产业生态学 2.0 (IE 2.0): 中国制造业的发展需要我们探索新的理论前沿 (Industrial Ecology 2.0: Chinese Manufacturing Asking New Integrated Theories)

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Outline:

- Background 研究背景
- Chinese Industrialization and Inspirations as well as Challenges 中国的工业化及其启发和挑战
- New Framework for Industrial Ecology 2.0 as a Solution 产业生态学2.0是否可以是新的理论框架
- Conclusion and Discussions 结论与讨论







Where we fit within the University:

6 Schools: 150 Department and Institutions, 9000 Staffs and 18000 Students http://www.cam.ac.uk/colleges-and-departments







If MANAGEMENT TECHNOLOGY POLICY



"Manufacturing is the full cycle of business process from understanding markets through product and process design to operations, distribution, and after-sales service, taking into account economic, financial and people issues."

对于"制造"概念的新理解

制造是一个从了解市场开始,通过产品与工艺设计,到生产运作和产品分销的整体过程,其中还需要考虑这一过程中的经济,财务,和人员的问题.





Production/Operations Management

生产运作管理的主要内容体系







China's Painful and Enjoyable Developments: How can we understand it more comprehensively?



Chinese Manufacturing Evolutions in the last 35 Years: a general picture

Policies, Legislations, and Regulations for Economic Reform	China stopped its Cultural Revolution in 1976 when its GDP took about Econo	The 7 th 5 Year Plan (1986-1990) mic Environmental	The 8 th 5 Year Plan (1991-1995) Deng's claim of	The 9 th Plan (199 CHN SOE	5 Year 96-2000) Asian Fin	The 10 th 5 Ye Plan (2001-200 China Joined WT ncial Crisis enhanced	ar The 11 th 5 Y D5) Plan (2006-2 O The world	The 12th 5 Year (010) Plan (2011-2015) Chines Circular Economy Provident Law (2000) Sector
and Openness - National - Provincial - Municipal	1.5% of the world, Develop and started its Zone economic reform in 1978.	Enterprise Bankruptcy	socialist market conomy in 1992 encouraged more than 100,000 civil	Further Reforms Chinese central government cont	the Chi Cent strategy tinuously	ese export position I Government made a develop the West C	a Eco-Industry Par and Low Carbon	rk Beijing Consensus n triggered serious
Industrial Sector Level Reforms/Restructures	Starting the contractual responsible system in Chinese countryside in 1978, the reform of state owned enterprise	VW JV Santana La	servants started their businesses. our intensive and onsumer goods	identifies and de new growing ind telecommunicati estates, and exp oriented sectors	velops ustries like on, real ort	Chinese economy ended the shortag economy stage an entered into buyer dominated marke	d Chinese High-speed to project trigger new ra t system development	debates on Chinese industrialisation and development models
Industry Emergence Industry Restructure Business Enterprise	in 1980, & introduction of market systems to replace the central planning systems	localisation in th SOE reform: adapting to the	stries got serious ogresses mainly ough transferring DE resources to vate enterprises.	Chinese equipment r emerged: I	telecommun nanufacturin Huawei, ZTE	company pro Datang, Chinand	nese automotive industry too very quickly became the lar oducer and market in the wo	ik off gest rid mobile internet
and Management System Reform: - Multinational	The 1 st EJV Firm was formed in April 1980 Collective/Commune	market demands China attracted FDI and developed equity	n the national level, hina had its coast regi nanufacturing bases –	on technology	to participate standard dev	new inte lopment gove st	ernational journeys through ernment supports and global trategic resource hunting.	Emerging Chinese Multinational prporations (ECMNCs)
 State Owned Public Owned Private/Township 	Firm Model Emerging Zhejiang Private Firm & Cluster Emerging	widen channels of openness. Township private firms	RD, YRD, Shandong eninsular, and BJ/TJ. In the regional level, pecialised industrial	(CMS) emerged in China. PRD becam electronics and precis		e world and Taiwar he centre for busine hengineering. with sp pioneered its collabor	aiwan's and Zhejiang's usiness model: SMEs ith specialisation and ollaboration for quick	new ansformation from cat hing-up towards overtaking Can Chinese
Industrial Systems For Manufacturing	Dongguan Contractual Mfq Model Emerging	attracted SOE talents to gain faster technology disseminations	o serve both foreign an omestic markets	d virtua	al manufactur	g model.	esponsiveness Sha Pheno Clobal In P	Phenomenon with the future omenon PRD in
Chinese National	Technology & Management countries and Japan includir Management (Business	were introduced from weste ng the scientific mgmt. and T	M Systems achieve their basic	Innovation M from imitati	Nodel: as on to but on or	e world factory aused debates arge vs strong	Manufacturing Ind	e Phone Businessi (6) iustrv Industrial (6) Ecosystems projection
Industrial and Societal Infrastructures, Education, Science, Technology and Engineering Systems	Education Systems were introduced in Dalian and Beijing. One its own Teo Child management s Policy schools	Chinese Infrastructure Development includes 6 ke power, transportation, envir inese 863 High- ch Development Strategic Plan	Tunctions: QCTF areas: resident & busin mental protection, and hina forms s IE (Ind. system in the partments	ness buildings, d IT/Telcom. ncial highway ms were built coast regions	i National Infr Drama	Chinese Mfg. structural Investments cally increased Restructure the nation innovation systems	Call for Chinese Indigenous Innovat National Long and Me for Science and Tech	anagem nt e tion edium T m Strategy mology evelopment
Time: Before 1980s	1980 19	985 1	990	1995	20	00	2005	2010 2015

The Business Collaboration: CMS 七十年代末、八十年代初的"三來一補"







Chinese Industrial System: Firm Level 中国企业如何利用全球化来发展自己……















27_{mins}





AGRICULTURE

中国制造的启示: Inspirations: Why so fast?

- Pursuing prosperity through hardworking and dedication are deep-rooted Chinese cultural traits.
- Well balanced between market and planed economy ambidexterity skills and incremental transformations
- Take advantage of globalised manufacturing
 - developed countries' manufacturing systems
 - robust knowledge for transferability
 - Chinese absorbing capacity
- Good understanding about industrial systems from all levels not only factory, but supply and value networks, regions / clusters ... business ecosystem





Six Levels of Industrial Systems: from factory to national and international industrial systems forming an industrial ecosystem







A Big-M Perspective on Manufacturing







Business Ecosystem (2.0): a holistic & dynamic view





China's Development during the Globalisation















UNITED ARAB **EMIRATES**

IF THE WORLD'S

5.4

Future industrial systems must -



- Cope with radical changes 应对不确定需求
- Be environmentally benign 环境友善和贡献
- Maximise value from resources 资源高效率









China Steel Corporation: from internal towards external/regional integration





台湾中钢公司











Resource Value Cascading Strategy - for the Value Potentials: RbV 3.0

- A tree → furniture →
 paper → fuel → energy
 → fertiliser → new trees
- Different orientations: not only the demands but also resources
- RbV: Competiveness
- NRbV (RbV 2.0): Benefit from and to the Natural Environment







Contributions from different disciplines:

- Economist Circular
 Economy
- Management School Circular Economy and Innovation
- Industrial Engineering saving cost and energy and improve efficiency
- Energy and Resource Management/Optimisation
- Environmental Engineering



Source: www.bfi.org







Ontcomes: 1. Ind. Systems 2. Ind. Ecosystem for Longer Term Sustainability 3. Ind Ecosystem Mgr. J. 4. Tool Box for IE^{2.0}





产业生态系统的设计、构建及其培育的概念模型



Key Building Blocks of IE 2.0: (IE 2.0 = IE 1.0 + BE 2.0 + RbV 3.0)

1. Classical Industrial Ecology (IE) 1.0 (page 3-4):

- Cleaner Production Technology
- Industrial Symbiosis
- Circular Economy

2. Business Ecosystem (BE) 2.0 (page 5-6):

- Classical Business Ecosystems
- Dynamic and Holistic Model of Business Ecosystems

3. Resource based View (RbV) 3.0 (page 7-8):

- Resource based View focusing on organisational resources
- Natural Resource based View focusing on the interactions between natural and organisational resources
- Resource cascading strategy for its potential values





A Simplified Mapping about Industrial Ecology (IE 1.0)



A Simplified Mapping for Business Ecosystems



A Simplified Mapping for RbV Theories

How:

- Design/nurture process
- Strategy process
- Evaluation process

Health assessment	Emergence of			
 What: Constructs Machaniama RBV was first raised by Wernerfelt in 1984. The roots of RBV trace back to 	e.g. Rumelt, 1984; Barney, 1986 &1991; Montgomery & Wernerfelt, 1988; Peteraf, 1993: Amit &	RbV 2.0 - Natural Resource-Based View (NRBV) Hart, 1995;	e.g. Aragón-Correa& Sharma, 2003; Barney et al. 2001; Bharadwaj, 2000; Chan, 2005; Das &Teng, 2000; Lavie, 2006; Peng, 2001; Richard, 2000; Wade, 2004; Wang & Barney, 2006; Barney & Clark, 2007; Hoopes & Walker, 2003; Kraaijenbrink et al. 2010; Priem& Butler, 2001; Sirmon et al., 2007	RbV 3.0 – Transforming and optimising resources into value
 Mechanisms Ricardo's insights (1817) Configuration into land rents and Capabilities Adaptations Evolutions 	Schoemaker, 1993; Dierickx & Cool, 1989; Grant, 1991; Kogut& Zander, 1992; Mahoney & Pandian, 1992;	Grant, 1996; Oliver, 1997; Teece, 1997; Coff, 1999 Phase 2: started from the middle of		e.g. Sirmon et al., 2011; Schmidt & Keil, 2013; Jensen et al., 2015; Biggs, 2016; Bromiley
				& Rau, 2016
Why &		the 1990s, dynamic	Phase 3: RBV has been widely applied and enriched through empirical studies since 2000. Focus: Building micro-foundations of	Phase 4: Inter-linkage and synthesis with
What For:Why does it emergeNew requirements	RbV 1.0 – Classical RbV Phase 1: Introduction and definition; historical theoretical comparisons; preliminary	and resource appropriation by different stakeholders,		other theories; relations between RBV and sustainability. Focus on <i>resources</i> <i>and its Impacts</i>
New contextsTriggers	strategy models. Focus: competitive advantage, resource attributes.	spin-offs of RBV	capabilities in a dynamic environment.	
	1990	200	00	20 UOIVERSITY OF



IE2.O的意义所在:它不仅仅可以是新的学科 宗和与创新体系;而且更重要的应该是中国给世 界的一个交代:第二大的经济体不再指望天塌 下来有高个子顶着啦,工业化的中国能够解决 人类可持续工业化和健康发展的问题!





Chinese Manufacturing Evolutions and Inspirations: IE 2.0 for the Future







Take-away希望你们带走些什么呢

IE2.0 = IE1.0 + BE2.0 + RbV3.0

- IE = Industrial ecology
- BE = Business ecosystem
- RbV = Resource based View

产业生态学2.0(IE2.0)是在经典的产业生态理论基础上, 结合动态的商业生态系统理论(BE 2.0),以及基于资源价 值创造的梯度开发过程的第三代资源观理论(RbV 3.0), 试图以产业系统及其生态系统为研究与管理对象,探讨它 们之间的相互依存关系和动态演化机制,为产业发展和环 境友善提供基础理论和实践方法的一个综合性新兴学科。

FIN MANAGEMENT TECHNOLOGY POLICY CAMBRIDGE

Business Ecosystem Industrial Ecology Resource based View (RbV3.0) Approach (IE1.0) Approach (BE2.0) Approach Scaling-Up Inventina Adapting Generating Expanding business Industrial System Innovative ideas. capacity to cope with responses to the Product design & market growth and environmental business models competition requirements changes Impacting Activating Integrating Operating Identifying all kinds Industrial system Motivating dormant Industrial system resources and raising operations and fragmented feedbacks to the funding to integrate management to resource pool resource pool fragmented resources achieve higher UNIVERSITY OF into a team efficiency - IT VEIGT

A Process based Model for Industrial Ecosystem usiness Ecosystem Resource based View Industrial Ecology

产业生态学2.0作为一 个跨学科的理论框架, 能够给予不同的工业发 展相关学科一个共同的 知识积累的理论平台。



Thank you very much!

Questions and Discussions

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