An absorptive capacity perspective on innovation in the Dutch and Chinese seed industry

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Introduction

- Objective

  ➢ *what are the key success factors that affect the innovation process at the project level of the Dutch and Chinese vegetable seed industry ?*

- Why?
  ➢ Innovation is costly, time-consuming and uncertain.
    - found that 44% of all innovation projects fail to achieve their profit target, 1/7 product concepts becomes a new product winner (Cooper and Edgett, 2009).
  ➢ The seed industry is highly recognized as an innovation-driven industry
  ➢ Average R&D budget (% of turnover)
    - in the Netherlands: 19%
    - in China: 13%

The leading position of Dutch vegetable seed industry

Top 5 Import and Export countries of Vegetable Seeds

Ranking of vegetable seed companies
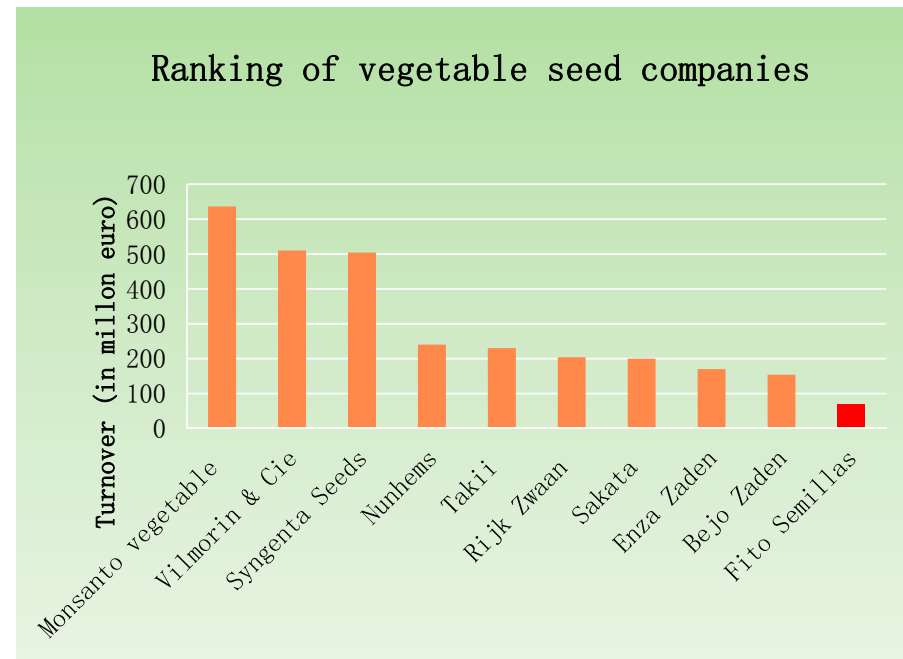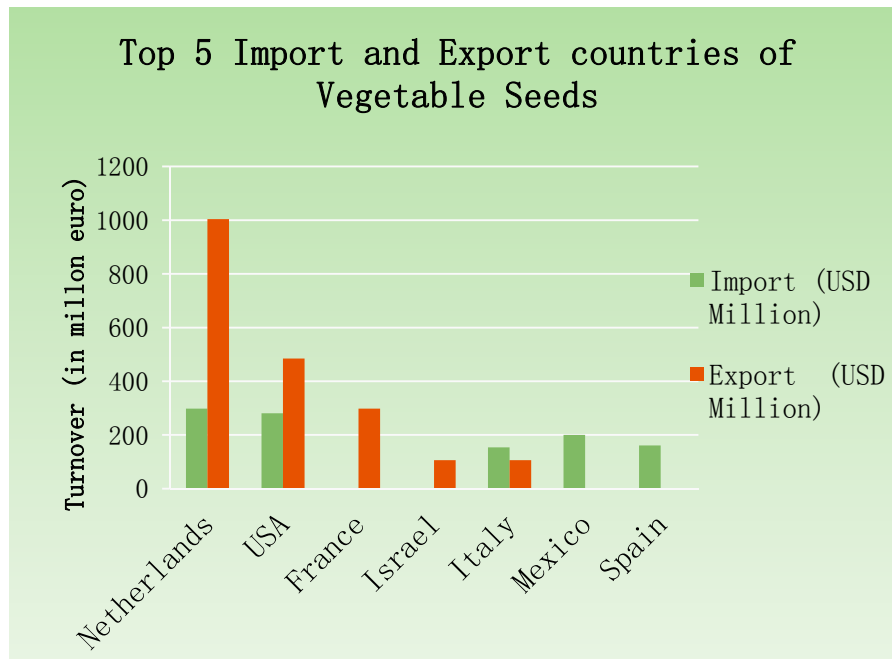
- The Netherlands is the largest vegetable seed import and export countries

- 9 of the world top 10 vegetable seed companies originated/located in the Netherlands

Huge market and large potential of Chinese vegetable seed industry
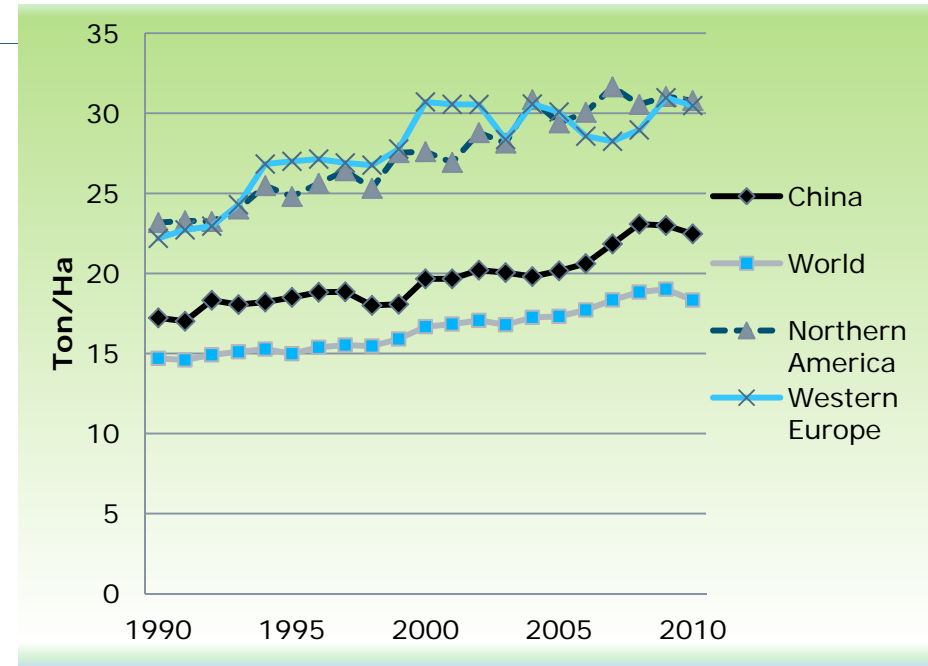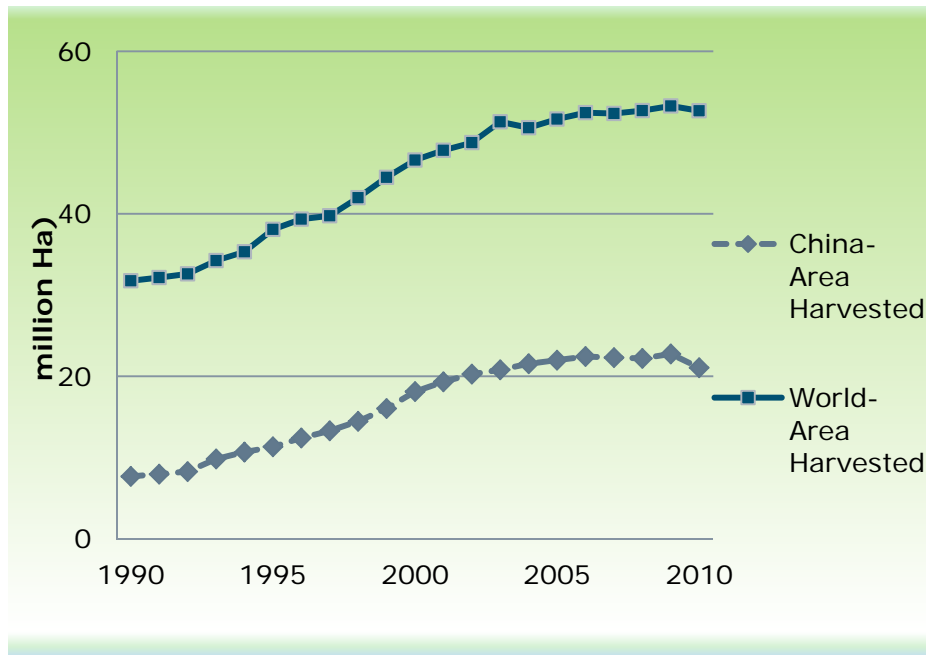

- One of the largest market
  - 22 million ha harvested area in China, accounts **42%** of total world vegetable harvested area
  - 500 million tons vegetable production, accounts **52%** of total world vegetable seed production
- In 2009, the average yield was about **1/3 lower** than Northern America and Western Europe.

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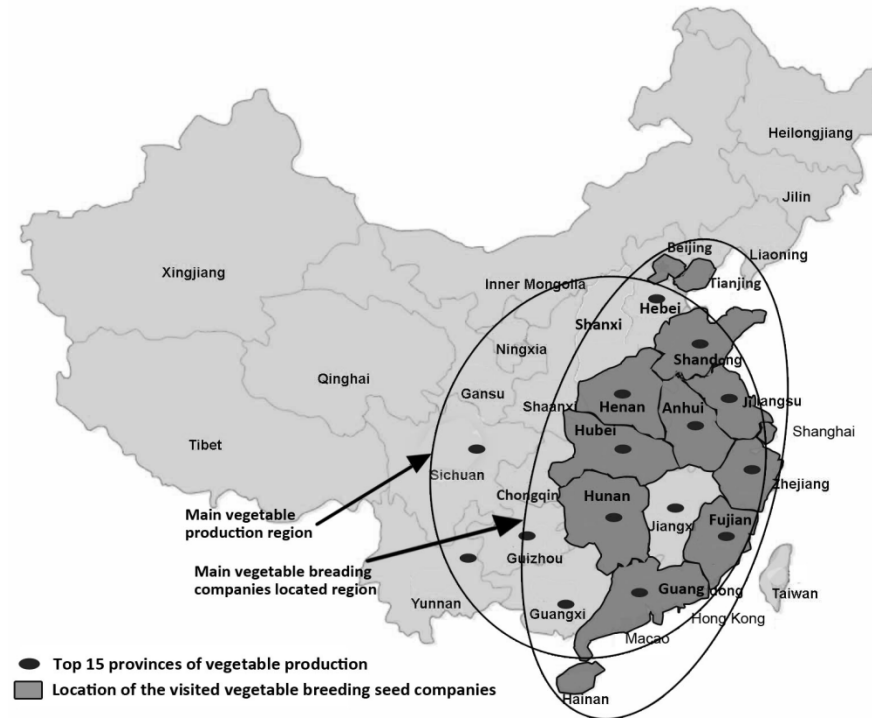WAGENINGEN UR

Source: FAO

Conceptual Model

- Interpret the innovation process at project level as four stages: acquisition, assimilation, transformation and application.

- as innovation projects aim to integrate, build and transfer internal and external competences into new commercial products/processes
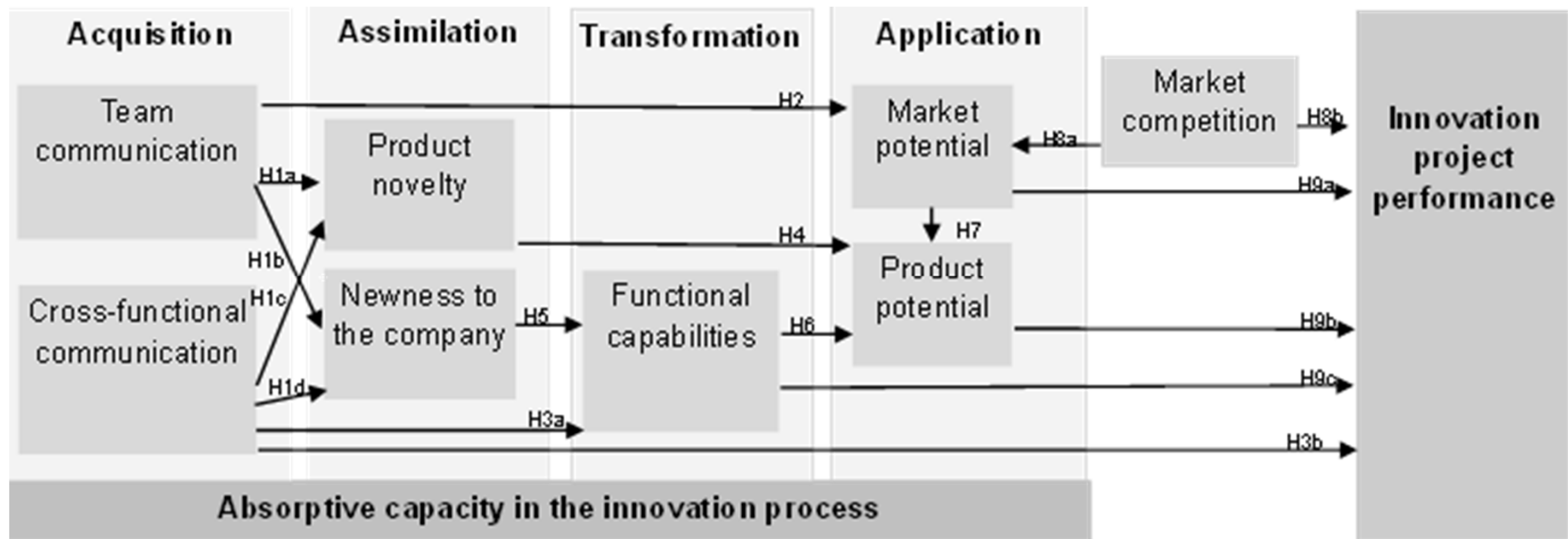
Methodology

- Literature review

- Pilot case studies

- Survey in 10 Dutch and 36 Chinese VBCs (vegetable breeding companies: >=10 employees, R&D investment, vegetable focus)

- 68 valid questionnaires

- SPSS and PLS

- Top 15 provinces of vegetable production
- Location of the visited vegetable breeding seed companies

Private family-owned companies		Part of multinational companies
[1]Large	• Rijk Zwaan • Enza Zaden • Bejo Zaden	• Monsanto Vegetable Seeds - Monsanto • Syngenta Seeds – Syngenta • Nunhems - Bayer Crop Science • Nickerson-Zwaan – Vilmorin & Cie • Takii Europe - Takii
[2]Small	• Pop Vriend Seeds • Agrisemen	

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Result(1): Structural model
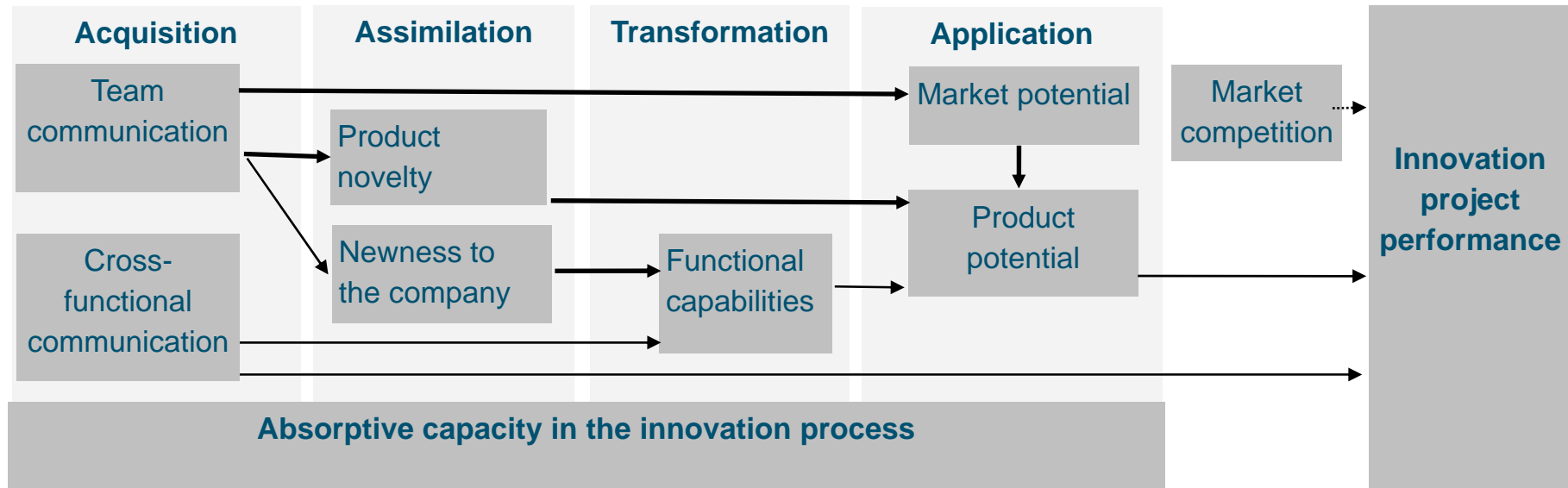
- item reliability (factor loading): >0.7

- internal consistency (composite reliability): >0.8

- Path coefficients and t-value (next page)

- discriminant validity: (next page)

- Goodness of Fit: 0.51 (GoF 0.10(Small), 0.25 (Medium) and 0.36 (Large))

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Result(2): Path coefficients, t-value and effect size

	Path Coefficients (β)[1]	T-value	f2-value[2]
Product novelty (R^2=0.12)			
Team communication	0.39***	3.01	0.13
Cross-functional communication	-0.11	0.68	0.01
Newness to the company (R^2=0.09)			
Team communication	0.31**	2.20	0.08
Cross-functional communication	-0.02	0.13	0.00
Functional capabilities(R^2=0.22)			
Cross-functional communication	0.25**	2.07	0.08
Newness to the company	0.37***	2.77	0.28
Market potential(R^2=0.20)			
Team communication	0.42***	3.22	0.18
Product potential(R^2=0.57)			
Market potential	0.47***	4.61	0.42
Product novelty	0.33***	3.17	0.20
Functional capabilities	0.21**	2.46	0.09
Innovation project performance(R^2=0.47)			
Market potential	0.23	1.16	0.05
Cross-functional communication	0.23**	2.30	0.06
Product potential	0.36**	2.03	0.06
Functional capabilities	-0.15	1.37	0.04
Market competition	0.36*	1.93	0.13

- [1] * Path coefficient is significant at 0.1 level (2-tailed); ** Path coefficient is significant at 0.05 level (2-tailed); *** Path coefficient is significant at 0.01 level (2-tailed).
- [2] f2-value of 0.02, 0.15 and 0.35 can be viewed as gague for whether a predictor latent variable has a week, medium or large effect at the structure level.

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Result(2): Discriminant validity of constructs

	Mean	S.D.	AVE	CR	1	2	3	4	5	6	7	8	9
1.Team communication	7.72	1.35	0.60	0.81	**0.77**								
2. Cross-functional communication	8.13	1.30	0.68	0.86	0.49**	**0.82**							
3.Product novelty	5.77	1.82	0.54	0.85	0.33**	0.07	**0.73**						
4.Newness to company	4.91	2.02	0.65	0.84	.028*	0.13	0.50**	**0.81**					
5.Functional capabilities	6.30	1.85	0.73	0.92	0.18	0.245*	0.15	0.39**	**0.85**				
6.Market potential	7.67	1.15	0.56	0.88	0.46**	0.25*	0.38**	0.08	0.21	**0.75**			
7.Product potential	6.82	1.61	0.62	0.92	0.22	0.03	0.55**	00.37**	0.36**	0.65**	**0.79**		
8.Market competition	8.25	1.71	0.88	0.94	0.40**	0.56**	0.04	-0.05	0.21	0.23	-0.04	**0.94**	
9.Innovation preformance	7.70	1.30	0.66	0.92	0.50**	0.44**	0.13	0.00	0.13	0.50**	0.35**	0.50**	**0.81**

- The bold numbers on the diagonal are the square roots of the variance shared between the constructs and their measures (square root of average variance extracted, refer AVE). CR refers to composite reliability and Off-diagonal are the correlations among the constructs.

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Conclusions

- Team communication and cross-functional communication plays different roles in the innovation process.

  ➢ Individual communication for acquisition and assimilation stage

  ➢ Team communication for transformation and application stage

- Innovation project newness stimulates the improvement of functional capabilities, when the product development cycle is long and communication is ensured.

- In the Chinese and Dutch vegetable seed industry, market potential has stronger effect on the product potential than the product novelty and functional capabilities.

- Product potential has directly affect while market potential has indirect affect on the innovation project performance.

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Questions?

Thanks!

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