex influence on the adoption process, and it is meaningless to identify it as strengths or constraints in a general context (although in a particular circumstance or perspective a factor might perceived as acting in an absolutely negative or positive way). Therefore, the researcher uses industry-related, organizational and individual level to classify influencing elements identified by prior researchers. However, for instance, 'learning through external networks' (Baker et al., 2016) cannot be simply identified as external or internal factor because it both require organizational learning capability and external networks. Therefore, researchers should attempt to conduct more in-depth qualitative studies in future and an abductive method should be utilized. It is worth to notice that, subthemes are existing below each subtheme, for instance, in organizational level, resources can be grouped as human, financial or social forms of capital (Bradley et al., 2012). But in this literature review those would not be mentioned in-depth. In sum, prior researchers focus on barriers and advantages; however, it is hard to identify which influencing element is purely negative or positive to the SMEs' innovation adoption process, therefore, the researcher chose to categories factors based on RBV and stakeholder theory as well as levels of analysis instead conclude them as barriers or strength.

Prior innovation researches normally explore influencing elements/determinants/antecedents in adoption process of innovation/innovation outputs/ innovation outcomes without clearly identify their influence in each stage. Details can be seen in the following table.

<b>Categories</b>	<b>Key subthemes</b>	<b>Exemplary authors</b>
<b>Industry level</b>	a high small business presence	Brouwer and Kleinknecht, 1996
	Customer assistance	Kumar and Subrahmanya, 2010;
	high-tech sectors	Cosh, Fu & Hughes, 2012
	Manufacturing system	Siu, Lin, Fang & Liu, 2006

	Suppliers processes and activities	Karlsson and Olsson, 1998
	Public policy/ Governmental direct and/or indirect supports (e.g. innovation system)	Hadjimanolis, 1999; Kang and Park, 2012; Parrilli and Elola, 2012; Siu, Lin, Fang & Liu, 2006
	Legislative and regulatory requirements	Hewitt-Dundas, 2006
	Bank policies on credit	Hadjimanolis, 1999
	global environmental regulations	n/a
	Supply chain position	n/a
	the spillovers from university research	Audretsch and Vivarelli, 1996
	Organizational learning through external networks/access to external source of knowledge	Baker et al., 2016; Fukugawa, 2006; Hadjimanolis, 1999; Keizer, Dijkstra & Halman, 2002
	collaboration and networking (e.g. technological alliance; joint R&D projects between small firms and technology centres, centres of excellence, business incubators, universities etc.)	Ceci and Iubatti, 2012; Cooke and Wills, 1999; Hadjimanolis, 2000; Hewitt-Dundas, 2006; Hoffman et al., 1998; Kang and Park, 2012; Parrilli and Elola, 2012; Rothwell, 1991
	the impact of policy instruments/ of EU innovation programmes/consultants	Brouwer and Kleinknecht, 1996; Parrilli and Elola, 2012
	environmental scanning	Hadjimanolis, 2000
	Labour force (size, density)	Karlsson and Olsson, 1998
<b>Organizational level</b>	strategic orientation/vision	Droge, Calantone & Harmancioglu, 2008 ; Siu, Lin, Fang & Liu, 2006
	organizational form/structure	Cosh, Fu and Hughes, 2012; Droge, Calantone & Harmancioglu, 2008; Hoffman et al., 1998; Nooteboom, 1994
	Location (more agglomerated regions or rural areas; location within a special economic or technological development zone like a national Economic and Technology Development Zone (ETDZ))	Brouwer and Kleinknecht, 1996; Deng, Hofman & Newman, 2013; Karlsson and Olsson, 1998
	R&D expenditures	Audretsch and Vivarelli, 1996
	R&D	Hadjimanolis, 1999; Hoffman et al., 1998; Parrilli and Elola, 2012; Rothwell, 1991
	R&D intensity-R&D as a permanent (as opposed to an occasional) activity	Brouwer and Kleinknecht, 1996

	financial resources	Hadjimanolis, 1999; Hewitt-Dundas, 2006; Madrid-Guijarro, Garcia and Van Auken, 2009
	employment of scientists and engineers'	Hadjimanolis, 2000; Hoffman et al., 1998; Rothwell, 1991
	Human resources-multi-skills employees	Hadjimanolis, 1999
	Human capital	Deng, Hofman & Newman, 2013; Kumar and Subrahmanya, 2010; Madrid-Guijarro, Garcia and Van Auken, 2009; Parrilli and Elola, 2012
	Knowledge/technology transfer capability/ absorptive capacity	Kumar and Subrahmanya, 2010; Madrid-Guijarro, Garcia-Perez-de-Lema, and Van Auken, 2013; Nooteboom, 1994;
	Technical reserves/ technological expertise	Hoffman et al., 1998;
	Information management capability	Frishammar & Horte, 2005
	Human forms of capital-managerial expertise/ business expertise	Bradley et al., 2012;
	Internal organizational learning/ knowledge and training/firm-level training intensity	Bradley et al., 2012; Freel, 2005b; Maes and Sels, 2014
	personal communication/ collaborative work between functions and departments	Frishammar & Horte, 2005; Kang and Park, 2012;
<b>Group and Individual level</b>	entrepreneurial orientation (EO)	Baker et al., 2016;
	entrepreneurial creativity	Ahlin, Drnovsek & Hisrich, 2014
	entrepreneurial self-efficacy	Ahlin, Drnovsek & Hisrich, 2014
	managers' values and knowledge	
	Managers' perceived stakeholder pressures (instead the actual levels of stakeholder pressures) and information	Nooteboom, 1994
	Transformational leadership/ transformational leaders	Gumusluoglu & Ilsev, 2009
	cross-functional communication and pervasive environmental awareness among managers	n/a
	Characteristics of the project manager	Souder, Buisson & Garrett, 1997

	Personal external network of entrepreneur/ individualized friendship networks	Nooteboom, 1994; Thai Thi and Hjortso, 2015
	Employees	n/a
	Group creative climate	Gisbert-Lopez, Verdu-Jover & Gomez-Gras, 2014
	Relationship conflict	Gisbert-Lopez, Verdu-Jover & Gomez-Gras, 2014
	employee resistance to change	Hewitt-Dundas, 2006

Future study:

1. First explore influencing elements of different stage of process.

(Ahlin, Drnovsek & Hisrich, 2014)

an entrepreneur's creativity may affect firm innovation outcomes through two processes, direct and moderated. entrepreneurial creativity directly affects the level of innovation outputs. (Note: might be future study, recommend future research should categories these two different stage in depth and in detail, so outcomes and outputs are different, one innovation LR mentioned that, and mentioned the model the researchers developed: according to xx(xxx) and xx(xx), The researcher aware that outcomes and outputs are different and the identification and influencing elements should be explore in both stage)

Bradley et al. (2012) Nairobi, Kenya

Lending group weak ties did increase the likelihood of differentiation-related innovation (2 times) and novelty-related innovation (1.7 times). This suggests that lending groups offer promise as a source of variance for business idea generation, though there is little research in this area. However, they did not have a significant effect on firm performance. ---can also give us a clue that some influencing elements may only significant influence one stage of the adoption process, so general them in the overall adoption process makes no sense; the role of lending groups in ideation remains relatively neglected by the literature and in need of further research.

It is worth noting that competition increased the likelihood of novelty-related innovations significantly. However, competition had a negative effect on firm performance. It seems that even though competition may have driven the respondents to try new things, the innovations either failed to create value or the value created by these efforts could not be captured by the entrepreneurs.---so only investigate rivers or input influencing elements are not enough, because even they made the correct and reasonable decisions, they might cannot capture the positive and significant outputs

(Brouwer and Kleinknecht, 1996)

a high small business presence will have a significantly positive influence on the diffusion of imitative innovations (products "new to the firm"); in the case of "true" innovations ("new to the sector"), the coefficient just fails to be significant at 90% level.

(Dolfsma & van der Panne, 2008) Dutch

An unfavourable competitive environment decreases the likelihood for the least successful innovators to announce new products.---commercialization stage

(Frishammar & Horte, 2005) survey-mail questionnaire, Swedish-innovation performance/outputs

carrying out an activity such as **environmental scanning is no guarantee that the substance of that activity has been fully appreciated.-understand source of innovation not means you will capture the success.**

(Kesting, Song, Qin and Krol, 2016); Kesting et al. (2016); Chinese high-tech firms, survey  
The regression results of models 1 and 3 show that **employee participation** has a significant positive impact during the generation phase of the innovation process. On the other hand, participation turned out to have a negative impact on the commercialisation of innovations. (Nootboom, 1994)

A complication here is that in fact the innovation process is not so neatly linear as Figure 1 suggests. As investigated by Cooper (1983), the different stages occur in parallel, and iteratively. For example: market exploration, prototype development, initial design of production, and design of market introduction and distribution may occur simultaneously. So perhaps we should speak of aspects or dimensions rather than stages.

In the first stage (or aspect) of invention

2. Second explore interaction between determinants.

(Baker et al., 2016)

**the utilization of external networks** (i. e., the process of learning from information, perspectives, and insights embedded in external networks) may act as **a primary driver** for innovation for those firms that are either not inclined and/or **do not** have the capabilities to **adopt entrepreneurial culture.---Interaction between determinants**

3. Third country context.

(Ahlin, Drnovsek & Hisrich, 2014)

the relationship between entrepreneur’s creativity and innovation was significant for product and process innovation for the US sample but not for the Slovene sample. as far as entrepreneurial culture is concerned, there is a strong **entrepreneurial tradition** should be considered, **---comparative study requires.**

(Frishammar & Horte, 2005) survey-mail questionnaire, Swedish-innovation performance/outputs

**political-economic factors** are more important **in a context where the institutional environment is much more turbulent (as in many developing countries)**, and perhaps **demographic information** is more important when the activities take place on an volatile market characterized by constantly changing customer preferences, for example in **fast moving consumer goods**. This is a plausible explanation, although truly speculative, and **evidence to back it up is not available**

## Appendices D

Indicators and measuring criteria for progress and outputs

a. Process

Key authors	Indicators and measuring criteria
-------------	-----------------------------------

<b>Bos-Brouwers (2010)</b>	the presence of an R&D department, the time and support employees receive to elaborate on innovative ideas, the effort and ambitions of the owner/manager.
<b>Kumar (2015)</b>	SMEs should set several environmental performance goals for responsible approach to achieve environmental goals
<b>Bradley et al. (2012)</b>	Business expertise and family business experience

According to Hoerisch, Johnson and Schaltegger (2015), Johnson and Schaltegger (2016) and Lefebvre, Lefebvre and Talbot (2003), the process could be managed by utilizing sustainability management tools such as Quality management system, Eco-efficiency analysis, Eco-design, Sustainability label, Environmental audit, product life cycle management score (PLM score) and Environmental management systems (EMS). However, they also claim that, in fact, most SMEs are not implementing such management tools. This issue is also noticed by innovation study researchers that specialized innovation tools and techniques recommended in the academic literature are hardly used in smaller companies (Rose, Jones & Furneaux, 2016)

b. Outcomes

<b>Key authors</b>	<b>Indicators and measuring criteria</b>
<b>Biondi, Iraldo and Meredith (2002)</b>	higher productivity and flexibility, reduce water consumption, a considerable saving in the cost of auxiliary materials, saved energy for heating water in plants and equipment, and achieving high cost savings through reduced use of raw materials, energy, water, waste reduction, and reduced payment for environmental permits and inspection.
<b>Frey, Iraldo and Testa (2013)</b>	research and innovation activity, patents ownership, patents demand, turnover, number of employees, export, partnership and funding access.
<b>Flammer, 2015</b>	operating performance (ROA, NPM, and ROE); labor productivity and sales growth; customer and employee satisfaction;
<b>Woo et al., 2014</b>	labor productivity, and other measures for green innovation in corporate social responsibility (CSR).
<b>Yam et al. (2004).</b>	Sales growth (sales performance), innovation rate (innovation performance), product competitiveness (product performance)
<b>Leonidou, Christodoulides &amp; Thwaites, 2016</b>	financial results (e.g., profits, sales, market share)
<b>Llach et al. (2015)</b>	Specifically, for restaurants/service industry: Market success factors (company's image, customer satisfaction level, Employee

	satisfaction level) and financial performance (sales, profits, customer occupancy rates)
<b>Wang, Cui &amp; Liang, 2015</b>	Financial performance: profits or ROS
<b>Sok, O'Cass &amp; Miles, 2016</b>	functional-level customer performance firm-level financial performance
<b>Classen et al. (2014)</b>	Product innovation output: Sales per employee in 2006 from products/services newly introduced or significantly improved between 2004 and 2006 (in log.) Process innovation output: Average percentage of cost reduction in unit costs due to process innovations in 2006 Labor productivity: Sales per employee in 2006 (in log.) Human capital: Percentage of employees with university or college degree in 2005 Market share: Market share of the number one product/service in 2006 Product life cycle duration: Average length of product life cycle for number 1 product/service (in years)
<b>Cosh, Fu, Hughes, 2012</b>	innovation performance measures: have introduced an innovation within the previous 3 years; the proportion of sales in the past financial year that was from new, or significantly improved, products or services
<b>(Deng, Hofman &amp; Newman, 2013)</b>	the share of total output accounted for by new products
<b>Droge, Calantone &amp; Harmancioglu, 2008</b>	Their average annual research and development budget Percentage of sales came from products introduced in the last five years
<b>Frishammar &amp; Horte, 2005</b>	a strong emphasis on R&D, the introduction of many new products/services over time, and changes in products/services having been significant.
<b>Gisbert-Lopez, Verdu-Jover &amp; Gomez-Gras, 2014</b>	uses two different measures of innovation: innovation results and satisfaction with innovation results,
<b>Gronum, Verreyne &amp; Kastle, 2012</b>	Firm performance is a multidimensional construct that used perceptual or self-reported measures of firm performance. effectiveness (sales growth and range of product or service growth) and efficiency (profitability and productivity growth)
<b>Harrison, R. T. and M. Hart (1987)</b>	percentage change in turnover over the previous five years.

My point of view: self-reported feedback are the most common indicators were used in prior researches

## Appendices E

### Process of innovation Adoption

<b>Key authors</b>	<b>Description</b>
<b>Ahlin, Drnovsek &amp; Hisrich, 2014</b>	Innovation outputs and innovation outcomes
<b>Audretsch and Vivarelli, 1996</b>	knowledge creating inputs to innovative outputs
<b>Bradley et al., 2012</b>	business idea generation/ determining the scope of business opportunities available; implement those innovations.
<b>Kesting et al., 2016</b>	idea generation (the generation phase); the commercialisation of innovations (the commercialisation stage)
<b>Hansen, Sondergard &amp; Meredith, 2002</b>	idea generation, search and selection, implementation and operation
<b>Nooteboom (1994).</b>	knowledge (awareness) conviction (interest) decision (evaluation) implementation (trial) confirmation (adoption)

.....”

Appendix A3 Research Methodology Summer School Poster  
 [according to the researcher's systematic reviewing report in 2017, the poster was designed and then external presented in Dublin Research Methodology Summer School, along with two other presentations: Jamie Callahan and Huan Sun on writing a systematic literature review (2017-07-18) & Q&A panel about the interviewing as a data collection method-Huan Sun, Helen Watson, Lesley- Ann Gunton, Paolo Gerli and Maria Ratz (2017-07-19)]

## [Systematic Understanding the Innovation-Driven Sustainability of Chinese SMEs: The Case of Central Zone]

Miss Huan Sun  
Ph.D. Business and Management Research

Email: [huan.sun@northumbria.ac.uk](mailto:huan.sun@northumbria.ac.uk)  
Supervisors: Dr. Rose Quan and Professor James Cunningham

### Background

How to attain small and medium sized enterprises' (SMEs) innovation-driven sustainability (IDS) has become a matter of urgent for forward-thinking SMEs, government and academics. However, to the researcher's best knowledge, there is no systematic and comprehensive research in this topic. Furthermore, the mainstream theory of innovation and sustainability either mainly focuses on large enterprises, or SMEs from Western economy. SMEs from developing countries and emerging markets are less well-understood, especially in China.

### Objectives

This researcher aims to mirror the IDS strategies and their implementation in the context of Chinese SMEs (CSMEs), and attain an understanding of systematic IDS of SMEs from China.

Key objectives are:

- Identify preferable IDS strategies adopted by CSMEs.
- Investigate the key influencing elements when crafting IDS strategies and putting IDS strategies into actions.
- Explore measuring criteria utilized by CSMEs to evaluate the effectiveness of IDS strategies.
- Develop a systematic theoretical framework in relation CSMEs' IDS.

### Potential Contributions

- Bring the existing knowledge forward regarding SMEs' IDS in emerging economy and developing country.
- Integrates different existing theories rather than single theory focused.
- Extend the existing innovation and sustainability studies by developing a systematic and comprehensive IDS framework. Critical implications for SME managers and public policymakers will be also derived from the study findings.
- Finally, this study will contribute to knowledge about how to conduct effective empirical case studies in a developing country such as China.

### LR-Descriptive Perspective

- The earliest publication date start from 1987
- The researches targeted developing countries like China and Cyprus are increased. However, most of researches are targeted developed countries.
- The majority of existing studies targeted theory testing rather than theory building or developing. Most of the theory and more specific hypotheses are derived from existing innovation studies.
- The qualitative, in-depth studies about the practices and processes of IDS are required.
- Resource-based view, organizational learning, and network theory are usually utilized separately when interpretive a conducted corporate strategy.
- Most of the existing researches only applied single level of analysis, 82% research applied organizational level of analysis only.
- Survey/questionnaire is still the data collection method that used most frequently.
- Participants specified in prior researches are mainly owners and managers of the SMEs

### LR-Thematic Perspective

### LR-Future Study

- More in-depth systematic and comprehensive research should be conducted by targeting influencing elements in each stage of the IDS strategy adoption process.
- Sample selection criteria should be more precisely in the future to ensure the researchers targeted SMEs who are truly achieved their sustainability towards innovation.

### Methodology

**Social Constructionism**

- Ontology-reality is constructed in the mind of the observer; subjective, may change, multiple perspectives (ontological idealism/subjectivism)
- Epistemology-social phenomena provides acceptable knowledge; prefer a study that uncovers inside perspectives or real meanings of social phenomena from its study participants (interpretivism)

**Multiple Case Studies**

- Targeted Locations-Henan and Jiangxi Provinces
- Number-6
- Selection Criteria (non-probability sampling, representative cases)

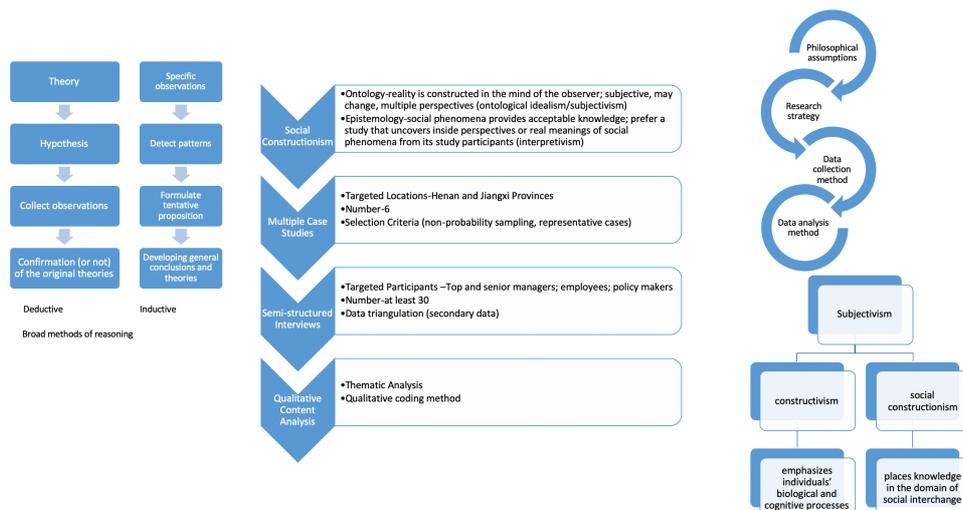
**Semi-structured Interviews**

- Targeted Participants –Top and senior managers; employees; policy makers
- Number-at least 30
- Data triangulation (secondary data)

**Qualitative Content Analysis**

- Thematic Analysis
- Qualitative coding method

### Feedback



please contact: [huan.sun@northumbria.ac.uk](mailto:huan.sun@northumbria.ac.uk)  
Philosophy and methodology

## **Appendix B Interview Guides (samples)**

### Appendix B1 Interview guides for managers

#### **Interview Guides (Example questions for managers)**

##### **Interview record - to be completed in advance**

Company:

Address:

Contact details:

Year of foundation:

Business founder (s):

Type of business/Industry

Interviewee:

Date:

##### **Section 1 Personal and organizational profile**

1. What is your current job position in this firm? Which responsibilities does that entail? How long have you been held for this position?
2. Have you involved in strategic decision-making? If so, did you think your opinion contribute significantly to your firm's strategy?
3. Do you think your firm is successful? Why?
4. Could you use one sentence to describe your firm's main strategic focus? Did it ever change within last three years?
5. What are the weaknesses of your firm?
6. What is your firm's competitive advantage? Can you sustain it? How?

##### **Section 2 Overall performance in corporate sustainability and innovation**

1. Have you ever heard the concept of 'corporate sustainability?' What is your interpretation?
2. What are the top five most influential factors that drive your firm to achieve corporate sustainability? Where are these driving forces come from?
3. What are the main sustainable-related activities of your company?
4. Tell me the impact of these activities in relation to your financial performance/employees. Can you give me some examples?

5. Tell me the impact of these activities in relation to the economy/local society/environment. Can you give me some examples?
6. Do you describe your firm as an innovative company? If so, to what extent; if not, why? Some examples?
7. What is your understanding of the relationship between innovation and corporate sustainability?
8. Have you ever heard “innovation-driven sustainability” (IDS)? How about “sustainability-oriented innovation” (SOI)? Is there any difference between these two terms? If so, could you interpret IDS and SOI in your perspective, separately; if not, could you give me your interpretation? Do you know any other term can be used to represent this phenomenon?
9. Are there different types of IDS strategies? Could you give me some examples? What types of IDS strategy are commonly used by your firm in last three years, and why? How should these IDS strategies be better utilized in the next three years, why?
10. What, in your opinion, is the most unfortunate IDS strategy? What have you done until the firm decided to call it off? Could you assign the top three reasons why this strategy failed?

### **Section 3 IDS process**

1. What is the most impressive successful IDS strategy of your company that you can remember? What are the objectives of this strategy?
2. How did it happen? Could you give me the detailed milestones that you can remember?
3. Who made the decisions in each stage of activity over the duration of the process from the idea formulation? Are other decisions of your firm usually made by him/her/these people?
4. At what stage did you become involved with this strategy?

#### Section 3-1 IDS strategy formulation

1. Which activities do you identify as part of the formulation of IDS strategy? Are any strategy tools involved? Are there any challenges during formulation? Examples?
2. In your experience, how external and internal factors may influence the strategy formulation? If so, to what extent? Some examples?
3. Is there any interaction between these factors? If so, what are the interactions and how can they influence the strategy formulation? Some examples?

#### Section 3-2 IDS implementation (take into action)

1. Which activities do you identify as part of the implementation of strategy? Are there any challenges during implementation? Examples?
2. Have you discovered how external and internal factors may influence the strategy implementation? If so, to what extent? Some examples?
3. Is there interaction between these factors? If so, what are the interactions and how can they influence the strategy implementation? Some examples?
4. What are the outputs of these strategies?

#### Section 3-3 IDS commercialization and evaluation

1. How did your firm commercialize the strategy outputs to the market? Are there any challenges during commercialization? Examples?
2. Have you discovered how external and internal factors may influence the commercialization? If so, to what extent? Some examples?
3. Is there interaction between these factors? If so, what are the interactions and how can they influence the commercialization? Some examples?
4. Does your firm undertake performance management, if so, do you use any assessment criteria? If not, how you evaluate the outcomes of this IDS strategy?
5. Has your firm attained any sustainable competitive advantage through this strategy?

#### **Section 4: Additional Questions**

1. In your opinion, are there any specific external stakeholders should be interviewed to better explore the IDS experiences of your firm?
2. In your opinion, what department/task force group should be targeted to better explore the IDS experiences of your firm?
3. In your opinion, are there any specific individuals should be interviewed to better explore the IDS experiences of your firm? For instance, the person who actively supports or against IDS adoption.
4. Additional relevant experience or thoughts that you want to mention about the IDS of Chinese manufacturing SMEs.
5. Could you give some suggestions for Chinese manufacturing SMEs to achieve IDS?
6. Could you give some suggestions for managers to better get involved in IDS strategy?

### **Interview Guides (Example questions for employees)**

#### **Interview record - to be completed in advance**

Company:

Address:

Contact details:

Year of foundation:

Business founder (s):

Type of business/Industry

Interviewee:

Date:

#### **Section 1 Personal and organizational profile**

1. What is your current job position in this firm? Which responsibilities does that entail?  
How long have you been held for this position?
2. Could you use one sentence to describe your firm's main strategic focus? Did it ever change within last three years?
3. Do you think your firm is successful? Why?
4. What is your firm's competitive advantage? Can your firm sustain it? How can you contribute to this?
5. What are the weaknesses of your firm?
6. To your best knowledge, any employees ever involved in strategic decision-making? If so, how?

#### **Section 2 Overall performance in corporate sustainability and innovation**

1. Have you ever heard corporate sustainability? What is your interpretation?
2. In your opinion, does your firm achieved corporate sustainability? What criteria/method had been used to help you made this assessment?
3. Do you describe your firm as an innovative company? If so, to what extent; if not, why? Some examples?
4. What is your understanding of the relationship between innovation and corporate sustainability?

5. Have you ever heard “innovation-driven sustainability” (IDS)? How about “sustainability-oriented innovation” (SOI)? Is there any difference between these two terms? If so, could you interpret IDS and SOI in your perspective, separately; if not, could you give me your interpretation? Do you know any other term can be used to represent this phenomenon?

6. Are there different types of IDS strategy? Could you give me some examples? What types of IDS strategy are commonly used by your firm in the last three years, why? How should IDS strategies be used in the next three years, why?

7. Do you think the employee engagement with IDS is important? If so, why? Can you give me some example?

### **Section 3 IDS process and employee engagement**

1. What is the most impressive IDS strategy that you can remember? What are the objectives of this strategy?

2. How does your firm make it happened? Could you give me the detailed critical moments that you can remember?

3. What is your personal attitude towards this strategy (support or against)? Had your attitude ever changed? If so, why? How your attitude influenced the IDS strategy?

4. Are you involved in IDS strategy idea generation, selection, and decision-making? If so, what have you done? Have you got any support or against? From whom? Do you think your activities contribute to your firm’s strategy formulation? How the firm assessed your efforts? Do you think the current evaluation method is objectively and efficiently?

5. Are you involved in taking IDS strategy into actions? If so, what have you done? Have you got any support or against? From whom? Do you think your activities contribute to your firm’s strategy implementation? How the firm assessed your efforts? Do you think the current evaluation method is objectively and efficiently?

6. Are you involved in commercializing the IDS outputs to the market? If so, what have you done? Have you got any support or against? From whom? Do you think your activities contribute significantly to your firm’s commercialization? How the firm assessed your efforts? Do you think the current evaluation method is objectively and efficiently?

7. How did your firm measure the corporate performance related to this IDS strategy?

8. In your opinion, how should you more engaged in IDS activities and strategy? How can managers encourage you and support you?

9. Someone mentioned the IDS strategy named (...), can you still recall it? When had you heard this strategy in the first time? What do you know about this strategy?

10. Additional relevant experience or thoughts that you want to mention?

## Appendix B3 Interview guides for government

### Interview Guides (Example questions for government)

#### Interview record - to be completed in advance

Institution:

Address:

Contact details:

Duty:

Interviewee:

Date:

#### Section 1 Personal and division profile

1. What is your current job position in your institution? Which responsibilities do that entail? How long have you been held for this position?
2. Could you use one sentence to describe your division's main duty? Has it ever change before?

#### Section 2 Regional and organizational sustainability and innovation

1. What is the advantage of this region (city card, city branding)? Will it influence the regional sustainability and innovation? If so, how? Will regional sustainability and innovation influence SMEs' innovation? If so, how?
2. Have you ever heard corporate sustainability? What is your interpretation? In your opinion, have any SMEs in your region achieved corporate sustainability? Examples? What criteria/method has been used to help you made this assessment? How will regional sustainability and innovation influence SMEs' sustainability?
3. What is your understanding of the relationship between innovation and corporate sustainability?
4. Have you ever heard "innovation-driven sustainability" (IDS)? How about "sustainability-oriented innovation" (SOI)? Is there any difference between these two terms? If so, could you interpret IDS and SOI in your perspective, separately; if not, could you give me your interpretation? Do you know any other term can be used to represent this phenomenon?
5. Are there different types of IDS strategy? Could you give me some examples? What types of IDS strategy are commonly used by SMEs within this region in the past, Why? How should IDS strategies be used in the future, Why?

#### Section 3 Government Engagement

1. What are the 'innovation- and sustainability-related' policies for manufacturing SMEs in this region?

2. Do you think the 'innovation- and sustainability-related' policies for SMEs applied in this region are different compares to other regions in your (province/city)? Examples? Why?
3. Do you believe that, in your region, there are unique 'innovation- and sustainability-related' policies for SMEs in certain sectors of manufacturing industry? Examples? Why?
4. In your opinion, what motivated government gets involved in manufacturing SMEs' IDS?
5. What are the outcomes expected from these policies?
6. In your opinion, how to bring policies into actions? Are there any barriers and problems occur in this process? Can you give me some examples?
7. Have SMEs' IDS practices affected environment, society and regional economy? To what extent? Could you give me some examples?
8. Additional relevant experience or thoughts that you want to mention about IDS of Chinese manufacturing SMEs?

### Appendix C Interviewee Records

Interviewee	Institution Code	Current Occupation & Duty	Method	Date & Time (ending time)	Duration (hrs:min:sec)
1	ED	CEO	Remote interview	2017/10/14 3:40 pm	00:54:33
2	ED	Executive Deputy General Manager	Remote interview	2017/10/15 4:52 pm	01:38:02
3	ED	R&D Manager	Remote interview	2017/10/21 4:23 pm	01:08:24
4	ED	Project Approval Manager	Remote interview	2017/10/21 9:28 pm	01:06:38
5	ED	General Manager, Sales Director	Survey and Text interview	2017/10/25 3:43 pm	82:50:00
6	ED	Administrative Director	Face-to-face interview	2017/11/24 9:29 am	00:28:03
7	ED	Home Textile Division, Product Development	Focus group	2017/11/24 11:02 am	01:26:36
8	ED	ISO and Quality Control	Focus group	2017/11/24 11:02 am	01:26:36
9	ED	Factory Manager, Production	Face-to-face interview	2017/11/24 12:04 pm	00:39:48
10	HD	CEO	Face-to-face interview	2017/11/24 4:15 pm	01:10:29
11	HD	Technical Director, Deputy Chief Engineer	Face-to-face interview	2017/11/24 5:25 pm	00:56:04
12	HD	Administrative Director, CFO	Face-to-face interview	2017/11/24 5:50 pm; 2017/11/24 7:25 pm	00:19:57; 00:27:53
13	HD	R&D, Product Design, ISO and Quality Control Manager	Face-to-face interview	2017/11/24 8:22 pm	00:47:51
14	HD	Workshop operator	Face-to-face interview	2017/11/25 9:03 am	00:23:07

Interviewee	Institution Code	Current Occupation & Duty	Method	Date & Time (ending time)	Duration (hrs:min:sec)
15	HD	Process Design and Process Tooling Design	Face-to-face interview	2017/11/25 9:39 am	00:33:28
16	SY	CEO, General Manager, Project Approval Manager	Face-to-face interview	2017/11/25 6:03 pm	01:36:45
17	SY	Air Pollution Technical Director	Face-to-face interview	2017/11/26 10:11 am	01:06:18
18	SY	Water Pollution Technical Director	Face-to-face interview	2017/11/26 10:11 am	01:06:18
19	SY	Executive Deputy General Manager, HR Director	Face-to-face interview	2017/11/26 10:53 am	00:23:54
20	JDZG	CEO	Face-to-face interview	2017/11/26 5:25 pm	01:06:35
21	QDQ	General Manager, Senior Engineer	Face-to-face interview	2017/11/27 10:33 am	01:47:14
22	QDQ	Deputy General Manager: Technology, Project Approval Manager	Face-to-face interview	2017/11/27 11:20 am; 2017/11/27 4:04 pm	00:45:14; 01:04:38
23	QDQ	Sales Director	Face-to-face interview	2017/11/27 11:20 am; 2017/11/27 2:55 pm; 2017/11/27 4:04 pm	00:45:14; 00:13:26; 01:04:38
24	QDQ	HR Director	Face-to-face interview	2017/11/27 12:03 pm	00:42:58
25	QDQ	Project Manager: R&D, Process Design and Process Tooling Design, Product Development	Face-to-face interview	2017/11/27 4:04 pm	01:04:38

Interviewee	Institution Code	Current Occupation & Duty	Method	Date & Time (ending time)	Duration (hrs:min:sec)
26	QDQ	Production Equipment Manufacturing	Face-to-face interview	2017/11/27 4:04 pm	01:04:38
27	GY	CEO	Face-to-face interview	2017/11/29 11:35 am	02:30:53
28	GY	Project Approval Manager	Face-to-face interview	2017/11/29 3:05 pm	00:13:25
29	GY	Sales Director	Face-to-face interview	2017/11/29 3:54 pm	00:44:50
30	GY	Administrative Director	Face-to-face interview	2017/11/29 4:16 pm	00:19:49
31	GY	Process Design and Process Tooling Design	Face-to-face interview	2017/11/29 4:30 pm	00:13:10
32	GY	Production	Face-to-face interview	2017/11/29 5:05 pm	00:31:02
33	GY	Product Development	Face-to-face interview	2017/11/29 5:28 pm	00:21:35
34	RN	Coordinate and Manage: International business; Knowledge exchange between market and R&D	Focus group	2017/12/11 4:46pm	01:15:12 01:24:56
35	RN	Project Manager of Technical Development Centre	Focus group	2017/12/11 4:46pm	01:15:12 01:24:56
36	RN	Sales Director	Focus group	2017/12/11 4:46pm	01:15:12 01:24:56
37	RN	CEO	Focus group	2017/12/11 6:33pm; 2017/12/11 7:20pm	01:06:32 00:42:35

Interviewee	Institution Code	Current Occupation & Duty	Method	Date & Time (ending time)	Duration (hrs:min:sec)
38	RN	Executive Deputy General Manager; HR	Focus group	2017/12/11 6:33pm; 2017/12/11 7:20pm	01:06:32 00:42:35
39	KJJ-gov	Director of Talent Management Office, Science and Technology Department (Local Government)	Face-to-face interview	2017/12/12 3:54pm	01:07:46
40	HJ	Finance Specialist (Subsidiary 1)	Face-to-face interview	2017/12/12 4:27pm	00:19:45
41	HJ	CEO (Subsidiary 1) General manager (Subsidiary 2)	Face-to-face interview	2017/12/12 5:07pm	00:37:17
42	HJ	Sales (Subsidiary 2)	Face-to-face interview	2017/12/12 5:31pm	00:20:56
43	XDF	Technical Project Group Leader	Face-to-face interview	2017/12/13 4:47pm	01:13:06
44	XDF	Vice Director of Technical Management Department	Face-to-face interview	2017/12/13 5:54pm	00:51:26
45	SNT	Executive Deputy General Manager	Face-to-face interview	2017/12/15 11:57am	01:41:32
46	SNT	Technical Project Group Leader	Face-to-face interview	2017/12/15 3:02pm	00:49:10
47	SNT	Sales Director	Face-to-face interview	2017/12/15 3:48pm; 2017/12/15 3:51pm; 2017/12/15 3:57pm	00:41:46 00:02:52 00:03:38
48	HC	General Manager	Face-to-face interview	2017/12/16 3:42pm	01:22:48

Interviewee	Institution Code	Current Occupation & Duty	Method	Date & Time (ending time)	Duration (hrs:min:sec)
49	ZX	CEO	Face-to-face interview	2017/12/23 10:56am	02:06:29
50	ZX	Deputy General Manager	Face-to-face interview	2017/12/23 11:55am	00:56:02
51	GXJ-gov	Director of Industry and Information Technology Department (Local Government)	Face-to-face interview	2017/12/27 12:00pm	01:04:29
52	MFB-gov	Deputy Director of Textile Industry Office (local Government)	Survey and Text interview	2017/12/28 00:59 am	17:39:00
53	MFB & RD-gov	Director of Textile Industry Office (Local Government)	Survey and Text interview	2017/12/31 21:00 pm	84:00:00
54	ZDB-gov	Executive Director of Key Construction Office (Local Government)	Survey and Text interview	2018/01/03 03:07 am	42:07:00

Shorthand Index

CEO (Chief Executive Officer)

R&D (Research and Development)

CFO (Chief Financial Officer)

ISO (International Standardization Organization)

HR (Human Resource)

## Appendix D Informed Consent Forms and Participant Information Sheets (samples in English)

### Appendix D1 Research Organisation Informed Consent Forms (Company)



#### RESEARCH ORGANISATION INFORMED CONSENT FORM

Faculty of Business and Law  
University of Northumbria

Completion of this form is required whenever research is being undertaken by Business and Law staff or students within any organisation. This applies to research that is carried out on the premises, or is about an organisation, or members of that organisation or its customers, as specifically targeted as subjects of research.

The researcher must supply an explanation to inform the organisation of the purpose of the study, who is carrying out the study, and who will eventually have access to the results. In particular issues of anonymity and avenues of dissemination and publications of the findings should be brought to the organisations attention.

Researcher's Name: Huan Sun

Student ID No. (if applicable): [Redacted]

Researcher's Statement:

**Research Purpose**  
The purpose of the project is to attain a systematic understanding of Chinese Small and Medium Enterprises (SMEs) innovation-driven sustainability. The research will be conducted in China.

**Parties Involved?**

- The entrepreneur/founder/business owners.
- The employees of the research organisation (R&D), production, human resource or marketing department. The researcher will call the entrepreneurs explaining the nature of the research and their expected role as a manager. Managers will then submit their expression of interest to the entrepreneur or researcher by email or telephone.
- The employees. The researcher will call the entrepreneurs explaining the nature of the research and their expected role as an employee. Employees will then submit their expression of interest to the entrepreneur or researcher by email or telephone.
- The research will be conducted by Huan Sun, a Ph.D. candidate at Newcastle Business School, Northumbria University. Huan Sun background is in business and management and will be engaged with participants during the data collection process.
- Organisation and individual participation is entirely voluntary and each may withdraw at any time.

**Research Methods**

A number of research methods will be employed, video or in-person semi-structured interviews over the internet or in China, and field notes. All participants will be distributed with an individual informed consent form through the internet which they to sign voluntarily and return to the researcher before the interview can take place. And a Participant Information Sheets (PIS) will be sent to them together with this informed consent form in order to offer detailed information about the research. Considering this is time-consuming, it may be done by them scanning the signed hard copy of participant informed consent forms and sending it to the researcher through email account. All interviews will be recorded in Chinese, and then the anonymized world-processed transcripts (which must be confirmed by the interviewees) will be translated into English by the researcher.

**Location of Research**

- Video or in-person interviews will be conducted over the internet or in China; the Chinese participants can choose their preferable place to talk from.
- Field notes related to the online interviews will be made by researcher in the UK or EU.

1

**Timescale**

The data collection timescale are:  
October 17 - November 17 Collect primary data of the pilot case study.  
November 17 - January 19 Collect primary data for the main study.

**Time Commitment**

- An initial telephone call or video chat of approximately half an hour to discuss the research process in more detail which will also allow owner entrepreneurs to decide whether they would like their company to participate in the research.
- An initial video or in-person interview with the entrepreneur in average 2 hours.
- Transcripts will then be emailed back to the entrepreneur to be reviewed (either with amendments, deletions or additions) approximately 1.5 hours.
- Any other meetings deemed necessary for the research upon negotiation with the entrepreneur.

**Managers**

- An initial video or in-person interview with the managers of the business in average 2 hours.
- Transcripts will then be emailed back to the managers to be reviewed (either with amendments, deletions or additions) approximately 1.5 hours.
- Any other meetings deemed necessary for the research upon negotiation with the managers.

**Employees**

- An initial video or in-person interview with the employees of the business in average 2 hours.
- Transcripts will then be emailed back to the employees to be reviewed (either with amendments, deletions or additions) approximately 1.5 hours.
- Any other meetings deemed necessary for the research upon negotiation with the employees.

**Anonymity**

As the research will involve both individual interviewees and organisations, the anonymity and confidentiality must be taken careful considerations at both individual and organisational levels.

**1) For individual**

Their personal data must not be disclosed to any third party individual or organization without the consent of participants. To manage the anonymity of the qualitative data subjects, first, the researcher will create two lists to record interview notes. The 'index list' contains a unique reference number next to the names of the participants. The 'working list' uses the same reference numbers against each set of data collected. By using the 'index list', the researcher can refer to the data without revealing the identity of the interviewee, and it is not until they are together and the references is used that they identify each individual and the details they have submitted. The two lists will be stored separately so the list containing the names would be locked away from the 'working list'.

If the interviewees mention some sensitive personal information (e.g. real names of colleagues), which can be possibly identify the individual participant, these information will be made anonymous or to be removed during the transcribing stage. The researcher will proof-read each Transcript carefully to ensure that other more subtle but obvious clues to a character, place or institution are not evident. Identifying details have to be mentioned in Transcript and the Ph.D. thesis will be replaced with pseudonyms (e.g. Participant, A, or a fictitious name).

**2) For organisation**

Organisations may also need their anonymity protected. In principle, for highest level of protection, some identifying details like geographical information should not being disclosed in the study. However, the level of anonymity that the researcher can realistically provide is masking of organisation name or using a fictitious name in research report. This is because this research is a multiple-case study, some identifying details like the size of the company, the location of the company or the sustainable strategies adopted by the company are important data to analyse the case systematically and objectively.

2

It is worth to notice that anonymized data obtained through interviews might be reproduced and published in a variety of forms and for a variety of audiences related to the research detailed above (i.e. conferences, peer reviewed journals, articles etc.). Both individual and company's rights to confidentiality will be respected and where participant data is published the anonymity of the participants will be maintained.

### 3) Further consideration

The notion that anonymity should be the default position is challenged by Ginyer (2022). She suggests that researchers should consider the possibility that participants may be able to identify themselves to be acknowledged, and be happy to have their identity made known alongside their contribution to the research.

To make sure participants will be in control of the disclosure of their identity and their contribution, the researcher's contact number and Email address will be offered in case they have specific consideration and requirements about their identity or confidentiality.

### Confidentiality

Two types of information will be collected for this research: primary data and secondary data.

Secondary data where the information is already in the public domain and the use of such data is not likely to cause unwarranted prejudice to the rights, freedoms or interests of the data subject.

Regarding the primary data, due to their sensitive privacy, these information will not be disclosed to any third party (individual or organization) without the consent of the participant. Only three types of people can access to these information.

All data collected by the researcher will be stored securely either electronically on computer or in hard copy version in a locked cupboard. The recordings on the digital recorder can only be accessed by the researcher and will be deleted after the completion of the researcher's Ph.D.

As part of the Ph.D. research process, hard copies of the anonymized word-processed transcripts (raw data) may be given to the supervision team to review. Hard copies will be returned to the researcher and will not remain in the possession of the supervisors.

The participant can ask to access or modify their individual word-processed information at any time by contacting the researcher via Email or telephone.

Anonymization will also be utilized for data in Ph.D. thesis and further reproduced and published documents to protect the confidentiality of the organisation.

Anonymity must be offered to the organisation if it does not wish to be identified in the research report. However, confidentiality is more complex and cannot extend to the markers of student work or the reviewers of staff work, but can apply to the published outcomes. Thus, four options of confidential forms are offered by the researcher see the last paragraph before the signature area.

Furthermore, the researcher's contact number and Email address are offered in case the organisation has specific consideration and requirements about its identity or confidentiality.

### Research Dissemination

Anonymized data obtained through this research might be reproduced and published in a variety of forms and for a variety of audiences related to the research detailed above (i.e. conferences, peer reviewed journals, articles etc.). The participants' right to confidentiality will be respected and where participant data is published the anonymity of participants will be maintained.

### Queries

Please direct any queries regarding this research to Huan Sun on +44 [redacted] or huan.sun@northumbria.ac.uk

Any organisation manager or representative who is empowered to give consent may do so here:

Name: \_\_\_\_\_

Position/Title: \_\_\_\_\_

Organisation Name: \_\_\_\_\_

Location: \_\_\_\_\_

Anonymity must be offered to the organisation if it does not wish to be identified in the research report. Confidentiality is more complex and cannot extend to the markers of student work or the reviewers of staff work, but can apply to the published outcomes. If confidentiality is required, what form applies?

- No confidentiality required
- Masking of organisation name in research report
- No publication of the research results without specific organisational consent
- Other by agreement as specified by addendum

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

This form can be signed via email if the accompanying email is attached with the signer's personal email address included. The form cannot be completed by phone, rather should be handled via post.

## Appendix D2 Research Organisation Informed Consent Forms (Government)

	<b>RESEARCH ORGANISATION INFORMED CONSENT FORM</b>
Faculty of Business and Law University of Northumbria	
<p>Completion of this form is required whenever research is being undertaken by Business and Law staff or students within any organisation. This applies to research that is carried out on the premises, or is about an organisation, or members of that organisation or its customers, as specifically targeted as subjects of research.</p>	
<p>The researcher must supply an explanation to inform the organisation of the purpose of the study, who is carrying out the study, and who will eventually have access to the results. In particular issues of anonymity and avenues of dissemination and publications of the findings should be brought to the organisations' attention.</p>	
Researcher's Name: _____ <b>Huan Sun</b> _____	Student ID No. (if applicable): _____
Researcher's Statement:	
<p><b>Research Purpose</b>          The research proposed is to attain a systematic understanding of Chinese Small and Medium Enterprises (SMEs) Innovation-driven sustainability. The research will be conducted in China.</p>	
<p><b>Parties Involved?</b>          - The policy makers or practitioners. The researcher will explain the nature of the research to the policy makers or practitioners. The policy makers or practitioners will then submit their expression of interest to the researcher by email or telephone.          - The research will be conducted by Huan Sun, a Ph.D. candidate at Newcastle Business School, Northumbria University. Huan Sun background is in business and management and will be engaged with participants during the research.          - Organisation and individual participation is entirely voluntary and each may withdraw at any time.</p>	
<p><b>Research Methods</b>          A number of research methods will be employed: video or in-person semi-structured interviews over the internet or in China, and field notes. All participants will be distributed with an individual informed consent form through the internet which they to sign voluntarily and return to the researcher before the interview can take place. And a Participant Information Sheet (PIS) will be sent to them together with this informed consent form in order to offer detailed information about the research. Considering this is time-consuming, it may be done by them scanning the signed hard copy of participant informed consent form and sending it to the researcher via email. The signed hard copy of participant informed consent, and then the anonymized word-processed transcripts (which must be confirmed by the interviewees) will be translated into English by the researcher.</p>	
<p><b>Location of Research</b>          - Video or in-person interviews will be conducted over the internet or in China; the Chinese participants can choose their preferable place to talk from.          - Field notes related to the online interviews will be made by researcher in the UK or EU.</p>	
<p><b>Timescale</b>          The data collection timescale are:          October - 17/November 17/Collect primary data of the pilot case study.</p>	
1	
November 17-January 18/Collect primary data for the main study.	
<p><b>Time Commitment</b></p>	
<p>The policy makers or practitioners          An initial telephone interview of approximately half an hour to discuss the research process in more detail (optional). The researcher will also allow the policy makers or practitioners to decide whether they would like to participate in the research.          - An initial video or in-person interview with the policy makers or practitioners in average 2 hours.          - Transcripts will then be emailed back to the policy makers or practitioners to be reviewed (either with amendments, deletions or additions) approximately 1.5 hours.          - Any other meetings deemed necessary for the research upon negotiation with the policy makers or practitioners.</p>	
<p><b>Anonymity</b></p>	
<p>The research will involve both individual interviewees and institutions. The anonymity and confidentiality must be take careful considerations at both individual and institutional levels.</p>	
<p><b>1) For individual</b></p>	
<p>Their personal data must not be disclosed to any third party individual or institution without the consent of participants.          To manage the anonymity of the qualitative data subjects, first, the researcher will create two lists to record interview notes. The index list, contains a unique reference number next to the names of the participants. The working list, uses the same reference numbers against each set of data collected. By perceiving their list, they will be able to identify each participant, even though they both contain personal information, and it is not clear whether the references is used that they identify each individual and the details they have submitted.          The two lists will be stored separately so the list containing the names would be locked away from the 'working' list.          If the interviewees mention some sensitive personal information (e.g. real names of colleagues), which can be possibly identify the individual participant, these information will be made anonymous or to be removed during the transcribing stage. The researcher will proof-read each transcript carefully to ensure that other more subtle but obvious clues to a character, place or institution are not evident. Identifying details have to be mentioned in transcript and the Ph.D. thesis will be replaced with pseudonyms (e.g. Participant A, or a fictitious name).</p>	
<p><b>2) For institution</b></p>	
<p>Institutions may also need their anonymity protected. In principle, for highest level of protection, some identifying details like geographical information should not being disclosed in the study. However, the level of anonymity that the researcher can realistically provide is masking of institution name or using a fictitious name in research report. This is because this research is a multiple-case study, some identifying details like the responsibility of the institution or the policies adopted by the institution are important data to analyse the case systematically and objectively.          It is hard to notice that anonymized data obtained through interviews might be reproduced and it is hard to notice that anonymized data obtained through interviews might be reproduced and it is hard to notice that anonymized data obtained through interviews might be reproduced above (i.e. conferences, peer reviewed journals, articles etc.). Both individual and institution's rights to confidentiality will be respected and where participant data is published the anonymity of the participants will be maintained.</p>	
<p><b>3) Further consideration</b></p>	
<p>The notion that anonymity should be the default position is challenged by Gmyer (2002). She suggests that in some research contexts, it is possible that participants may be keen for their own voices to be acknowledged, and be happy to have their identity made known alongside their contribution to the research. To be sure, participants will be in control of the disclosure of their identity and their contribution, the researcher's contact number and Email address will be offered in case they have specific consideration and requirements about their identity or confidentiality.</p>	
<p><b>Confidentiality</b></p>	
2	

Two types of information will be collected for this research: primary data and secondary data.

Secondary data where the information is already in the public domain and the use of such data is not likely to cause unwarranted prejudice to the rights, freedoms or interests of the data subject.

Regarding the primary data, due to their sensitive privacy, these information will not be disclosed to any third party (individual or organization) without the consent of the participant. Only three types of people can access to these information.

All data collected by the researcher will be stored securely either electronically on computer or in hard copy version in a locked cupboard. The recordings on the digital recorder can only be access by the researcher and will be deleted after the completion of the researcher's Ph.D.

As part of the Ph.D. research process, hard copies of the anonymized word-processed transcripts (raw data) may be given to the supervision team to review. Hard copies will be returned to the researcher and will not remain in the possession of the supervisors.

The participant can ask to access or modify their individual word-processed information at any time by contacting the researcher via Email or telephone.

Anonymization will also be utilized for data in Ph.D. thesis and further reproduced and published documents to protect the confidentiality of the institution.

Anonymity must be offered to the institution if it does not wish to be identified in the research report. However, confidentiality is more complex and cannot extend to the markers of student work or the reviewers of staff work, but can apply to the published outcomes. Thus, four options of confidentiality forms are offered by the researcher see the last paragraph before the signature area.

Furthermore, the researcher's contact number and Email address are offered in case the institution has specific consideration and requirements about its identity or confidentiality.

#### Research Dissemination

Anonymized data obtained through this research might be reproduced and published in a variety of forms and for a variety of audiences related to the research detailed above (i.e. conferences, peer reviewed journals, articles etc.). The participants' right to confidentiality will be respected and where participant data is published the anonymity of participants will be maintained.

#### Queries

Please direct any queries regarding this research to Huan Sun on +44  or [huan.sun@northumbria.ac.uk](mailto:huan.sun@northumbria.ac.uk)

Any institution director or representative who is empowered to give consent may do so here.

Name: \_\_\_\_\_

Position/Title: \_\_\_\_\_

Institution Name: \_\_\_\_\_

Location: \_\_\_\_\_

Anonymity must be offered to the institution if it does not wish to be identified in the research report. Confidentiality is more complex and cannot extend to the markers of student work or the reviewers of staff work, but can apply to the published outcomes. If confidentiality is required, what form applies?

- No confidentiality required
- Masking of institution name in research report
- No publication of the research results without specific organisational consent
- Other by agreement as specified by addendum

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

This form can be signed via email if the accompanying email is attached with the signer's personal email address included. The form cannot be completed by phone, rather should be handled via post.

## Appendix D3 PIS (Manager)

### Participant Information Sheets

Dear manager,

My name is Huan Sun and I am a postgraduate research student at Newcastle Business School, Northumbria University, studying for a Doctorate (Ph.D.). My research topic explores how innovation-driven sustainability is attained or enhanced in Chinese small and medium sized enterprises (SMEs). The aim is to understand SMEs innovation-driven sustainability systematically in the context of China.

Your organisation has expressed an interest in participating in the study, and I would like to invite you to take part from a manager perspective.

To collect in-depth primary data for my multiple-case study, the research will use a number of techniques: semi-structured interviews and field notes. The timescale of the study is approximately three years, but the primary data collection timescale is from October 2017 to January 2018, therefore, the time commitment will be minimal when divided over this timeframe (further details below). I can also guarantee full anonymity for all participants that take part in the research.

#### Parties Involved

- Huan Sun (the researcher) will conduct the research
- Other entrepreneurs as research participants
- Self selected employees as research participants
- Self selected policy makers or practitioners as research participants

#### Your time commitment

- An initial video or in-person interview (in average 2 hours)
- Review transcript (approximately 1.5 hours)
- Any other meetings deemed necessary upon negotiation with you.

#### Where will the research take place?

- Video or in-person interviews will be conducted over the internet or in China, you can choose your preferable place to talk from.
- The field notes will take place during the interview and be recorded by me to aid probing.

#### What information might be collected?

- The interviews will be conducted in a semi-structured format with a series of open questions or discussion points, and further probing questions being asked throughout the interview. These questions will focus on your experience and perspective as a manager and are related to the innovation-driven sustainable practices of your firm. Each interview will be recorded in Chinese, and the researcher will transcribe the major information into a word-processed format.
- Your name, occupation and length of service will be collected to offer background information of yourself, but this will be securely stored and anonymously protected during and after the research.
- Any additional information that is not relevant to the study will not be asked.

#### What are the possible benefits of taking part?

- The study intended to bring the existing knowledge forward regarding emerging-economy based SMEs' innovation-driven sustainability. Thus, some potential benefits might be obtained as follows:
- Empowering you to learn more about the utilized sustainable practices of your firm.
  - Offer you an opportunity to aware and then explore your role in conducting innovation-driven sustainability strategies.
  - Being feeling more supported and respected to involve in a Ph.D. research.
  - The findings achieved from this research might offer some clues for you to address sustainability challenges and assist innovation-driven sustainability for your firm.
  - The research results will be used to develop a useful practical guidance in helping Chinese SMEs enhance their innovation-driven sustainability. Then, the results and the guidance can be used for the purpose of training activities organized by your firm or the Chinese governments.

#### What will happen if you don't want to carry on with the study?

You have the right to withdraw at any time without prejudice. If you withdraw from the study, any information that might identify you will be destroyed, but I might use the data collected up to your withdrawal.

#### Who has reviewed this study?

All research in the Northumbria University is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by the Research Ethics Committee of Northumbria University.

#### Will your information be kept confidential?

Yes. Personal data must not be disclosed to any third party, individual or organization without the consent of you. To manage the anonymity of the data subjects, first, I will create two lists. The "index list," contains a unique reference number next to the names of the participants. The "working list," uses the same reference numbers against each set of data collected. By themselves, neither list identifies a specific individual, even though they both contain personal information, and it is not until they are together and the reference is used that they identify each individual and the details they have submitted. The two lists will be stored separately so the list containing the names would be locked away from the "working list." (e.g. real names of colleagues), which can be possibly identify you, these information will be made anonymous or to be removed during the transcribing stage. Identifying details have to be mentioned will be replaced with pseudonyms (e.g. Participant A, or a fictitious name) in transcript and the Ph.D. thesis.

Anonymised data obtained through this interview might be reproduced and published in a variety of forms and for a variety of audiences related to the research detailed above (i.e. conferences, peer reviewed journals, articles etc.). Your right to confidentiality will be respected and where participant data is published the anonymity of you will be maintained.

#### Who will access the information collected?

- Where the information is already in the public domain and the use of such data is not likely to cause unreasonable prejudice to the rights, freedoms or interests of the data subject.
- All data collected by me will be stored securely either electronically on computer or in hard copy version in a locked cupboard. The recordings on the digital recorder can only be access by me and will be deleted after the completion of my Ph.D.
- As part of the Ph.D. research process, hard copies of the anonymized transcripts (raw data) may be given to my supervision team to review. Hard copies will be returned to me and will not remain in the possession of the supervisors.
- You can ask to access or modify your individual word-processed information at any time by contacting me via Email or telephone, detailed contact information see below.
- Your personal data will not be disclosed to any third party (individual or organization) without the consent of you.

If you would like to participate please send an expression of interest via email or telephone to your owner entrepreneur and me (+44) [huan.sun@northumbria.ac.uk](mailto:huan.sun@northumbria.ac.uk)

I have attached an individual informed Consent Form to provide you with further details, however, should you have any further queries relating to the research please do not hesitate to contact me on (+44) [191 275 2611](tel:+441912752611)

Thank you for time and considering my request.

Kind regards

Huan Sun

Newcastle Business School  
Northumbria University  
City Campus East  
Newcastle upon Tyne  
NE1 7ST

## Appendix D4 PIS (Employee)

### Participant Information Sheets

Dear employee,

My name is Huan Sun and I am a postgraduate research student at Newcastle Business School, Northumbria University, studying for a Doctorate (Ph.D.). My research topic explores how innovation-driven sustainability is attained or enhanced in Chinese small and medium sized enterprises (SMEs). The aim is to understand SMEs innovation-driven sustainability systematically in the context of China.

Your organisation has expressed an interest in participating in the study and I would like to invite you to take part from an employee perspective.

To collect in-depth primary data for my multiple-case study, the research will use a number of techniques; semi-structured interviews, focus groups and document analysis. The data collection timescale is from October 2017 to January 2018. Therefore, the time commitment will be minimal when divided over this timeframe (further details below). I can also guarantee full anonymity for all participants that take part in the research.

#### Parties Involved

- Huan Sun (the researcher) will conduct the research
- Owner entrepreneurs as research participants
- Self selected managers as research participants
- Self selected employees as research participants
- Self selected policy makers or practitioners as research participants

#### Your time commitment

- An initial video or in-person interview (in average 2 hours)
- Review transcript (approximately 1.5 hours)
- Any other meetings deemed necessary upon negotiation with you.

#### Where will the research take place?

- Video or in-person interviews will be conducted over the internet or in China, you can choose your preferable place to talk from.
- The field notes will take place during the interview and be recorded by me to aid probing.

#### What information might be collected?

- The data collected will be recorded in a semi-structured format with a series of open questions or discussion points, and further probing questions being asked throughout the interview. These questions will focus on your experience and perspective as an employee and are related to the innovation-driven sustainable practices of your firm. Each interview will be recorded in Chinese, and the researcher will transcribe the major information into a word-processed format.
- Your name, occupation and length of service will be collected to offer background information of yourself, but this will be securely stored and anonymously protected during and after the research.
- Any additional information that is not relevant to the study will not be asked.

#### What are the possible benefits of taking part?

- The study will help to identify key forward regarding emerging-economy based SMEs' innovation-driven sustainability. Thus, some potential benefits might be obtained as follows:
  - Empowering you to learn more about the utilized sustainable practices of your firm.
  - Offer you an opportunity to aware and then explore your role in conducting innovation-driven sustainability strategies.
  - Being feeling more supported and respected to involve in a Ph.D. research.
  - The findings achieved from this research might offer some clues for you to address sustainability challenges and assist innovation-driven sustainability for your firm.
- The research results will be used to develop a useful practical guidance in helping Chinese SMEs enhance their innovation-driven sustainability. Then, the results and the guidance can be used for the purpose of training activities organized by your firm or the Chinese government.

#### What will happen if you don't want to carry on with the study?

You have the right to withdraw at anytime without prejudice. If you withdraw from the study, any information that might identify you will be destroyed, but I might use the data collected up to your withdrawal.

#### Who has reviewed this study?

All research in the Northumbria University is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by the Research Ethics Committee of Northumbria University.

#### Will your information be kept confidential?

Yes. Personal data must not be disclosed to any third party individual or organization without the consent of you. To manage the anonymity of the data subjects, I will create two lists. The index list contains a unique identification number for each participant and the data list contains the data collected. I will store the data against each set of data collected. By themselves neither list identifies a specific individual, even though they both contain personal information, and it is not until they are together and the reference is used that they identify each individual and the details they have submitted. The two lists will be stored separately so the list containing the names would be locked away from the working list.

If you mention some sensitive personal information (e.g. real names of colleagues), which can be possibly identify you, these information will be made anonymous or to be removed during the transcribing stage. Identifying details have to be mentioned will be replaced with pseudonyms (e.g. Participant A, or a fictitious name) in transcript and the Ph.D. thesis.

When publishing the research, this interview might be reproduced and published in a variety of forms and for a variety of audiences related to the research detailed above (i.e. conferences, peer reviewed journals, articles etc.). Your right to confidentiality will be respected and where participant data is published the anonymity of you will be maintained.

#### Who will access the information collected?

- Where the information is already in the public domain and the use of such data is not likely to cause unwarranted prejudice to the rights, freedoms or interests of the data subject.
- All data collected by me will be stored securely either electronically on computer or in hard copy version in a locked cupboard. The recordings on the digital recorder can only be access by me and will be deleted after the data collection.
- As part of the Ph.D. research process, hard copies of the anonymized transcripts (raw data) may be given to my supervision team to review. Hard copies will be returned to me and will not remain in the possession of the supervisors.
- You can ask to access or modify your individual word-processed information at any time by contacting me via Email or telephone, detailed contact information see below.
- Your personal data will not be disclosed to any third party (individual or organization) without the consent of you.

If you would like to participate please send an expression of interest via email or telephone to your owner entrepreneur and me (+44) [huan.sun@northumbria.ac.uk](mailto:huan.sun@northumbria.ac.uk).

I have attached an Individual Informed Consent Form to provide you with further details, however, should you have any further queries relating to the research please do not hesitate to contact me on (+44) [1912754611](tel:+441912754611).

Thank you for time and considering my request.

Kind regards

Huan Sun  
Newcastle Business School  
Northumbria University  
City Campus East  
Newcastle upon Tyne  
NE1 8ST

## Appendix D5 PIS (Government)

### Participant Information Sheets

Dear policy maker or practitioner,

My name is Huan Sun and I am a postgraduate research student at Newcastle Business School, Northumbria University, studying for a Doctorate (Ph.D.). My research topic explores how innovation-driven sustainability is attained or enhanced in Chinese small and medium sized enterprises (SMEs). The aim is to understand SMEs innovation-driven sustainability systematically in the context of China.

Your institution has expressed an interest in participating in the study and I would like to invite you to take part from a policy maker's or practitioner's perspective.

To collect in-depth primary data for my multiple-case study, the research will use a number of techniques: semi-structured interviews, focus groups, and document analysis. The data collection period is from October 2017 to January 2018. Therefore, the time commitment will be minimal when divided over this timeframe (further details below). I can also guarantee full anonymity for all participants that take part in the research.

#### Parties involved

- Huan Sun, (the researcher) will conduct the research
- Owner entrepreneurs as research participants
- Self selected managers as research participants
- Self selected employees as research participants
- Self selected policy makers or practitioners as research participants

#### Your time commitment

- An initial video or in-person interview (in average 2 hours).
- Review transcript (approximately 1.5 hours).
- Any other meetings deemed necessary upon negotiation with you.

#### Where will the research take place?

- Video or in-person interviews will be conducted over the internet or in China; you can choose your preferable place to talk from.
- The field notes will take place during the interview and be recorded by me to aid probing.

#### What information might be collected?

- The data will be collected in a semi-structured format with a series of open questions or discussion points, and further probing questions being asked throughout the interview. These questions will focus on your experience and perspective as a policy maker or practitioner, and be related to SMEs' innovation-driven sustainable policies and practices of this region. Each interview will be recorded in Chinese, and the researcher will transcribe the major information into a word-processed format. Your name, occupation and length of service will be collected to offer background information of yourself, but this will be securely stored and anonymously protected during and after the research.
- Any additional information that is not relevant to the study will not be asked.

#### What are the possible benefits of taking part?

This study will be used to identify forward-looking, regarding emerging-economy, based SMEs' innovation-driven sustainability. Thus, the potential benefits might be obtained as follows:

- Empowering you to learn more about the utilized sustainable practices of SMEs in your region.
- Offer you an opportunity to aware and then explore your role in conducting innovation-driven sustainability strategies.
- Being feeling more supported and respected to involve in a Ph.D. research.
- The findings achieved from this research might offer some clues for you to address sustainability challenges and assist innovation-driven sustainability for this region.
- The research results will be used to develop a useful practical guidance in helping Chinese SMEs enhance their innovation-driven sustainability. Then, the results and the guidance can be used for the purpose of training activities organized by firms or the Chinese governments.

#### What will happen if you don't want to carry on with the study?

You have the right to withdraw at any time without prejudice. If you withdraw from the study, any information that might identify you will be destroyed, but I might use the data collected up to your withdrawal.

#### Who has reviewed this study?

All research in the Northumbria University is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by the Research Ethics Committee of Northumbria University.

#### Will your information be kept confidential?

Yes. Personal data must not be disclosed to any third party, individual or organization without the consent of you. To manage the anonymity of the data subject, first, I will create two lists. The 'index list' contains a unique name for each data subject, and the 'data list' contains the data subject's name. The 'index list' is used to identify each set of data collected. By themselves, neither list identifies a specific individual, even though they both contain personal information, and it is not until they are together and the reference is used that they identify each individual and the details they have submitted. The two lists will be stored separately so the list containing the names would be locked away from the 'working' list.

If you mention some sensitive personal information (e.g. real names of colleagues), which can be possibly identify you, these information will be replaced with pseudonyms (e.g. Participant A, or a fictitious name) in transcript and the Ph.D. thesis.

Although this interview might be reproduced and published in a variety of forms and for a variety of audiences related to the research detailed above (i.e. conferences, peer reviewed journals, articles etc.), your right to confidentiality will be respected and where participant data is published the anonymity of you will be maintained.

#### Who will access the information collected?

- Where the information is already in the public domain and the use of such data is not likely to cause unwarranted prejudice to the rights, freedoms or interests of the data subject.
- All data collected by me will be stored securely either electronically on computer or in hard copy version in a locked cupboard. The recordings on the digital recorder can only be accessed by me and will be stored in a locked cupboard.
- As part of the Ph.D. research process, hard copies of the anonymized transcripts (raw data) may be given to my supervision team to review. Hard copies will be returned to me and will not remain in the possession of the supervisors.
- You can ask to access or modify your individual word-processed information at any time by contacting me via Email or telephone, detailed contact information see below.
- Your personal data will not be disclosed to any third party (individual or organization) without the consent of you.

If you would like to participate please send an expression of interest via email or telephone to your owner entrepreneur or me (+44) [huan.sun@northumbria.ac.uk](mailto:huan.sun@northumbria.ac.uk).

I have attached an Individual Informed Consent Form to provide you with further details, however, should you have any further queries relating to the research, please do not hesitate to contact me on (+44) [11857](tel:11857).

Thank you for time and considering my request.

Kind regards

Huan Sun  
Newcastle Business School  
Northumbria University  
City Campus East  
Newcastle upon Tyne  
NE1 8ST

## Appendix D6 Informed Consent Form for research participants (Manager)



### Faculty of Business and Law Informed Consent Form for research participants

Title of Study:	A Systematic Understanding the Innovation-Driven Sustainability of Chinese SMEs
Person(s) conducting the research:	Huan Sun
Programme of study:	Ph.D. Business and Management Research
Address of the researcher for correspondence:	Newcastle Business School, City Campus East 1, Newcastle upon Tyne, NE1 8ST, UK
Telephone:	+44 [redacted]
Email:	huan_sun@northumbria.ac.uk
Description of the broad nature of the research:	To collect data to attain a systematic understanding of Chinese Small and Medium Enterprises (SMEs) innovation-driven sustainability.
Description of the involvement expected of participants including the broad nature of questions to be answered or events to be observed or activities to be undertaken, and the expected time commitment:	<p>The expected involvement of the research participants is as follows:</p> <p>An initial video or in-person interview with the manager/s of the business (in average 2 hours).</p> <p>Full transcripts will then be emailed back to the manager/s to be reviewed and agreed (either with amendments, deletions or additions) (approximately 1.5 hours).</p> <p>Any other meetings deemed necessary for the research upon negotiation with the manager/s.</p> <p>The interviews will be semi structured and based upon managers' experiences and views. The initial interview questions will be exploratory in nature and focus on the managers' experiences and feelings about the innovation-driven sustainability of the SME.</p> <p>Anybody will be assured by changing the names of the participants, the organisations and people that they name during the interview in the transcripts.</p>

Description of how the data you provide will be securely stored and/or destroyed upon completion of the project.

All data will be stored securely either electronically on computer or in hard copy version in a locked cupboard. The recordings on the digital recorder will be deleted after the completion of the researcher's Ph.D. As part of the data analysis process, hard copies of the anonymized transcripts (raw data) may be given to the Ph.D. supervision team to review. Hard copies will be returned to the researcher.

Information obtained in this study, including this consent form, will be kept strictly confidential (i.e. will not be passed to others) and anonymous (i.e. individuals and organisations will not be identified *unless this is expressly excluded in the details given above*).

Data obtained through this research may be reproduced and published in a variety of forms and for a variety of audiences related to the broad nature of the research detailed above. It will not be used for purposes other than those outlined above without your permission.

Participation is entirely voluntary and participants may withdraw at any time.

**By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this study on the basis of the above information.**

**Participant's signature:**

**Date:**

**Student's signature:**

**Date:**

Please keep one copy of this form for your own records

## Appendix D7 Informed Consent Form for research participants (Employee)



### Faculty of Business and Law Informed Consent Form for research participants

Title of Study:	A Systematic Understanding the Innovation-Driven Sustainability of Chinese SMEs
Person(s) conducting the research:	Huan Sun
Programme of study:	Ph.D. Business and Management Research
Address of the researcher for correspondence:	Newcastle Business School, City Campus East 1, Newcastle upon Tyne, NE1 8ST, UK
Telephone:	+44 [REDACTED]
E-mail:	huan.sun@northumbria.ac.uk
Description of the broad nature of the research:	To collect data to attain a systematic understanding of Chinese Small and Medium Enterprises (SMEs) innovation-driven sustainability.
Description of the involvement expected of participants including the broad nature of questions to be answered or events to be observed or activities to be undertaken, and the expected time commitment:	<p>The expected involvement of the research participants is as follows:</p> <p>An initial video or in-person interview with the employees of the business (in average 2 hours).</p> <p>Full transcripts will then be emailed back to the employee/s to be reviewed and agreed (either with amendments, deletions or additions) (approximately 1.5 hours).</p> <p>Any other meetings deemed necessary for the research upon negotiation with the employee/s.</p> <p>The interviews will be semi structured and based upon employees' experiences and views. The initial interview questions will be exploratory in nature and focus on the employees' experiences and feelings about the innovation-driven sustainability of the SME.</p> <p>Anonymity will be assured by changing the names of the participants, the organisations and people that they name during the interview in the transcripts.</p>

1

Description of how the data you provide will be securely stored and/or destroyed upon completion of the project.	All data will be stored securely either electronically on computer or in hard copy version in a locked cupboard. The recordings on the digital recorder will be deleted after the completion of the researcher's Ph.D. As part of the data analysis process, hard copies of the anonymized transcripts (raw data) may be given to the Ph.D. supervision team to review. Hard copies will be returned to the researcher.
--	---

Information obtained in this study, including this consent form, will be kept strictly confidential (i.e. will not be passed to others) and anonymous (i.e. individuals and organisations will not be identified *unless this is expressly excluded in the details given above*).

Data obtained through this research may be reproduced and published in a variety of forms and for a variety of audiences related to the broad nature of the research detailed above. It will not be used for purposes other than those outlined above without your permission.

Participation is entirely voluntary and participants may withdraw at any time.

**By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this study on the basis of the above information.**

**Participant's signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Student's signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

*Please keep one copy of this form for your own records*

2

## Appendix D8 Informed Consent Form for research participants (Government)



### Faculty of Business and Law Informed Consent Form for research participants

Title of Study:	A Systematic Understanding the Innovation-Driven Sustainability of Chinese SMEs
Person(s) conducting the research:	Huan Sun
Programme of study:	Ph.D. Business and Management Research
Address of the researcher for correspondence:	Newcastle Business School, City Campus East 1, Newcastle upon Tyne, NE1 8ST, UK
Telephone:	+44 [redacted]
E-mail:	huan.sun@northumbria.ac.uk
Description of the broad nature of the research:	To collect data to attain a systematic understanding of Chinese Small and Medium Enterprises (SMEs) innovation-driven sustainability.
Description of the involvement expected of participants including the broad nature of questions to be answered or events to be observed or activities to be undertaken, and the expected time commitment:	<p>The expected involvement of the research participants is as follows:</p> <p>An initial video or in-person interview with the policy makers or practitioners of the government (in average 2 hours).</p> <p>Full transcripts will then be emailed back to the policy makers or practitioners to be reviewed and agreed (either with amendments, deletions or additions) (approximately 1.3 hours).</p> <p>Any other meetings deemed necessary for the research upon negotiation with the policy makers or practitioners.</p> <p>The interviews will be semi structured and based upon the policy makers' or practitioners' experiences and views. The initial interview questions will be exploratory in nature and focus on the policy makers' or practitioners' experiences and feelings about innovation- and sustainability-related policies and practices.</p> <p>Anonymity will be assured by changing the names of the participants, the institutions and people that they name during the interview in the transcripts.</p>

Description of how the data you provide will be securely stored and/or destroyed upon completion of the project.	All data will be stored securely either electronically on computer or in hard copy version in a locked cupboard. The recordings on the digital recorder will be deleted after the completion of the researcher's Ph.D. As part of the data analysis process, hard copies of the anonymized transcripts (raw data) may be given to the Ph.D. supervision team to review. Hard copies will be returned to the researcher.
--	---

Information obtained in this study, including this consent form, will be kept strictly confidential (i.e. will not be passed to others) and anonymous (i.e. individuals and institutions will not be identified unless this is expressly excluded in the details given above).

Data obtained through this research may be reproduced and published in a variety of forms and for a variety of audiences related to the broad nature of the research detailed above. It will not be used for purposes other than those outlined above without your permission.

Participation is entirely voluntary and participants may withdraw at any time.

**By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this study on the basis of the above information.**

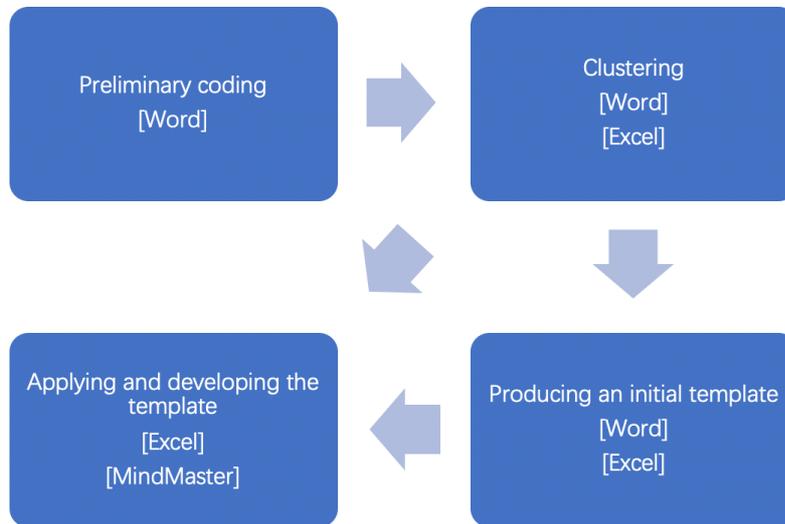
**Participant's signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Student's signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

*Please keep one copy of this form for your own records*

## Appendix E Template analysis records

### Appendix E1 Main coding progress



81 脚踏实地这种。这就是一个可持续的精神，因为

82 A 有这么一个环境吗，环境还是比较好。我觉得中国党和政府对我

83 们这种人，创业的热情的这个支持和理解，还是有土壤的。然后我

84 们这些人自己其实也是辛苦、坚持到今天的。虽然企业不是很成

85 功，但是我们还是走了这么久，20年吗。

86 Q 太谦虚了。那咱们现在主要聊一下企业的创新和可持续发展方面

87 咱们企业的一些行为。首先，您觉得，企业可持续发展是什么意思？

88 思？

89 A 企业可持续发展还是要符合现代这些环保、社会责任、产品的时

90 尚。产品必须符合消费者的期待，符合消费理念的。公司你必须符

91 合法律法规，特别是环保啊，目前我们国家提倡的这些扶贫啊，有

92 社会责任感。产品好，理念好，还要你的这个有“德”，就是我们中

93 国人说，要有德行，才能获得可持续发展。

huan. sun  
14 竞争优势【反复提及】  
14.1 产业政策的支持  
14.2 团队价值观 managers' characteristics  
14.2.1 勤劳 hard-working  
14.2.2 坚持/persistent efforts/unremitting

huan. sun  
15 可持续发展的定义【从 stakeholder 角度划分】  
15.1 消费者  
15.1.1 符合消费者期待 consumers' expectation  
产品时尚【满足家纺行业的顾客需求—对时尚的需求：  
“产品好”  
15.1.2 符合消费理念 consumption concept 【理念好  
】  
15.2 政府（符合法律法规 government regulation and  
policies）  
15.2.1 环保  
15.2.2 扶贫  
15.2 社会（有社会责任感）【要有德行】

第 6 页，共 21 页 7982 个字 英语(美国) 14.0%

**Pilot study**

1. IDS Definition

1.1 可持续发展的定义

1.1.1 资源【对应可持续性的来源和基本定义】

第一要技术方面有不断创新，第二要培养自己的人才，第三是管理，管理得好的企业才能有生机，才能留住人才；第四是原料，如果产蔗都没人种了，那我们的企业能做什么呢，我们的企业不消耗资源，不污染环境，应该是一个好项目，不像矿产企业把资源都挖光了，不可能可持续，石油等资源都是不可再生的，(4.83-87)

1.1.2 产品和效益【对应经济可持续性】

首先，产品有一个危机就是可替代性，时刻应防止被别人所替代，如果果要实现可持续性，产品就不能被别人所替代，一旦被别人替代了，

**Clustering**

有趣的观点：有一些企业会为主营业务的本性，不得有可持续性

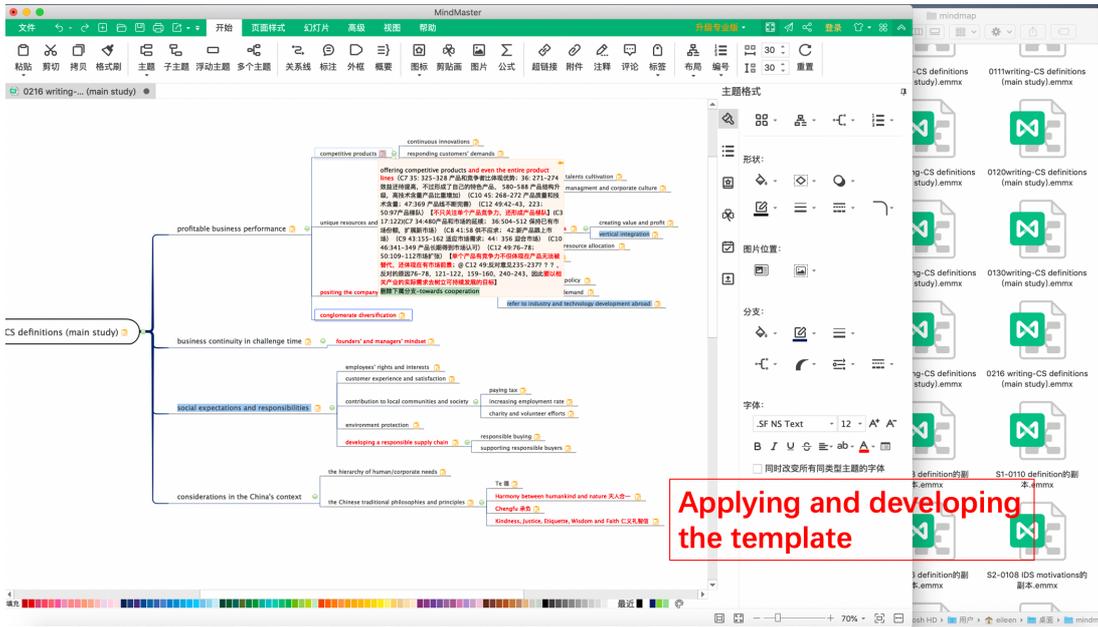
**Producing an initial template**

**Main study**

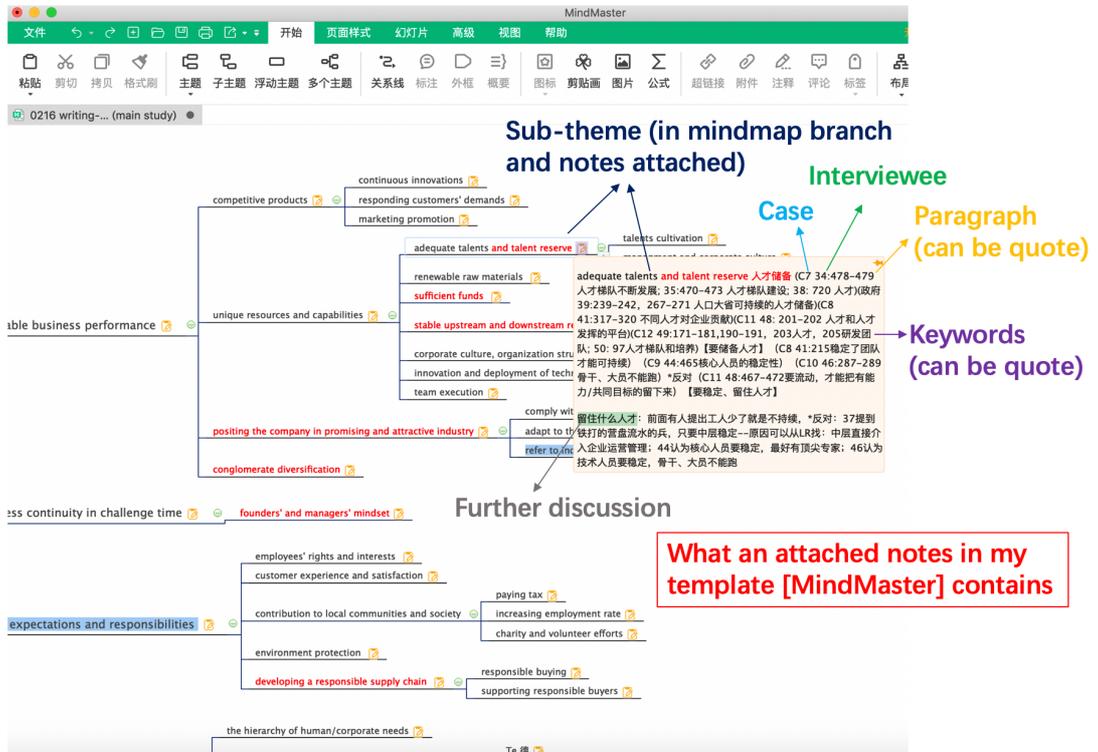
**Clustering**

**Applying and developing the template**

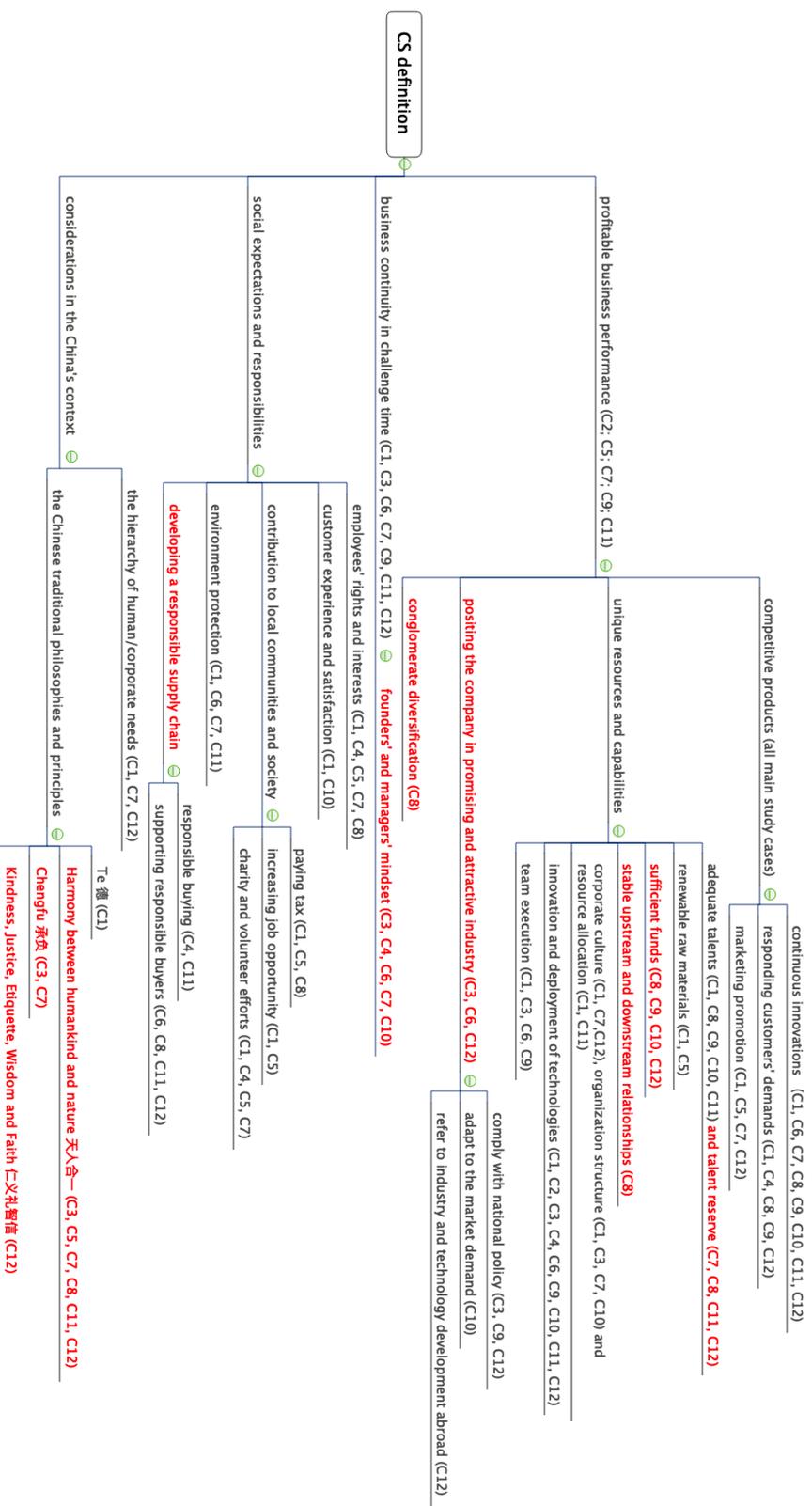
	A	B	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
1			32	33	34	35	36	37	38	39											
2	5.1	创新成功的检验方法和标准 (技术、经济指标44提到)	设备工艺技术																		
3	产品创新																				
4	生产成本降低																				
5	新产品数量增加，扩大潜在市场																				
6	产品质量优化 (分析和改进)																				
7	研发投入阶段																				
8	实验数据																				
9	试验数据 (企业内、下游使用者)																				
10	产线生产阶段																				
11	实验数据																				
12	订单和销售额																				
13	长期客户																				
14	市场占有率																				
15	获得专利 (知识产权)																				
16	获得科技成果鉴定 (3给了这个奖项，27次提到相关内容)																				
17	达成更多技术合作																				
18	其企业成为行业领军企业政府支持，生产保持正常																				
19	收益品牌知名度和行业影响力 (34)我考虑把它放经济可持续发展指标下)																				
20	产品通过国家 (权威机构) 验收和证书																				
21	新产品研发有连续性 (一直能赶上企业预期标准，这期间高于国家标准，参考项，即时参考新技术新材料)																				
22	新产品实现行业领先的功能升级																				
23	技术创新奖																				
24	工序工艺创新																				
25	工作效率提高																				
26	工作安全增强																				
27	产品质量稳定																				
28	产品质量优化																				
29	亦品质或降低																				
30	节约成本																				
31	降低物耗率																				
32																					
33	5.2 创新是否成功驱动了企业可持续发展的检验方法和标准 (Stakeholder还是p)																				
34	是否成功驱动了经济可持续性																				
35	注：经济指标 (含净现金流) 有来源：销售数量和收入																				
36																					
37																					
38																					
39																					
40																					
41	非数量化定性指标																				
42	(5.1)从达成技术合作到行业影响，提高品牌形象																				
43	最佳化管理																				
44																					

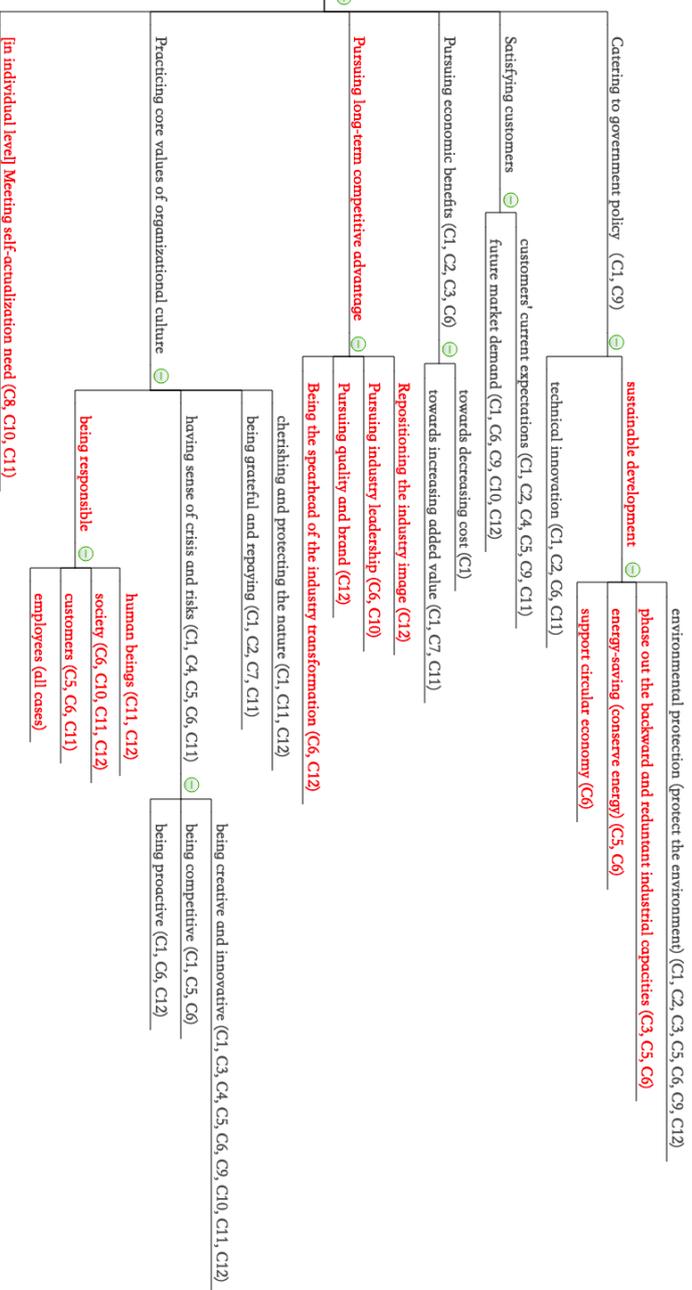


Appendix E2 Use the function to insert notes & comments properly on MindMaster



## Appendix E3 Main templates (the themes matching across 12 cases)





**motivations to pursuing IDS**

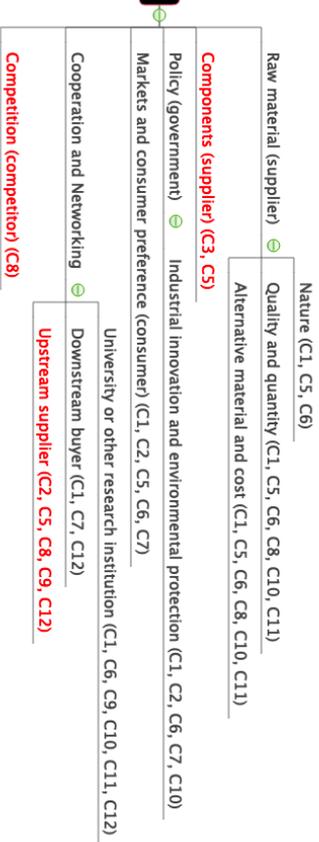
raw material	Innovation potential (C1, C11)
	Industrial development (C1, C2, C6, C9, C10)
government	Innovation (C1, C2, C8, C9, C10)
	<b>Environmental protection (C6, C9, C12)</b>
consumer	market demands (C1, C2, C3, C4, C5, C7, C9, C10, C12)
	customers' preference (C1, C6, C7, C8, C9, C10, C11)
	University or other research institution (C1, C2)
	Other semi-product manufacturer
	exchange information (C1, C2, C6, C7, C10)
	learning techniques (C1, C2)
	Downstream buyer
	product R&D (C1, C5)
	Supplier
	exchanging information (C8)
cooperation/networking	big company or famous brand
	funding and product R&D (C5)
	product promotion (C5)
	generating new ideas (C7, C8, C12)
	external experts and talents
	orienting strategy (C7, disagree-C9)
	screening and assessing project feasibility/project evaluation (C9)
	industry environment (C2, C3, C6, C9, C10)
	future labor demand (C4, C5, C6)
	land (C2, C6, C9)
	competition/competitor research (C5, C10)

contextual factors and networks in crafting

Key influencing factors in crafting



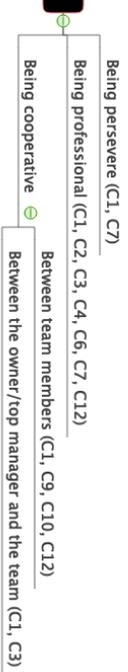
**Contextual factors and networks in implementing**



**firm-level factors in implementing**

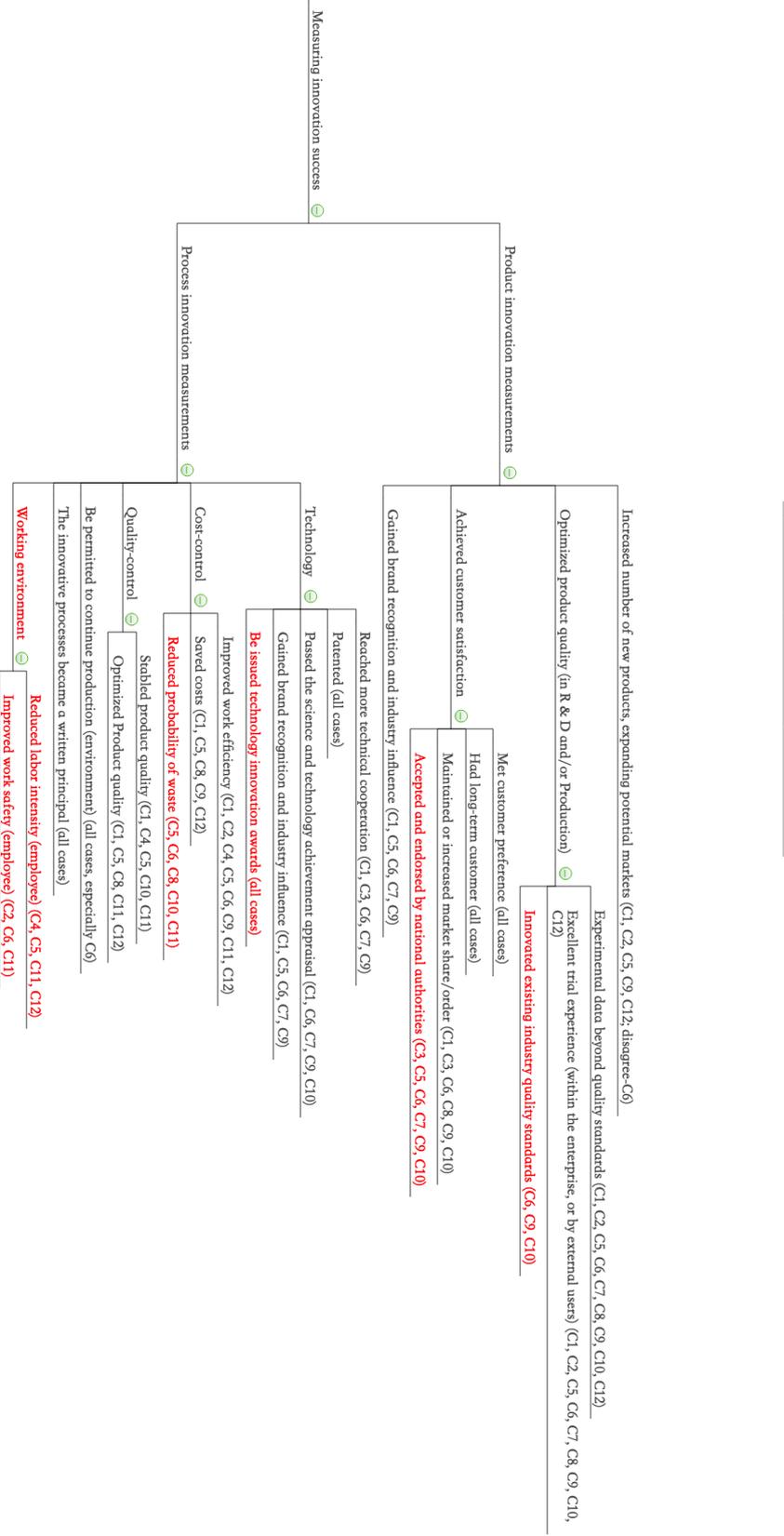


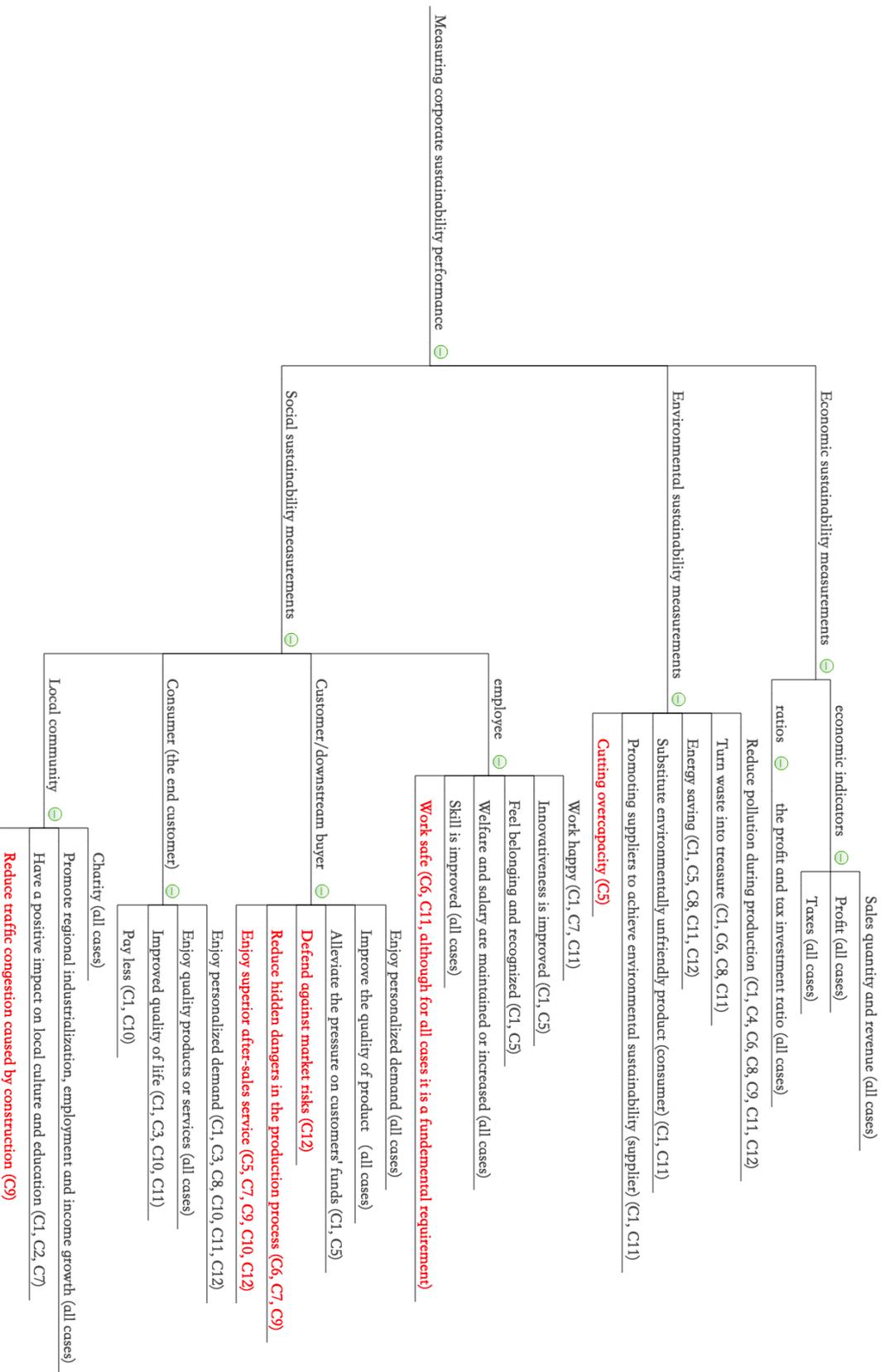
**Team characteristics in implementing**



## Influencing factors in commercialising

- Cost control (C1, C2, C8, C10, C11)
- Market acceptance and recognition (all cases)





## References

- Adams, B., Vallières, F., Duncan, J. A., Higgins, A., & Eaton, J. (2020). Stakeholder perspectives of community mental health forums: a qualitative study in Sierra Leone. *International journal of mental health systems*, *14*(1), 1-13.
- Aggerholm, H. K., Andersen, S. E., & Thomsen, C. (2011). Conceptualising employer branding in sustainable organisations, *Corporate Communications: An International Journal*, *16*(2), 105-123.
- Agostini, L., & Nosella, A. (2017a). A dual knowledge perspective on the determinants of SME patenting Results of an empirical investigation. *Management Decision*, *55*(6), 1226-1247. doi:10.1108/md-04-2016-0215
- Agostini, L., & Nosella, A. (2017b). Enhancing radical innovation performance through intellectual capital components. *Journal of Intellectual Capital*, *18*(4), 789-806. doi:10.1108/jic-10-2016-0103
- Ahlin, B., Drnovsek, M., & Hisrich, R. D. (2014). Entrepreneurs' creativity and firm innovation: the moderating role of entrepreneurial self-efficacy. *Small Business Economics*, *43*(1), 101-117. doi:10.1007/s11187-013-9531-7
- Ahlstrom, D. (2010). Innovation and Growth: How Business Contributes to Society. *Academy of Management Perspectives*, *24*(3), 11-24.
- Al Omoush, K. S., Al-Qirem, R. M., & Al Hawatmah, Z. M. (2018). The degree of e-business entrepreneurship and long-term sustainability: an institutional perspective. *Information Systems and E-Business Management*, *16*(1), 29-56. doi:10.1007/s10257-017-0340-4
- Al, S. (2013). Interpretive research design : Concepts and processes. *International Journal of Social Research Methodology.*, *16*(4), 351-352.
- Anderson, P. (2002). Assessment and development of executive function (EF) during childhood. *Child neuropsychology*, *8*(2), 71-82.
- Antonoli, D., & Della Torre, E. (2016). Innovation adoption and training activities in SMEs. *International Journal of Human Resource Management*, *27*(3), 311-337. doi:10.1080/09585192.2015.1042901
- Apanasovich, N., Alcalde Heras, H., & Parrilli, M. D. (2016). The impact of business innovation modes on SME innovation performance in post-Soviet transition economies: The case of Belarus. *Technovation*, *57-58*, 30-40. doi:10.1016/j.technovation.2016.05.001
- Audretsch, D. B., & Vivarelli, M. (1996). Firms size and R&D spillovers: Evidence from Italy. *Small Business Economics*, *8*(3), 249-258. doi:10.1007/bf00388651
- Ayuso, S., & Navarrete-Báez, F. E. (2018). How Does Entrepreneurial and International Orientation Influence SMEs' Commitment to Sustainable Development? Empirical Evidence from Spain and Mexico. *Corporate Social Responsibility and Environmental Management*, *25*(1), 80-94.
- Azungah, T. (2018). Qualitative research: Deductive and inductive approaches to data analysis. *Qualitative Research Journal.*, *18*(4), 383-400.
- Baker, W. E., Grinstein, A., & Harmancioglu, N. (2016). Whose Innovation Performance Benefits More from External Networks: Entrepreneurial or Conservative Firms? *Journal of Product Innovation Management*, *33*(1), 104-120. doi:10.1111/jpim.12263

- Banbury, C. M., & Mitchell, W. (1995). THE EFFECT OF INTRODUCING IMPORTANT INCREMENTAL INNOVATIONS ON MARKET SHARE AND BUSINESS SURVIVAL. *Strategic Management Journal*, 16, 161-182. doi:10.1002/smj.4250160922
- Batra, S., Sharma, S., Dixit, M. R., & Vohra, N. (2017). Does strategic planning determine innovation in organizations? A study of Indian SME sector. *Australian Journal of Management*, 0312896217734893.
- Beise, M., & Rennings, K. (2005). Lead markets and regulation: a framework for analyzing the international diffusion of environmental innovations. *Ecological economics*, 52(1), 5-17.
- Bernard, H. R., Wutich, A., & Ryan, G. W. (2017). *Analyzing qualitative data: Systematic approaches*. SAGE publications.
- Bhaskaran, S. (2006). Incremental innovation and business performance: Small and medium-size food enterprises in a concentrated industry environment. *Journal of Small Business Management*, 44(1), 64-80. doi:10.1111/j.1540-627X.2006.00154.x
- Biernacki, P., & Waldorf, D. (1981). Snowball sampling: Problems and techniques of chain referral sampling. *Sociological methods & research*, 10(2), 141-163.
- Biondi, V., Iraldo, F., & Meredith, S. (2002). Achieving sustainability through environmental innovation: the role of SMEs. *International Journal of Technology Management*, 24(5-6), 612-626. doi:10.1504/ijtm.2002.003074
- Bos-Brouwers, H. E. J. (2010). Corporate Sustainability and Innovation in SMEs: Evidence of Themes and Activities in Practice. *Business Strategy and the Environment*, 19(7), 417-435. doi:10.1002/bse.652
- Boström, M., Jönsson, A. M., Lockie, S., Mol, A. P., & Oosterveer, P. (2015). Sustainable and responsible supply chain governance: challenges and opportunities. *Journal of Cleaner Production*, 107, 1-7.
- Bradley, S. W., McMullen, J. S., Artz, K., & Simiyu, E. M. (2012). Capital is not enough: Innovation in developing economies. *Journal of Management Studies*, 49(4), 684-717.
- Brammer, S., Hojmoser, S., & Marchant, K. (2012). Environmental Management in SMEs in the UK: Practices, Pressures and Perceived Benefits. *Business Strategy and the Environment*, 21(7), 423-434. doi:10.1002/bse.717
- Brouwer, E., & Kleinknecht, A. (1996). Firm size, small business presence and sales of innovative products: A micro-econometric analysis. *Small Business Economics*, 8(3), 189-201. doi:10.1007/bf00388647
- Brundtland, G. H. (1987). *Our Common Future World Commission On Environment And Development*.
- Bryman, A. (2016). *Social research methods*. Oxford university press.
- Burke, S., & Gaughran, W. F. (2007). Developing a framework for sustainability management in engineering SMEs. *Robotics and Computer-Integrated Manufacturing*, 23(6), 696-703.
- Burla L, T. et al. (2008). From text to codings: Intercoder reliability assessment in qualitative content analysis. *Nursing Research*, 57(2), 113-117.
- Cakar, N. D., & Erturk, A. (2010). Comparing Innovation Capability of Small and Medium-Sized Enterprises: Examining the Effects of Organizational Culture and Empowerment. *Journal of Small Business Management*, 48(3), 325-359.
- Campbell, J. L. (2007). Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. *Academy of management Review*, 32(3), 946-967.

- Cao, J. (2010). *A Research of Innovation Strategy on the Sustainable Development of SME in China*.
- Ceci, F., & Iubatti, D. (2012). Personal relationships and innovation diffusion in SME networks: A content analysis approach. *Research Policy*, 41(3), 565-579. doi:10.1016/j.respol.2011.10.003
- Chasan-Taber, L. (2014). *Writing dissertation and grant proposals: Epidemiology, preventive medicine and biostatistics*. CRC Press.
- Chatzoglou, P., & Chatzoudes, D. (2017). The role of innovation in building competitive advantages: an empirical investigation. *European Journal of Innovation Management*, 21(1), 44-69.
- Chen, M. J., & Hambrick, D. C. (1995). Speed, stealth, and selective attack: How small firms differ from large firms in competitive behavior. *Academy of management journal*, 38(2), 453-482.
- Chhabra, N. L., & Sharma, S. (2014). Employer branding: strategy for improving employer attractiveness. *International Journal of Organizational Analysis*, 22(1), 48-60.
- Chițu, E., & Russo, M. (2020). The Impact of Employer Branding in Recruiting and Retaining Human Resources. *International Journal of Communication Research*, 10(2), 202-212.
- Chițu, E. (2020). The Importance of Employer Branding in Recruiting Young Talents. *Postmodern Openings*, 11(3), 220-230.
- Choi, Y. R., & Phan, P. H. (2014). Exploration, Exploitation, and Growth Through New Product Development: The Moderating Effects of Firm Age and Environmental Adversity. *Ieee Transactions on Engineering Management*, 61(3), 428-437. doi:10.1109/tem.2014.2310633
- Chun, J. S., Shin, Y., Choi, J. N., & Kim, M. S. (2013). How does corporate ethics contribute to firm financial performance? The mediating role of collective organizational commitment and organizational citizenship behavior. *Journal of management*, 39(4), 853-877.
- Ciobanu, G., Ghinararu, C., & Teodor, C. (2018). ECO-INNOVATION AND THE DEVELOPMENT OF NEW NEW OPPORTUNITIES ON SMES. *Quality-Access to Success*, 19, 154-159.
- Classen, N., Carree, M., Van Gils, A., & Peters, B. (2014). Innovation in family and non-family SMEs: an exploratory analysis. *Small Business Economics*, 42(3), 595-609. doi:10.1007/s11187-013-9490-z
- Cooke, P., & Wills, D. (1999). Small firms, social capital and the enhancement of business performance through innovation programmes. *Small Business Economics*, 13(3), 219-234. doi:10.1023/a:1008178808631
- Cosh, A., Fu, X., & Hughes, A. (2012). Organisation structure and innovation performance in different environments. *Small Business Economics*, 39(2), 301-317. doi:10.1007/s11187-010-9304-5
- Creswell, J. W. (2014). *Qualitative, quantitative and mixed methods approaches*. Sage. limitation literature
- Crossan, M. M., & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of management studies*, 47(6), 1154-1191.
- Cuerva, M. C., Triguero-Cano, A., & Corcoles, D. (2014). Drivers of green and non-green innovation: empirical evidence in Low-Tech SMEs. *Journal of Cleaner Production*, 68, 104-113. doi:10.1016/j.jclepro.2013.10.049

- Curado, C. (2018). Human resource management contribution to innovation in small and medium-sized enterprises: A mixed methods approach. *Creativity and Innovation Management, 27*(1), 79-90. doi:10.1111/caim.12251
- Darnall, N., Henriques, I., & Sadorsky, P. (2010). Adopting Proactive Environmental Strategy: The Influence of Stakeholders and Firm Size. *Journal of Management Studies, 47*(6), 1072-1094. doi:10.1111/j.1467-6486.2009.00873.x
- Davide Parrilli, M., & Elola, A. (2012). The strength of science and technology drivers for SME innovation. *Small Business Economics, 39*(4), 897-907. doi:10.1007/s11187-011-9319-6
- de Jesus Pacheco, D. A., ten Caten, C. S., Jung, C. F., Guitiss Navas, H. V., & Cruz-Machado, V. A. (2018). Eco-innovation determinants in manufacturing SMEs from emerging markets: Systematic literature review and challenges. *Journal of Engineering and Technology Management, 48*, 44-63. doi:10.1016/j.jengtecman.2018.04.002
- Del Giudice, M., Khan, Z., De Silva, M., Scuotto, V., Caputo, F., & Carayannis, E. (2017). The microlevel actions undertaken by owner-managers in improving the sustainability practices of cultural and creative small and medium enterprises: A United Kingdom-Italy comparison. *Journal of Organizational Behavior, 38*(9), 1396-1414. doi:10.1002/job.2237
- Deng, Q. (2005) The Origin and Development of Kindness, Justice, Etiquette, Wisdom and Faith and Their Connotations, *Journal of Changsha University, 19*(6), 4-10. DOI:10.3969/j.issn.1008-4681.2005.06.002.
- Deng, Z., Hofman, P. S., & Newman, A. (2013). Ownership concentration and product innovation in Chinese private SMEs. *Asia Pacific Journal of Management, 30*(3), 717-734. doi:10.1007/s10490-012-9301-0
- Dessie, W. M., & Ademe, A. S. (2017). Training for creativity and innovation in small enterprises in Ethiopia. *International Journal of Training and Development, 21*(3), 224-234. doi:10.1111/ijtd.12107
- Dey, I. (2003). *Qualitative data analysis: A user friendly guide for social scientists*. Routledge.
- Dolfsma, W., & van der Panne, G. (2008). Currents and sub-currents in innovation flows: Explaining innovativeness using new-product announcements. *Research Policy, 37*(10), 1706-1716. doi:10.1016/j.respol.2008.08.009
- Droge, C., Calantone, R., & Harmancioglu, N. (2008). New product success: Is it really controllable by managers in highly turbulent environments? *Journal of Product Innovation Management, 25*(3), 272-286.
- Duckworth, H. A., & Moore, R. A. (2010). *Social responsibility: Failure mode effects and analysis*. CRC Press.
- Dwyer, R., Lamond, D., & Lee, K.-H. (2009). Why and how to adopt green management into business organizations? The case study of Korean SMEs in manufacturing industry. *Management Decision, 47*(7), 1101-1121.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review, 14*(4), 532-550.
- Elos & Kyngä's (2008) The qualitative content analysis process. *Journal of Advanced Nursing 62*(1), 107–115. doi: 10.1111/j.1365-2648.2007.04569.x
- Epstein, M. J., Buhovac, A. R., & Yuthas, K. (2010). Implementing sustainability: The role of leadership and organizational culture. *Strategic finance, 91*(10), 41.
- Erickson, G. S. (1996). Environment and innovation: The case of the small entity. *Industrial Marketing Management, 25*(6), 577-587. doi:10.1016/s0019-8501(96)00063-6

- Eva, K. W., & Lingard, L. (2008). What's next? A guiding question for educators engaged in educational research. *Medical education*, 42(8), 752-754.
- Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International journal of qualitative methods*, 5(1), 80-92.
- Figurska, I., & Matuska, E. (2013). Employer branding as a human resources management strategy. *Human Resources Management & Ergonomics*, 7(2).
- Filser, M., De Massis, A., Gast, J., Kraus, S., & Niemand, T. (2018). Tracing the Roots of Innovativeness in Family SMEs: The Effect of Family Functionality and Socioemotional Wealth. *Journal of Product Innovation Management*, 35(4), 609-628. doi:10.1111/jpim.12433
- Fink, G. A. (2014). *Markov models for pattern recognition: from theory to applications*. Springer Science & Business Media.
- Finn, J. L. (2016). *Just practice: A social justice approach to social work*. Oxford University Press.
- Flammer, C. (2015). Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management Science*, 61(11), 2549-2568.
- Flick, U. (2014). *An introduction to qualitative research*. Sage.
- Fontana, R., Geuna, A., & Matt, M. (2006). Factors affecting university-industry R&D projects: The importance of searching, screening and signalling. *Research Policy*, 35(2), 309-323. doi:10.1016/j.respol.2005.12.001
- Foreman, J., & Argenti, P. A. (2005). How corporate communication influences strategy implementation, reputation and the corporate brand: an exploratory qualitative study. *Corporate Reputation Review*, 8(3), 245-264.
- Freel, M. S. (2005). Patterns of innovation and skills in small firms. *Technovation*, 25(2), 123-134. doi:10.1016/s0166-4972(03)00082-8
- Freel, M. S. (2005). Perceived environmental uncertainty and innovation in small firms. *Small Business Economics*, 25(1), 49-64. doi:10.1007/s11187-005-4257-9
- Frey, M., Iraldo, F., & Testa, F. (2013). The determinants of innovation in green supply chains: evidence from an Italian sectoral study. *R & D Management*, 43(4), 352-364. doi:10.1111/radm.12020
- Frishammar, J., & Horte, S. A. (2005). Managing external information in manufacturing firms: The impact on innovation performance. *Journal of Product Innovation Management*, 22(3), 251-266. doi:10.1111/j.0737-6782.2005.00121.x
- Fukugawa, N. (2006). Determining factors in innovation of small firm networks: A case of cross industry groups in Japan. *Small Business Economics*, 27(2-3), 181-193. doi:10.1007/s11187-006-0010-2
- Gao, W. (2018, February 8). China has set the direction of the world's sustainable development: innovation-driven and green development is the fundamental way out, Economic Information Daily. [In Chinese], accessed November 14, 2021, [http://dz.jjckb.cn/www/pages/webpage2009/html/2018-02/08/content\\_40833.htm](http://dz.jjckb.cn/www/pages/webpage2009/html/2018-02/08/content_40833.htm)
- Gisbert-Lopez, M. C., Verdu-Jover, A. J., & Gomez-Gras, J. M. (2014). The moderating effect of relationship conflict on the creative climate-innovation association: the case of traditional sectors in Spain. *International Journal of Human Resource Management*, 25(1), 47-67. doi:10.1080/09585192.2013.781525

- Glaser, B., & Strauss, A. (1967). Grounded theory: The discovery of grounded theory. *Sociology the journal of the British sociological association*, 12, 27-49.
- Golinska, P., & Kuebler, F. (2014). The method for assessment of the sustainability maturity in remanufacturing companies. *Procedia Cirp*, 15, 201-206.
- Goswami, U. (2010). Inductive and deductive reasoning. *The Wiley-Blackwell handbook of childhood cognitive development*, 399-419.
- Gronum, S., Verreyne, M.-L., & Kstelle, T. (2012). The Role of Networks in Small and Medium-Sized Enterprise Innovation and Firm Performance. *Journal of Small Business Management*, 50(2), 257-282. doi:10.1111/j.1540-627X.2012.00353.x
- Gumusluoglu, L., & Ilsev, A. (2009). Transformational Leadership and Organizational Innovation: The Roles of Internal and External Support for Innovation. *Journal of Product Innovation Management*, 26(3), 264-277.
- Gunday, G., Ulusoy, G., Kilic, K., & Alpkan, L. (2011). Effects of innovation types on firm performance. *International Journal of production economics*, 133(2), 662-676.
- Hadjimanolis, A. (1999). Barriers to innovation for SMEs in a small less developed country (Cyprus). *Technovation*, 19(9), 561-570. doi:10.1016/s0166-4972(99)00034-6
- Hadjimanolis, A. (2000). An investigation of innovation antecedents in small firms in the context of a small developing country. *R & D Management*, 30(3), 235-245. doi:10.1111/1467-9310.00174
- Hakim, C. (2000). *Research design: Successful designs for social and economic research*. Psychology Press.
- Halme, M., & Korpela, M. (2014). Responsible Innovation Toward Sustainable Development in Small and Medium-Sized Enterprises: a Resource Perspective. *Business Strategy and the Environment*, 23(8), 547-566. doi:10.1002/bse.1801
- Hansen, E. G., Grosse-Dunker, F., & Reichwald, R. (2009). Sustainability innovation cube—a framework to evaluate sustainability-oriented innovations. *International Journal of Innovation Management*, 13(04), 683-713.
- Hansen, O. E., Søndergård, B., & Meredith, S. (2002). Environmental innovations in small and medium sized enterprises. *Technology Analysis & Strategic Management*, 14(1), 37-56. doi:10.1080/09537320220125874
- Harrison, R. T., & Hart, M. (1987). INNOVATION AND MARKET DEVELOPMENT - THE EXPERIENCE OF SMALL FIRMS IN A PERIPHERAL ECONOMY. *Omega-International Journal of Management Science*, 15(6), 445-454. doi:10.1016/0305-0483(87)90002-8
- Hausman, A. (2005). Innovativeness among small businesses: Theory and propositions for future research. *Industrial Marketing Management*, 34(8), 773-782. doi:10.1016/j.indmarman.2004.12.009
- Heit, E., & Rotello, C. M. (2010). Relations between inductive reasoning and deductive reasoning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 36(3), 805.
- Henriques, J., & Catarino, J. (2015). Sustainable value and cleaner production—research and application in 19 Portuguese SME. *Journal of Cleaner Production*, 96, 379-386.
- Hewitt-Dundas, N. (2006). Resource and capability constraints to innovation in small and large plants. *Small Business Economics*, 26(3), 257-277. doi:10.1007/s11187-005-2140-3
- Heydebreck, P., Klofsten, M., & Maier, J. C. (2000). Innovation support for new technology-based firms: the Swedish Teknopol approach. *R & D Management*, 30(1), 89-100. doi:10.1111/1467-9310.00160

- Hicks, D., & Hegde, D. (2005). Highly innovative small firms in the markets for technology. *Research Policy*, 34(5), 703-716. doi:10.1016/j.respol.2005.03.008
- Hirose, K., Lee, S. H., & Matsumura, T. (2017). Environmental corporate social responsibility: A note on the first-mover advantage under price competition. *Economics Bulletin*, 37(1), 214-221.
- Hoerisch, J., Johnson, M. P., & Schaltegger, S. (2015). Implementation of Sustainability Management and Company Size: A Knowledge-Based View. *Business Strategy and the Environment*, 24(8), 765-779. doi:10.1002/bse.1844
- Hoffman, K., Parejo, M., Bessant, J., & Perren, L. (1998). Small firms, R & D, technology and innovation in the UK: a literature review. *Technovation*, 18(1), 39-55. doi:10.1016/s0166-4972(97)00102-8
- Hofmann, K. H., Theyel, G., & Wood, C. H. (2012). Identifying Firm Capabilities as Drivers of Environmental Management and Sustainability Practices - Evidence from Small and Medium-Sized Manufacturers. *Business Strategy and the Environment*, 21(8), 530-545. doi:10.1002/bse.739
- Hoogendoorn, B., Guerra, D., & van der Zwan, P. (2015). What drives environmental practices of SMEs? *Small Business Economics*, 44(4), 759-781.
- Hsu, J. L., & Cheng, M. C. (2012). What prompts small and medium enterprises to engage in corporate social responsibility? A study from Taiwan. *Corporate social responsibility and environmental management*, 19(5), 288-305.
- Huang, H.-C., Lai, M.-C., & Lo, K.-W. (2012). Do founders' own resources matter? The influence of business networks on start-up innovation and performance. *Technovation*, 32(5), 316-327.
- Ioannidis, J. P. (2007). Limitations are not properly acknowledged in the scientific literature. *Journal of clinical epidemiology*, 60(4), 324-329.
- Jiang, W., & Wong, J. K. (2016). Key activity areas of corporate social responsibility (CSR) in the construction industry: a study of China. *Journal of cleaner production*, 113, 850-860.
- Johnson, M. P., & Schaltegger, S. (2016). Two decades of sustainability management tools for SMEs: how far have we come? *Journal of Small Business Management*, 54(2), 481-505.
- Jones, J. C. Design methods: seeds of human futures, 1970. *London and New York: John Wiley (2nd edn, 1992, New York: Van Nostrand Reinhold)*.
- Kang, K.-N., & Park, H. (2012). Influence of government R&D support and inter-firm collaborations on innovation in Korean biotechnology SMEs. *Technovation*, 32(1), 68-78. doi:10.1016/j.technovation.2011.08.004
- Karlsson, C., & Olsson, O. (1998). Product innovation in small and large enterprises. *Small Business Economics*, 10(1), 31-46. doi:10.1023/a:1007970416484
- Keizer, J. A., Dijkstra, L., & Halman, J. I. M. (2002). Explaining innovative efforts of SMEs. An exploratory survey among SMEs in the mechanical and electrical engineering sector in The Netherlands. *Technovation*, 22(1), 1-13. doi:10.1016/s0166-4972(00)00091-2
- Kesting, P., Song, L. J., Qin, Z., & Krol, M. (2016). The role of employee participation in generating and commercialising innovations: insights from Chinese high-tech firms. *International Journal of Human Resource Management*, 27(10), 1059-1081. doi:10.1080/09585192.2015.1060512
- Khan, M.A. and Law, L.S. (2018, November 5). The Role of National Cultures in Shaping the Corporate Management Cultures: A Three-Country Theoretical Analysis, *Organizational*

- Culture, Jolita Vveinhardt, IntechOpen, DOI: 10.5772/intechopen.78051. Available from: <https://www.intechopen.com/books/organizational-culture/the-role-of-national-cultures-in-shaping-the-corporate-management-cultures-a-three-country-theoretic>
- Ki-Hoon, L. (2009). Why and how to adopt green management into business organizations?. *Management Decision*, 47(7), 1101.
- Kim, M.-K., Park, J.-H., & Paik, J.-H. (2018). Factors influencing innovation capability of small and medium-sized enterprises in Korean manufacturing sector: facilitators, barriers and moderators. *International Journal of Technology Management*, 76(3-4), 214-235. doi:10.1504/ijtm.2018.10012461
- Kim, N., & Shim, C. (2018). Social capital, knowledge sharing and innovation of small- and medium-sized enterprises in a tourism cluster. *International Journal of Contemporary Hospitality Management*, 30(6), 2417-2437. doi:10.1108/ijchm-07-2016-0392
- Kim, Y., Song, K., & Lee, J. (1993). DETERMINANTS OF TECHNOLOGICAL INNOVATION IN THE SMALL FIRMS OF KOREA. *R & D Management*, 23(3), 215-226. doi:10.1111/j.1467-9310.1993.tb00824.x
- King, N., & Brooks, J. M. (2017). *Template analysis for business and management students*. Sage.
- Klassen, R. D. (2000). Exploring the linkage between investment in manufacturing and environmental technologies. *International Journal of Operations & Production Management*, 20(2), 127-147. doi:10.1108/01443570010304224
- Klewitz, J., & Hansen, E. G. (2014). Sustainability-oriented innovation of SMEs: a systematic review. *Journal of Cleaner Production*, 65, 57-75. doi:10.1016/j.jclepro.2013.07.017
- Ko, W. W., & Liu, G. (2017). Environmental Strategy and Competitive Advantage: The Role of Small- and Medium-Sized enterprises' Dynamic Capabilities. *Business Strategy and the Environment*, 26(5), 584-596. doi:10.1002/bse.1938
- Kocak, A., Carsrud, A., & Oflazoglu, S. (2017). Market, entrepreneurial, and technology orientations: impact on innovation and firm performance. *Management Decision*, 55(2), 248-270. doi:10.1108/md-04-2015-0146
- Kumar, P. (2015). Green marketing innovations in small Indian firms. *World Journal of Entrepreneurship Management and Sustainable Development*, 11(3), 176-190. doi:10.1108/wjemdsd-01-2015-0003
- Kumar, R. S., & Subrahmanya, M. H. B. (2010). Influence of subcontracting on innovation and economic performance of SMEs in Indian automobile industry. *Technovation*, 30(11-12), 558-569. doi:10.1016/j.technovation.2010.06.005
- Lao Zi (n.d.) *道德经* [Dao De Jing].
- Latham, S. (2009). Contrasting strategic response to economic recession in start-up versus established software firms. *Journal of small business management*, 47(2), 180-201.
- Lee, K.-H. (2009). Why and how to adopt green management into business organizations? The case study of Korean SMEs in manufacturing industry. *Management Decision*, 47(7), 1101-1121.
- Lee, S.-Y. (2008). Drivers for the participation of small and medium-sized suppliers in green supply chain initiatives. *Supply Chain Management-an International Journal*, 13(3), 185-198. doi:10.1108/13598540810871235
- Lefebvre, E., Lefebvre, L. A., & Talbot, S. (2003). Determinants and impacts of environmental performance in SMEs. *R & D Management*, 33(3), 263-283. doi:10.1111/1467-9310.00297

- Lehtimäki, A. (1991). MANAGEMENT OF THE INNOVATION PROCESS IN SMALL COMPANIES IN FINLAND. *Ieee Transactions on Engineering Management*, 38(2), 120-126. doi:10.1109/17.78408
- Leiblein, M. J., & Madsen, T. L. (2009). UNBUNDLING COMPETITIVE HETEROGENEITY: INCENTIVE STRUCTURES AND CAPABILITY INFLUENCES ON TECHNOLOGICAL INNOVATION. *Strategic Management Journal*, 30(7), 711-735. doi:10.1002/smj.746
- Leiponen, A., & Byma, J. (2009). If you cannot block, you better run: Small firms, cooperative innovation, and appropriation strategies. *Research Policy*, 38(9), 1478-1488. doi:10.1016/j.respol.2009.06.003
- Leonidou, L. C., Christodoulides, P., & Thwaites, D. (2016). External Determinants and Financial Outcomes of an Eco-friendly Orientation in Smaller Manufacturing Firms. *Journal of Small Business Management*, 54(1), 5-25. doi:10.1111/jsbm.12121
- Li, X., & Mitchell, R. K. (2009). The Pace and Stability of Small Enterprise Innovation in Highly Dynamic Economies: A China-Based Template. *Journal of Small Business Management*, 47(3), 370-397.
- Lis, A., Czerniachowicz, B., & Wieczorek-Szymańska, A. (2017). Leadership and Corporate Social Responsibility: Research Topic Profiling. *Business and Non-profit Organizations Facing Increased Competition and Growing Customers' Demands*, 16, 59-74.
- Llach, J., Del Mar Alonso-Almeida, M., Garcia-Castellvi, A., & Bagur-Femenias, L. (2015). A Fresh Approach to Context Influence, Development and Performance in Environmental Management. *Business Strategy and the Environment*, 24(8), 855-872. doi:10.1002/bse.1850
- Locke, E. (2007). The Case for Inductive Theory Building†. *Journal of Management*, 33(6), 867-890.
- Longenecker, J. G., Moore, C. W., Petty, J. W., Palich, L. E., & McKinney, J. A. (2006). Ethical attitudes in small businesses and large corporations: Theory and empirical findings from a tracking study spanning three decades. *Journal of Small Business Management*, 44(2), 167-183.
- Lo, S. M. (2014). Effects of supply chain position on the motivation and practices of firms going green. *International Journal of Operations & Production Management*, 34(1), 93-114. doi:10.1108/ijopm-04-2012-0133
- Luo, Y. D. (1999). Environment-strategy-performance relations in small businesses in China: A case of township and village enterprises in southern China. *Journal of Small Business Management*, 37(1), 37-52.
- Lv, D. D., Zeng, P., & Lan, H. (2018). Co-patent, financing constraints, and innovation in SMEs: An empirical analysis using market value panel data of listed firms. *Journal of Engineering and Technology Management*, 48, 15-27. doi:10.1016/j.jengtecman.2018.02.001
- Madrid-Guijarro, A., Garcia, D., & Van Auken, H. (2009). Barriers to Innovation among Spanish Manufacturing SMEs. *Journal of Small Business Management*, 47(4), 465-488.
- Madrid-Guijarro, A., Garcia-Perez-de-Lema, D., & Van Auken, H. (2013). An Investigation of Spanish SME Innovation during Different Economic Conditions. *Journal of Small Business Management*, 51(4), 578-601. doi:10.1111/jsbm.12004
- Madsen, H., & Ulhoi, J. P. (2016). Corporate Environmental Initiatives in Small and Medium Sized Enterprises and Their Outcomes: A Longitudinal Study. *Business Strategy and the Environment*, 25(2), 92-101. doi:10.1002/bse.1859

- Maes, J., & Sels, L. (2014). SMEs' Radical Product Innovation: The Role of Internally and Externally Oriented Knowledge Capabilities\*. *Journal of Small Business Management*, 52(1), 141-163. doi:10.1111/jsbm.12037
- Mahto, R. V., McDowell, W. C., Kudlats, J., & Dunne, T. C. (2018). Learning Orientation and Performance Satisfaction as Predictors of Small Firm Innovation: The Moderating Role of Gender. *Group Decision and Negotiation*, 27(3), 375-391. doi:10.1007/s10726-018-9566-x
- Mandhanya, Y., & Shah, M. (2010). EMPLOYER BRANDING-A TOOL FOR TALENT MANAGEMENT. *Global Management Review*, 4(2).
- Marco-Fondevila, M., Moneva Abadia, J. M., & Scarpellini, S. (2018). CSR and green economy: Determinants and correlation of firms' sustainable development. *Corporate Social Responsibility and Environmental Management*, 25(5), 756-771. doi:10.1002/csr.1492
- Massa, S., & Testa, S. (2008). Innovation and SMEs: Misaligned perspectives and goals among entrepreneurs, academics, and policy makers. *Technovation*, 28(7), 393-407. doi:10.1016/j.technovation.2008.01.002
- Mbizi, R., Hove, L., Thondhlana, A., & Kakava, N. (2013). Innovation in SMEs: A review of its role to organisational performance and SMEs operations sustainability. *Interdisciplinary Journal of Contemporary Research in Business*, 4(11), 370-389.
- McKeiver, C., & Gadenne, D. (2005). Environmental management systems in small and medium businesses. *International Small Business Journal*, 23(5), 513-537. doi:10.1177/0266242605055910
- Meyer, A. D., Tsui, A. S., & Hinings, C. R. (1993). Configurational approaches to organizational analysis. *Academy of Management journal*, 36(6), 1175-1195.
- Moini, A. H. (1998). Small firms exporting: how effective are government export assistance programs?. *Journal of Small Business Management*, 36(1), 1.
- Moon, J., & Shen, X. (2010). CSR in China research: Salience, focus and nature. *Journal of business ethics*, 94, 613-629.
- Moore, S. B., & Manring, S. L. (2009). Strategy development in small and medium sized enterprises for sustainability and increased value creation. *Journal of cleaner production*, 17(2), 276-282.e
- Muenjohn, N., & McMurray, A. (2017). Design leadership, work values ethic and workplace innovation: an investigation of SMEs in Thailand and Vietnam. *Asia Pacific Business Review*, 23(2), 192-204. doi:10.1080/13602381.2017.1281642
- Newell, A., & Simon, H. A. (1972). *Human problem solving* (Vol. 104, No. 9). Englewood Cliffs, NJ: Prentice-Hall.
- Noci, G., & Verganti, R. (1999). Managing 'green' product innovation in small firms. *R & D Management*, 29(1), 3-15. doi:10.1111/1467-9310.00112
- Nooteboom, B. (1994). INNOVATION AND DIFFUSION IN SMALL FIRMS - THEORY AND EVIDENCE. *Small Business Economics*, 6(5), 327-347. doi:10.1007/bf01065137
- O'Donohue, W., & Torugsa, N. (2016). The moderating effect of 'Green' HRM on the association between proactive environmental management and financial performance in small firms. *International Journal of Human Resource Management*, 27(2), 239-261. doi:10.1080/09585192.2015.1063078
- O'Dwyer, M., Gilmore, A., & Carson, D. (2009). Innovative marketing in SMEs: an empirical study. *Journal of Strategic Marketing*, 17(5), 383-396.

- O'Dwyer, M. (2009). *Marketing the SME: Innovation and approach*. Cambridge Scholars Publishing.
- O'Reilly, C. A. (1982). Variations in decision makers' use of information sources: The impact of quality and accessibility of information. *Academy of Management journal*, 25(4), 756-771.
- O'Reilly, K., Paper, D., & Marx, S. (2012). Demystifying grounded theory for business research. *Organizational Research Methods*, 15(2), 247-262.
- Ormerod, R. (2010). Rational inference : Deductive, inductive and probabilistic thinking. *The Journal of the Operational Research Society.*, 61(8), 1207-1223.
- Pahl, G., & Beitz, W. (2013). *Engineering design: a systematic approach*. Springer Science & Business Media.
- Panizzolo, R. (1998). Managing innovation in SMEs: A multiple case analysis of the adoption and implementation of product and process design technologies. *Small Business Economics*, 11(1), 25-42. doi:10.1023/a:1007941228765
- Papa, A., Santoro, G., Tirabeni, L., & Monge, F. (2018). Social media as tool for facilitating knowledge creation and innovation in small and medium enterprises. *Baltic Journal of Management*, 13(3), 329-344. doi:10.1108/bjm-04-2017-0125
- Parker, C. M., Redmond, J., & Simpson, M. (2009). A review of interventions to encourage SMEs to make environmental improvements. *Environment and planning C: Government and policy*, 27(2), 279-301.
- Pavia, T. M. (1991). THE EARLY STAGES OF NEW PRODUCT DEVELOPMENT IN ENTREPRENEURIAL HIGH-TECH FIRMS. *Journal of Product Innovation Management*, 8(1), 18-31. doi:10.1111/1540-5885.810753
- Pedersen, E. R. (2009). The many and the few: rounding up the SMEs that manage CSR in the supply chain. *Supply Chain Management-an International Journal*, 14(2), 109-116. doi:10.1108/13598540910941975
- Pettigrew, A. M., Woodman, R. W., & Cameron, K. S. (2001). Studying organizational change and development: Challenges for future research. *Academy of management journal*, 44(4), 697-713.
- Pfirmsmann, O. (1994). THE GEOGRAPHY OF INNOVATION IN SMALL AND MEDIUM-SIZED FIRMS IN WEST-GERMANY. *Small Business Economics*, 6(1), 41-54. doi:10.1007/bf01066111
- Pinget, A., Bocquet, R., & Mothe, C. (2015). Barriers to Environmental Innovation in SMEs: Empirical Evidence from French Firms. *Management*, 18(2), 132-155.
- Pisano, G. P., & Teece, D. J. (2007). How to capture value from innovation: Shaping intellectual property and industry architecture. *California Management Review*, 50(1), 278-+.
- Prajogo, D., & McDermott, C. M. (2014). Antecedents of Service Innovation in SMEs: Comparing the Effects of External and Internal Factors. *Journal of Small Business Management*, 52(3), 521-540. doi:10.1111/jsbm.12047
- Prajogo, D. I., McDermott, C. M., & McDermott, M. A. (2013). Innovation orientations and their effects on business performance: contrasting small- and medium-sized service firms. *R & D Management*, 43(5), 486-500. doi:10.1111/radm.12027
- PRC Ministry of Industry and Information Technology. PRC National Bureau of Statistics. PRC National Development and Reform Commission. PRC Ministry of Commerce. 2011. *China's Regulations on the Standards for Classification of SMEs*. [In Chinese.] (no. 300,

- June 18), accessed March 23, 2016, [http://www.gov.cn/zwgk/2011-07/04/content\\_1898747.htm](http://www.gov.cn/zwgk/2011-07/04/content_1898747.htm).
- Price, J. H., & Murnan, J. (2004). Research limitations and the necessity of reporting them. *American Journal of Health Education, 35*(2), 66.
- Radas, S., & Bozic, L. (2009). The antecedents of SME innovativeness in an emerging transition economy. *Technovation, 29*(6-7), 438-450. doi:10.1016/j.technovation.2008.12.002
- Radicic, D., & Pugh, G. (2017). R&D Programmes, Policy Mix, and the 'European Paradox': Evidence from European SMEs. *Science and Public Policy, 44*(4), 497-512. doi:10.1093/scipol/scw077
- Richards, L., & Morse, J. M. (2012). *Readme first for a user's guide to qualitative methods*. Sage.
- Rittel, H. W. J., & Webber, M. M. (1984). Planning problems are wicked problems. In N. Cross (Ed.), *Developments in Design Methodology* (pp. 135-144).
- Robescu, V.-O. (2010). Eco Innovation Practice and Romanian SMEs. *Proceedings of the 5th European Conference on Innovation and Entrepreneurship*, 480-488.
- Robson, C. (2011). *Real world research: A resource for users of social research methods in applied settings 3rd edition*.
- Romanelli, M. (2018). Towards Sustainable Ecosystems. *Systems Research and Behavioral Science, 35*(4), 417-426. doi:10.1002/sres.2541
- Romero, I., & Martinez-Roman, J. A. (2012). Self-employment and innovation. Exploring the determinants of innovative behavior in small businesses. *Research Policy, 41*(1), 178-189. doi:10.1016/j.respol.2011.07.005
- Rose, J., Jones, M., & Furneaux, B. (2016). An integrated model of innovation drivers for smaller software firms. *Information & Management, 53*(3), 307-323. doi:10.1016/j.im.2015.10.005
- Rosenbusch, N., Brinckmann, J., & Bausch, A. (2011). Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs. *Journal of business Venturing, 26*(4), 441-457.
- Rothwell, R. (1991). EXTERNAL NETWORKING AND INNOVATION IN SMALL AND MEDIUM-SIZED MANUFACTURING FIRMS IN EUROPE. *Technovation, 11*(2), 93-112. doi:10.1016/0166-4972(91)90040-b
- Roxas, B., Ashill, N., & Chadee, D. (2017). Effects of Entrepreneurial and Environmental Sustainability Orientations on Firm Performance: A Study of Small Businesses in the Philippines. *Journal of Small Business Management, 55*, 163-178. doi:10.1111/jsbm.12259
- Ryoo, J. (2017). Choosing between internal and external development for innovation projects: antecedents and consequences. *Asia Pacific Business Review, 23*(1), 90-115. doi:10.1080/13602381.2015.1109818
- Sadowski, B. M., Maitland, C., & van Dongen, J. (2002). Strategic use of the Internet by small-and medium-sized companies: an exploratory study. *Information economics and Policy, 14*(1), 75-93.
- Sajan, M. P., Shalij, P. R., Ramesh, A., & Augustine, B. P. (2017). Lean manufacturing practices in Indian manufacturing SMEs and their effect on sustainability performance. *Journal of Manufacturing Technology Management, 28*(6), 772-793. doi:10.1108/jmtm-12-2016-0188

- Sancha, C., Gimenez, C., & Sierra, V. (2016). Achieving a socially responsible supply chain through assessment and collaboration. *Journal of Cleaner Production*, 112, 1934-1947.
- Sanchez-Famoso, V., Maseda, A., & Iturralde, T. (2017). Family involvement in top management team: Impact on relationships between internal social capital and innovation. *Journal of Management & Organization*, 23(1), 136-162.  
doi:10.1017/jmo.2016.2
- Santos-Vijande, M. L., López-Sánchez, J. Á., & Trespalacios, J. A. (2012). How organizational learning affects a firm's flexibility, competitive strategy, and performance. *Journal of business research*, 65(8), 1079-1089.
- Scapens, R. W. (2004). Doing case study research. In *The real life guide to accounting research* (pp. 257-279). Elsevier.
- Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: categories and interactions. *Business strategy and the environment*, 20(4), 222-237.
- Shao, X. F., Gouliamos, K., Luo, B. N. F., Hamori, S., Satchell, S., Yue, X. G., & Qiu, J. (2020). Diversification and Desynchronicity: An Organizational Portfolio Perspective on Corporate Risk Reduction. *Risks*, 8(2), 51.
- Sharma, N. (2017). INNOVATIVE BEHAVIOUR OF INDIAN MICRO SMALL AND MEDIUM ENTERPRISES: AN EMPIRICAL STUDY. *International Journal of Innovation Management*, 21(7). doi:10.1142/s136391961750061x
- Shevchenko, A., Levesque, M., & Pagell, M. (2016). Why Firms Delay Reaching True Sustainability. *Journal of Management Studies*, 53(5), 911-935.  
doi:10.1111/joms.12199
- Shi, Q. (2004). A Comparative Study of Confucianism, Taoism and Buddhism on Taiping Jing/ Scripture of the Great Peace " [Master's thesis, Wuhan University]. DOI: 10.7666/d.Y630468
- Siggelkow, N. (2007). Persuasion with case studies. *The Academy of Management Journal*, 50(1), 20-24.
- Silverman, D. (2015). *Interpreting qualitative data*. Sage.
- Singh, R. K., Garg, S. K., & Deshmukh, S. G. (2008). Strategy development by SMEs for competitiveness: a review. *Benchmarking: An international journal*, 15(5), 525-547.
- Siu, W. S., Lin, T. L., Fang, W. C., & Liu, Z. C. (2006). An institutional analysis of the new product development process of small and medium enterprises (SMEs) in China, Hong Kong and Taiwan. *Industrial Marketing Management*, 35(3), 323-335.  
doi:10.1016/j.indmarman.2005.04.008
- Soiferman, L. K. (2010). Compare and Contrast Inductive and Deductive Research Approaches. *Online Submission*.
- Sok, P., O'Cass, A., & Miles, M. P. (2016). The Performance Advantages for SMEs of Product Innovation and Marketing Resource-Capability Complementarity in Emerging Economies. *Journal of Small Business Management*, 54(3), 805-826.  
doi:10.1111/jsbm.12172
- Souder, W. E., Buisson, D., & Garrett, T. (1997). Success through customer-driven new product development: A comparison of US and New Zealand small entrepreneurial high technology firms. *Journal of Product Innovation Management*, 14(6), 459-472.  
doi:10.1016/s0737-6782(97)00064-7

- Stefańska, M., & Bilińska-Reformat, K. (2020). Employer branding and corporate social responsibility. In *CSR in Contemporary Poland: Institutional Perspectives and Stakeholder Experiences* (pp. 153-171). Cham: Springer International Publishing.
- Stoian, C., & Gilman, M. (2017). Corporate Social Responsibility That "Pays": A Strategic Approach to CSR for SMEs. *Journal of Small Business Management*, 55(1), 5-31. doi:10.1111/jsbm.12224
- Suominen, A., Seppänen, M., & Dedehayir, O. (2019). A bibliometric review on innovation systems and ecosystems: a research agenda. *European Journal of Innovation Management*, 22(2), 335-360.
- Szymańska, A.K. (2014). *The Impact of Organisational Culture on Employer Branding*.
- Terziovski, M. (2010). INNOVATION PRACTICE AND ITS PERFORMANCE IMPLICATIONS IN SMALL AND MEDIUM ENTERPRISES (SMEs) IN THE MANUFACTURING SECTOR: A RESOURCE-BASED VIEW. *Strategic Management Journal*, 31(8), 892-902. doi:10.1002/smj.841
- Thai Thi, M., & Hjortso, C. N. (2015). How Institutions Influence SME Innovation and Networking Practices: The Case of Vietnamese Agribusiness. *Journal of Small Business Management*, 53, 209-228. doi:10.1111/jsbm.12189
- Thanki, S. J., & Thakkar, J. (2018). Interdependence analysis of lean-green implementation challenges: a case of Indian SMEs. *Journal of Manufacturing Technology Management*, 29(2), 295-328. doi:10.1108/jmtm-04-2017-0067
- Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American journal of evaluation*, 27(2), 237-246.
- Thong, J. Y. L., & Yap, C. S. (1995). CEO CHARACTERISTICS, ORGANIZATIONAL CHARACTERISTICS AND INFORMATION TECHNOLOGY ADOPTION IN SMALL BUSINESSES. *Omega-International Journal of Management Science*, 23(4), 429-442. doi:10.1016/0305-0483(95)00017-i
- Tolcachier, J. (2019, September). The Chinese vision of a "Community of Shared Destiny for Humanity": a prelude to a universal humanist moment?. Retrieved 10 October 2020, from <https://www.pressenza.com/2019/09/the-chinese-vision-of-a-community-of-shared-destiny-for-humanity-a-prelude-to-a-universal-humanist-moment/>
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British journal of management*, 14(3), 207-222.
- Triguero, A., Moreno-Mondejar, L., & Davia, M. A. (2015). Eco-innovation by small and medium-sized firms in Europe: from end-of-pipe to cleaner technologies. *Innovation-Management Policy & Practice*, 17(1), 24-40. doi:10.1080/14479338.2015.1011059
- Tsai, F. S., Lin, C. H., Lin, J. L., Lu, I. P., & Nugroho, A. (2018). Generational diversity, overconfidence and decision-making in family business: A knowledge heterogeneity perspective. *Asia Pacific Management Review*, 23(1), 53-59.
- Wang, F. (2006) Discussing the sustainable development to China traditional culture inheritance in scientific development view, *Journal of North China Institute of Aerospace Engineering*.
- Wang, L., Cui, Z., & Liang, X. (2015). Does it pay to be green? Financial benefits of environmental labeling among Chinese firms, 2000–2005. *Management and Organization Review*, 11(03), 493-519.
- Wang, L., & Juslin, H. (2009). The impact of Chinese culture on corporate social responsibility: The harmony approach. *Journal of Business Ethics*, 88(3), 433-451.

- Wang, T. (2016, April 8) Green development should promote the spirit of " One generation plants the trees in whose shade another generation rests. " Retrieved 30 April 2019 from [http://www.wenming.cn/wmpl\\_pd/yczl/201604/t20160408\\_3269049.shtml](http://www.wenming.cn/wmpl_pd/yczl/201604/t20160408_3269049.shtml)
- Weng, M.-H., & Lin, C.-Y. (2011). Determinants of green innovation adoption for small and medium-size enterprises (SMES). *African Journal of Business Management*, 5(22), 9154-9163.
- Weterings, A., & Koster, S. (2007). Inheriting knowledge and sustaining relationships: What stimulates the innovative performance of small software firms in the Netherlands? *Research Policy*, 36(3), 320-335.
- Woiceshyn, J., & Daellenbach, U. (2018). Evaluating inductive vs deductive research in management studies: Implications for authors, editors, and reviewers. *Qualitative research in organizations and management: An International Journal*, 13(2), 183-195.
- Wolff, J. A., & Pett, T. L. (2006). Small-firm performance: Modeling the role of product and process improvements. *Journal of Small Business Management*, 44(2), 268-284. doi:10.1111/j.1540-627X.2006.00167.x
- Woo, C., Chung, Y., Chun, D., Han, S., & Lee, D. (2014). Impact of Green Innovation on Labor Productivity and its Determinants: an Analysis of the Korean Manufacturing Industry. *Business Strategy and the Environment*, 23(8), 567-576. doi:10.1002/bse.1807
- Wright, L. T., & Narrow, C. (2001). Improving marketing communication & innovation strategies in the small business context. *Small Business Economics*, 16(2), 113-123. doi:10.1023/a:1011188221120
- Wu, G.-C. (2017). Effects of Socially Responsible Supplier Development and Sustainability-Oriented Innovation on Sustainable Development: Empirical Evidence from SMEs. *Corporate Social Responsibility and Environmental Management*, 24(6), 661-675. doi:10.1002/csr.1435
- Yasin, G., Nawab, S., Bhatti, K. K., & Nazir, T. (2014). Relationship of intellectual stimulation, innovations and SMEs performance: Transformational leadership a source of competitive advantage in SMEs. *Middle-East Journal of Scientific Research*, 19(1), 74-81.
- Yam, R. C. M., Guan, J. C., Pun, K. F., & Tang, E. P. Y. (2004). An audit of technological innovation capabilities in Chinese firms: some empirical findings in Beijing, China. *Research Policy*, 33(8), 1123-1140. doi:10.1016/j.respol.2004.05.004
- Yang, H., Luo, J., & Wang, H. (2017). The role of revenue sharing and first-mover advantage in emission abatement with carbon tax and consumer environmental awareness. *International Journal of Production Economics*, 193, 691-702.
- Yang, J. S. (2017). The governance environment and innovative SMEs. *Small Business Economics*, 48(3), 525-541. doi:10.1007/s11187-016-9802-1
- Yin, R. K. (1994). Case study research: Design and Methods, Applied social research methods series, 5. *Biography*, Sage Publications, London.
- Yin, R. K. (1981). The case study crisis: Some answers. *Administrative science quarterly*, 26(1), 58-65.
- Zhu, Y., Wittmann, X., & Peng, M. W. (2012). Institution-based barriers to innovation in SMEs in China. *Asia Pacific Journal of Management*, 29(4), 1131-1142. doi:10.1007/s10490-011-9263-7
- Zimmerman, C. (2000). The development of scientific reasoning skills. *Developmental review*, 20(1), 99-149.

