



Towards Sustainability in the Chinese Construction Industry: A Transition Approach

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List of Abbreviations

ANOVA	one-way analysis of variance
ANT	actor network theory
AoD	arena of development
AQSIQ	General Administration of Quality Supervision, Inspection and Quarantine (China)
ASCE	American Society of Civil Engineers
BAT	best available techniques
BM	business model
BREEAM	Building Research Establishment Environmental Assessment Methodology
BREF	BAT (best available techniques) Reference Document
CASS-CSR	Chinese Academy of Social Sciences-Corporate Social Responsibility Guidelines
CCCC	China Communications Construction Company Ltd
CCIA	China Construction Industry Association
CED	Committee for Economic Development
CHINCA	Chinese International Contractors Association
CIB	International Council for Research and Innovation in Building and Construction
CNY	Chinese yuan (currency)
CO ₂	carbon dioxide
CRM	customer relationship management
CS	corporate sustainability
CSA	critical sustainability aspect
CSCEC	China State Construction Engineering Corp. Ltd
CSP	corporate social performance
CSR	corporate social responsibility
DRIFT	Dutch Research Institute for Transitions
EID	Economic Information Daily
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
FFF	foreign-funded firm

GCP	Global Construction Perspective
GDP	gross domestic product
GHG	greenhouse gases
GOV	gross output value
GRI	Global Reporting Initiative
GVA	gross value added
GVAI	Gross Value Added Index
HE	huge enterprise
high-tech	high-technology
HMTFF	Hong Kong, Macao and Taiwan-funded firms
ICCREM	International Conference on Construction and Real Estate Management
IISD	International Institution of Sustainable Development
IPA	importance–performance analysis
ISO	International Organization for Standardization
IT	information technology
IUCN	International Union for Conservation of Nature and Natural Resources
LE	large enterprise
LEED	Leadership in Energy & Environmental Design
m ²	square metre
ME	medium enterprise
MHUD	Ministry of Housing and Urban-Rural Development (China)
MIP-SR	major infrastructure projects' social responsibility
MLP	multi-level perspective (on transitions)
MOF	Ministry of Finance (China)
MOST	Ministry of Science and Technology (China)
MPC	multi-phase concept (of transition)
NBS	National Bureau of Statistics (China)
NDRC	National Development and Reform Commission (China)
NGO	non-governmental organization
NO _x	nitrous oxide
NPC	National People's Congress of China
OE	Oxford Economics
OECD	Organisation for Economic Co-operation and Development

OHS	occupational health and safety
OTDF	other types of domestic firms
R&D	research and development
RIV	relative importance value
RPV	relative performance value
SAL	sustainability attitude level
SASAC	State-owned Assets Supervision and Administration Commission
SBM	sustainable business model
SCC	State Council of China
SE	small enterprise
SEM	structural equation modelling
SNM	strategic niche management
SOE	state-owned enterprise
SO _x	sulphur oxide
SPL	sustainability performance level
SWOT	strengths, weaknesses, opportunities, threats
TBL	triple bottom line
TEF	triple embeddedness framework
TM	transition management
TPS	transition pathway/s towards sustainability
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
URC	urban and rural collective
US/USA	United States of America
WBCSD	World Business Council for Sustainable Development
WCED	World Commission on Environment and Development
WTO	World Trade Organization

Abstract

Despite the massive scale of the Chinese construction industry, there is a lack of adequate awareness of sustainable development within this industry. This study aims to analyse the current status of, and the motivations for and barriers to, the sustainability transitions of Chinese construction enterprises.

Firstly, as the policy environment could significantly influence sustainability transitions, this study holistically examined China's policy landscape for facilitating the transition to sustainable construction. Regulation and control, economic incentives and supporting activities have been identified as the main policy instruments for facilitating sustainable construction in China. Two critical challenges of the policy system are revealed, namely, a lack of consideration of the economic and social dimensions of sustainable construction, and the ineffectiveness of some policies.

This study then examined the transition processes towards sustainability in three leading Chinese construction firms from 2009 to 2013. In total, 29 critical sustainability aspects and 92 sub-aspects of sustainability practices implemented by the case firms were identified. By comparing the implemented sustainability practices with the requirements of three sustainability guidelines, this study revealed that the three firms presented different strategic sustainability behaviours, and that practices towards environmental sustainability are weak compared with practices towards economic and social sustainability.

Subsequently, to investigate how various construction firms in China, other than only the leading firms, perceive and perform in relation to sustainability, a questionnaire was developed based on the 29 sustainability aspects identified from the case study. The questionnaire survey results revealed that quality management and customer service are perceived by the firms as not only the most important but are also the best-performed aspects while supporting community development is the least important and worst-performed aspect. Sustainability attitude is positively correlated with performance, and larger firms tend to have better sustainability performance than smaller firms. However,

larger firms do not necessarily believe sustainability is more important than is the case among smaller firms. Based on k-means cluster analysis and importance–performance analysis, this study then classified the investigated firms into three groups according to their sustainability performance, namely, low-performing, medium-performing and high-performing firms, and identified the transition pathways from low-performing to high-performing firms.

Last but not least, after discovering the transition pathways, this study investigated the various factors driving and prohibiting these transitions, based on an integrated conceptual framework built on the multi-level perspective and triple embeddedness framework of sustainability transitions. The results show that for low-performing firms, the key stimulus for sustainability comes from external socio-political pressures, while economic and industry issues, for example, inadequate incentives present the biggest hindrance. Even though medium-performing firms also regard external socio-political pressures as key drivers, they start to recognize the benefits brought by sustainability, for example, improved corporate image as key drivers. Although high-performing firms clearly acknowledge the economic benefits of sustainability, they still experience complex barriers to sustainability, for example, the inconsistency of policies and the culture of conservatism. Thus, this study shows that China has a long way to go to facilitate sustainable practices in the construction industry.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and, where applicable, any partner institution responsible for the joint award of this degree.

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Date: 9/12/2016

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Publications that Emanated from This Research

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