Preliminary Study: Influence of Cultural Differences on the Innovation Process Between Chinese and Germans

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Abstract. The success of companies in the industrial sector is highly dependent on innovation. China is the biggest industry nation in the world and Germany is well-known for its engineering and innovations. The differences and conflictions between Chinese and German culture appear in the innovation process. We designed a questionnaire based on Hofstedes cultural model and the stage-gate innovation process to study these differences and elaborate guidelines to encourage innovation in Sino-German companies. We surveyed 92 participants from China and Germany. Furthermore, four semi-structured interviews were conducted with top executives for qualitative data collection. The results suggested that Chinese might be mainly influenced by the concept of power-distance and face, whereas Germans might be influenced by uncertainty avoidance during the innovation process. We developed guidelines to understand the national cultural influence on the innovation process and to manage Chinese and German engineers in this process.

Keywords: Cross-cultural studies · International management · Chinese and German engineers · Innovation · Innovation process

1 Introduction

The success of companies in the industrial sector is highly influenced by the innovation power [3]. Innovation can create a balance between efficient operations and future opportunities [4]. In the middle of the 20^{th} century most people thought that innovativeness is highly correlated with Research and Development(R&D) spending. Nowadays scholars focus more on soft factors like cultural influences as main drivers for successful innovations. Furthermore, mismatched cultural conditions cause frictions within companies [6].

An innovation is something original, new, and important in whatever field that breaks into a market or society [7]. Recent research shows the role of organizational culture for enabling organizations to translate innovation activities

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into real performance improvements. One of the most important models is the stage-gate innovation process. It contains six phases as shown in Fig. 1. These six phases consist of cross-functional and parallel activities which are undertaken by a team of employees from different departments [11]. A complete innovation process starts from the idea generation stage, and a successful process should pass each check gate then comes to the final market launch stage.

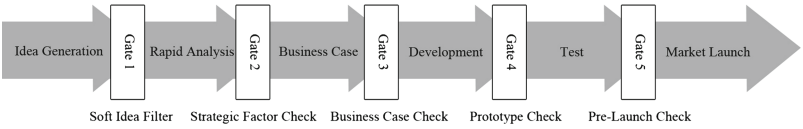

Fig. 1. The stage-gate model of innovation process [11,12]

China is one of the biggest industry nations in the world and Germany is well-known for its engineering and innovations. Due to globalization needs many German companies build plants in China, but the two countries have very different cultural backgrounds. Yang states that Chinese management style is based on three different pillars: Confucianism, Socialism and Capitalism, whereas German management was highly influenced by the American capitalism [13].

Culture is the patterns of thinking, emotions, and behavior in a society that reflects traditional ideas and values [10]. Cultures are contested, ever changing and emergent, they are invented and reinvented in social life [2]. Hofstede created a cultural model and identified four dimensions that he named individualism (IDV), masculinity (MAS), power distance (PDI), and uncertainty avoidance (UAI) [9]. Yang added long-term orientation versus short-term orientation to life (LTO) as the fifth dimension [14].

Due to different scholars' background there is not one single research approach to conduct cross-cultural research [10]. Four major groups conducting cross-cultural research are anthropologists, psychologists, statisticians, and qualitative-minded researchers by different methods, such as interviews, experiments, statistical tools etc. To gain a broad insight into the cultural influence on the innovation process, we author chose a combination of quantitative data collection by surveys as well as qualitative datas via interviews. Weused Eisenhardts case study approach to prove framework for the research [5]. Based on preliminary result, we made inference of the culture effects on innovation process and developed guidelines to understand the cultural influence on the innovation process and to manage Chinese and German engineers in this process.

2 Method

2.1 Quantitative Data Collection

There are three levels of factors influencing the innovation process of companies: micro, meso and macro level. The micro level involves forces addressing the

companys own culture. The meso level is the transactional level consisting of market forces like suppliers or strategic alliances. The micro and meso level influences are kept to a minimum by a broad scope of participants from different companies since this study aims to analyze the macro level influenced by national cultural characters.

For measuring the influence factors on the innovation process, the authors used Archarya scaling questions. The importance of each factor was rated on a 4 step scale. The "1" meant very unimportant and "4" meant very important [1]. The final questionnaire consisted of five stages directly related to the stage-gate innovation processes including 17 questions addressing Hofstedes five cultural dimensions (see Table 1). The English questionnaire was translated into the mother tongues of the participants (Chinese and German) to avoid any misinterpretation due to a foreign language.

2.2 Qualitative Data Collection

We conducted semi-structured interviews to collect qualitative dataenhancing controversial discussion with the experts. This method enabled the authors to investigate the root causes of cross cultural issues in the innovation process. Based on Gubrium guidelines, the interviews started with a self-introduction and an expectation exchange [8]. Afterwards the improvement possibilities and problems during each of the six stages in the innovation process were discussed. These interviews ended with open questions to further investigate and to ensure a deep understanding of the ideas. The participant for the interviews were chosen based on their relevant experience of managing Chinese and German engineers in the industrial sector. Four senior executives with different education and working background took part.

3 Results

3.1 Questionnaire Results

Participants. The web-based questionnaire was filled out by 28 Chinese (36 % female, 64 % male) and 64 German (23 % female, 77 % male) managers. With most subjects in the age of 21–29. Chinese and Germany participants had similar education background (about 50 % rewarded a Bachelors Degree or equivalent).

Factors in Each Innovation Stage. Due to the limitation of the sample size and the unbalanced amount of feedbacks from Chinese and Germany participants, the author gave intuitive inferences and suggestions rather than conducting statistical comparisons. The preliminary questionnaire result revealed similar findings as previous research showed. Chinese tend to have a high score in power distance, low in individualism, and compared to Germans a long-term orientation during the innovation process.

Table 1. Questionnaire items regarding the five cross culture dimensions

Stage	Question	Detailed Items	Dimensions
Idea generation	Important factors and triggers	Regular formal meetings	PDI
		Internal/External sources/events	IDV
	Responsible person	None	PDI, LTO
	Key driving person	None	PDI, LTO
	Motivation tools	None	MAS
Analysis of ideas	Employees to proceed or discontinue a proposal	None	PDI
	Important factors and triggers	Personal experience, use of structured methods, knowledge of competitor/customer	UAI
		Predictability of the market	LTO
		Idea generation direction	UAI
Development	Leadership style	Led by top-management, middle manager or by engineers	PDI
		Autonomous teams	MAS
Test stage	Ways to handle problems	None	IDV
	Importance of standardized methods and tools	None	UAI
	Management style for on time test	None	UAI
Market launch	Reasons for success	Proximity to authorities	IDV
		Proximity to customers	LTO
		Innovation process management	MAS, PDI
		R&D funding	UAI
		Teams and engineers	IDV

* IDV - Individualism(MAS)
* MAS - Masculinity
* PDI - Power Distance
* UAI - Uncertainty Avoidance
* LTO - Long-term Orientation to Life

Figure 2 showed how the participants assessed the four factors regarding the generation of new ideas. For the factor formal meetings, Germans assessed it in the middle of the range important to very important while Chinese ranked this factor between important and unimportant, revealing a difference towards the idea of PDI. Thus the form of meetings should be carefully designed in a cross-cultural company in the idea generating stage.

For the responsible person of idea generation, we concluded from Fig. 3 that Chinese tended to assess managers more important for the process to generate new ideas. Germans assessed the involvement of engineers as more important in comparison to the Chinese participants. 83 % of the Chinese participants

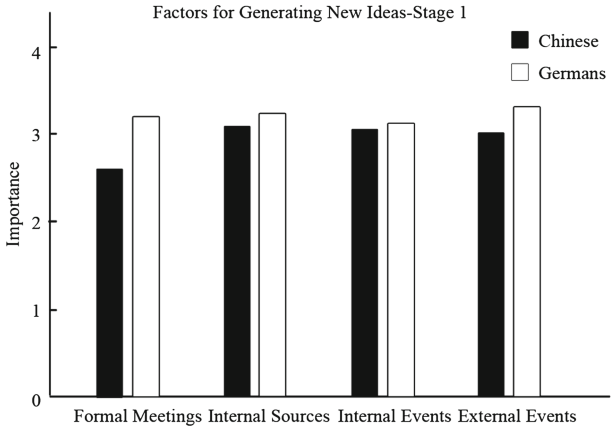

Fig. 2. Factors of generating of new ideas-Idea generation stage

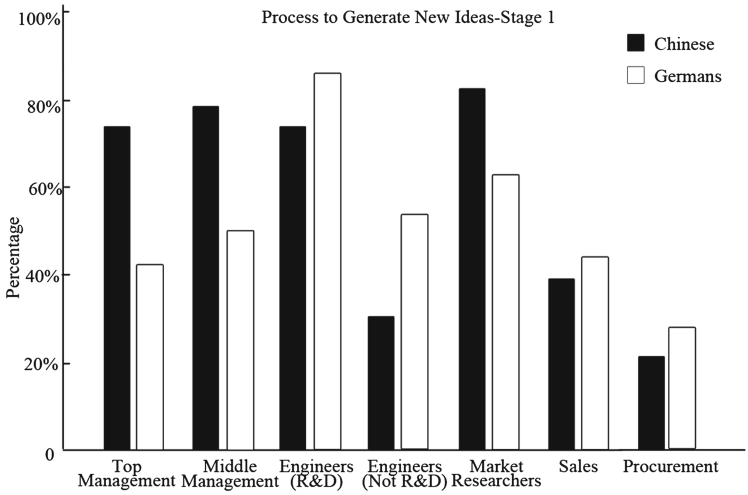

Fig. 3. The responsible person-Idea generation stage

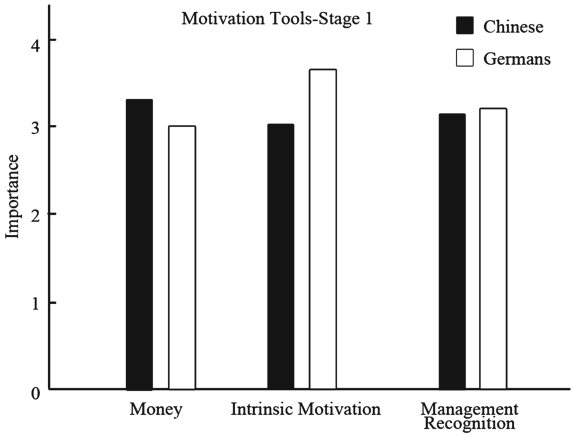

Fig. 4. Motivation tools C Idea generation stage

evaluated market researchers as important for the process, but only 63 % of the Germans. This suggested that Chinese have a higher power distance.

Regarding motivation, Chinese participants tended to rate money as motivation tool for generating innovative ideas a bit higher than German participants. The intrinsic motivation, e.g. the ability to improve something, was very important for the German employees (see Fig. 4). The difference in the masculinity dimension could not be proven directly through the scores.

Demonstrated in Fig. 5, Germans rated the knowledge of customer needs 0.5 higher than the Chinese participants. This could be an indicator for long-term orientation. Chinese evaluated the origin of the idea much higher than German participants, about 0.9 which was the biggest difference of all factors. Chinese seemed to have low uncertainty avoidance from the result.

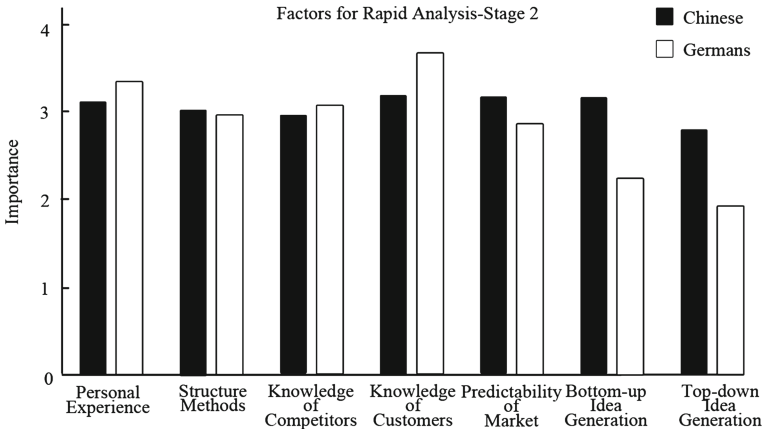

Fig. 5. Factors for rapid analysis-Rapid analysis stage

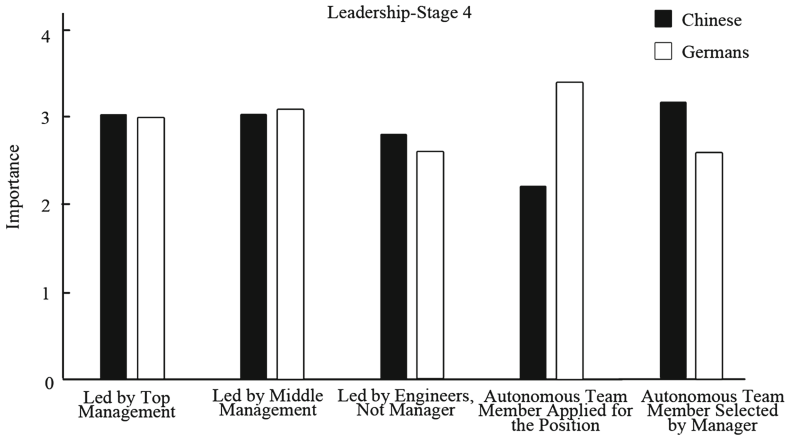

Fig. 6. Leadership style-Development stage

For the development stage, an opposite result was found regarding autonomous teams between Chinese and Germans. If members in the team were staffed by managers Chinese assess them as more important. If employees were staffed afterwards to an autonomous team, Germans evaluated it 1.2 higher than the Chinese participants. Concluding this, power distance is a big difference between these two cultures (Fig. 6).

When facing an occurred problem, Chinese tended to solve it in a team while Germans preferred to solve it individuality (Fig. 7). It revealed the difference in IDV.

A LTO difference appeared in the test stage. The Chinese participants thought that long-term planning, on a monthly or less than a monthly basis

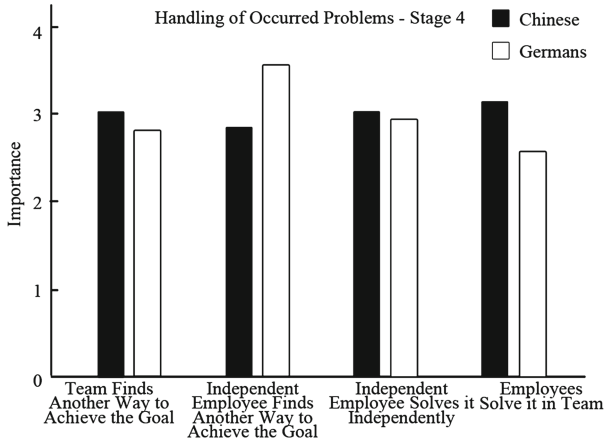

Fig. 7. Ways to handle occurred problems-Development stage

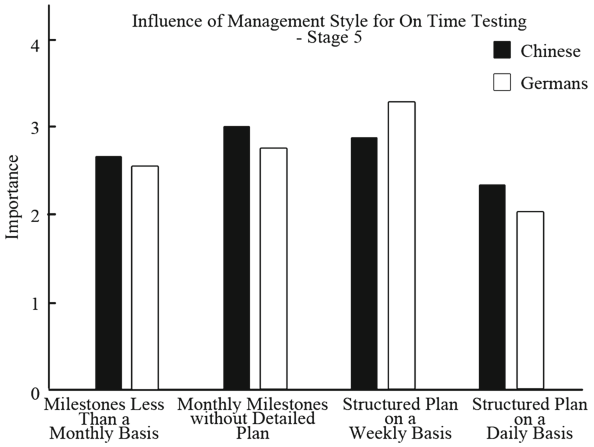

Fig. 8. Management styles for an on time testing C Test stage

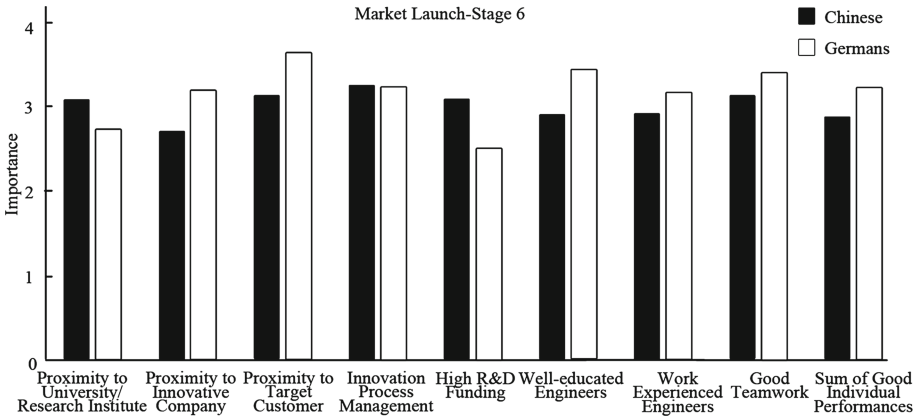

Fig. 9. Reasons for successful market launch - Market launch stage

was slightly more important, whereas Germans preferred a structured planning on a weekly basis. Both Chinese and German do not consider planning on a daily basis as really important for the on time testing, shown in Fig. 8.

The following Fig. 9 visualized the assessment of factors regarding a successful market launch. Chinese tended to rate the proximity to leading universities higher as a success factor for the market launch. For Germans the proximity to innovative companies and the proximity to customers was more important, the result blurred the difference of Germans and Chinese in IDV and LTO dimensions. High R&D funding was rated by the German engineers with a score of 2.46; whereas Chinese rated it with 3.09, indicating a lower uncertainty avoidance need. The education, work experience, good teamwork, and a sum of good

individual performances was more important for the German participants showing a individualism character.

3.2 Interview Results

Overall more than seven hours of interviews were conducted with the four experts. One interview was conducted face-to-face, the other interviews were conducted via telephonical system. All interviewees agreed that the interviews were recorded for recapitulation. The quantitative insights were used to elaborate the guidelines.

Based on the interviews main improvement points for the collaboration between Chinese and German engineers are communication strategies, handling of guanxi(Chinese term of relationship), handling of a collectivist/individualistic culture, and understanding of pragmatism versus sticking to plans.

4 Conclusion

Discovered the underlying influence of culture during the innovation process in cross-cultural companies, we focused on two very important countries for innovations in the industrial sector: China and Germany. Their national cultures and their historical influences are very different. This leads to frictions and preventable problems during the innovation process in Chinese-German working environments. The authors analyzed the differences with a questionnaire for qualitative data and interviews for qualitative data gathering. Based on this data, guidelines for managers were elaborated. The result confirmed most of the factors revealed by former researchers. The derived guidelines are described in the following:

- Formal meeting structures are more important for Germans, but German managers should consider conducting 1-on1 meetings to discuss negotiable points in advance with Chinese engineers who could be afraid to lose face in bigger meetings.
- Chinese having a long-term oriented culture tend to think longer about innovative ideas before offering them. Due to this fact, foreign managers should be aware that their employees spend a lot of effort to elaborate the idea and should never directly reject them.
- Chinese engineers overall accept monthly milestones. Being aware of the possibility to pragmatically skip parts of the structured proceeding to enhance a faster innovation process and therefore more time for testing the prototype.
- Hierarchy is very important in China, thus German employees should be aware to stick to the hierarchical order.
- Chinese managers should be aware that most Germans think of engineers as most important persons and main driver for the innovation process. This can lead to conflicts with Chinese for whom hierarchy is more important than the department background.

- In Germany on-the-job trainings and further education is very popular on all hierarchical levels, but in China most companies do not spend much effort in the further education of their employees. German joint-ventures in China should try to be an exception and start with trainings, e.g. soft skills, or intercultural communication abilities. Furthermore, this probably decreases the employee fluctuation.
- According to the interviewees a lot Chinese engineers are afraid of making mistakes when they speak English. Therefore Western managers should try to create a comfortable setting while discussion in a foreign language.
- Managers could use official awards which will please both the German employees who are more driven by the intrinsic motivation to improve something and the Chinese employees whose face would be strengthen due to such an award.
- According to the interviewees the best possibility to enhance the intercultural collaboration between Chinese and German is sending the employees to the other country to get used to the specific national business habits.

Though most of the findings consist on the former studies that Chinese were less individualized and stressed more on relationship, having long-term thought rather than short-term, results on the uncertainty avoidance dimension needed to be check further since some mismatch findings occurred. It might be caused by the culture transportation and more competitive environments in the rapid innovation process.

This research dealt with national cultural influence on the innovation process. Although this process is very important for companies in the industrial sector, there are a lot more processes in companies which influence its success. Further research could analyze e.g. the national culture influence on strategic decisions or the marketing.

All in all only two different cultures C Chinese and German - were analyzed. In total 92 questionnaires were collected due to the spread method of the surveys, and the amount of the samples were unbalanced with 28 Chinese against 64 Germans. Considering this issue, the author did not conduct strict statistical comparisons to test the significance of difference on each item, but gave preliminary findings on the tendency of performance between Chinese and Germans. These tendency was used to elaborate guidelines for managers in Sino-Germany Companies to encourage innovations. In future research, more samples should be collected and statistically compared to convince the result.

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