With License to Build

Chinese Offshore Wind Firms Rejecting European Certificates

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Abstract:

This paper examines the role of six European certification firms, and how they attempt to position themselves in China's offshore wind industry. These firms may be seen as intermediaries in technology development processes, and we examine their importance in an emerging renewable energy industry in China, offshore wind. We find that European certification firms lack attention to local needs and struggle with differences in risk perceptions. Chinese companies, on their part, stress the importance of first-hand experience rather than foreign involvement in project development, making the efforts of European certification companies redundant. We therefore conclude that the Chinese development strategy is in opposition to established European certification practices: From a Chinese perspective, the European approach looks like over-engineered project development, whilst in China taking risks, gaining access to necessary experienced and 'independent' knowledge is seen as a precondition for developing the offshore wind industry.

Highlights:

- European certification agencies have been unsuccessful in selling their services to companies in China's emerging offshore wind industry due to differences in risk perception, views on the service industry and lack of attention to Chinese needs
- European certificates are unwanted in China because Chinese companies stress the importance of gaining first-hand experience
- Intermediaries coming from abroad are not important in China's offshore wind industry, and this is also likely to be the case for other Chinese industries
- The right design for innovation policy and risk regulation must be evaluated locally

Keywords: certification, intermediaries, innovation, China, offshore wind

1. Introduction

China is the world's most populated country, and 80 per cent of its electricity generation is fuelled by coal power (EIA 2014). This makes China the single most important country in terms of global greenhouse gas emission mitigation. The nation's almost insatiable electricity consumption is also one of the reasons why China is the world's largest investor in new renewable energy industries (FS-UNEP 2015), such as the offshore wind industry where Chinese companies are eager to get a head start. Such development is motivated by concerns related to ensuring energy security, developing industry and increasing the percentage of renewable energy in the energy mix as a way of cutting CO_2 emissions (Ydersbond and Korsnes 2016). The development of offshore wind energy is currently high on the agenda of many countries. Whilst the European Wind Energy Association set a target of 40 GW of installed offshore wind capacity by 2020 in Europe, the twelfth five-year Plan for Renewable Energy (2012) of the Chinese government had the ambitious goal of installing 30 GW of offshore wind capacity by 2020. At the beginning of 2016 EU-28 had more than 11 GW installed offshore wind capacity, whilst China had 1GW (GWEC 2016; EWEA 2016). Europe has around 25 years of experience with offshore wind, and the first wind turbine was installed offshore in 1991 in Denmark. China has around 10 years of experience, as the first turbine was installed in 2006 in Bohai Bay outside of Beijing.

We study the role of European certification firms in China's offshore wind industry development. Certification refers in this paper to the work of advisory and certification agencies. Both agencies work with international standards, and often one company has a certification and an advisory branch. The main difference is that advisory firms are able to perform and contribute with tacit and explicit knowledge and experience, whilst certification agencies merely point to issues that do not accord to standards without providing advice on how the issues may be resolved; hence, they often provide scope for advisory agencies. Certification has exploded over the past 25 years (Bartley 2011), and certification companies have been considered important intermediaries in technology development and transfer settings (Bessant and Rush 1995; Howells 2006). As risk and uncertainty have become fields to be 'managed' (Power 2007), certification firms have arguably gained an important role by providing evidence that a technology will function within a given set of conditions. Moreover, as certification firms certify products and processes according to internationally acknowledged standards, they may be seen as maintenance agents of standards (Timmermans

and Epstein 2010). Nevertheless, there is a surprising lack of research critically assessing the increasing role that certification firms have taken.

Thus, by better understanding the roles and strategies of European certification firms in the development of offshore wind energy in China, we also aim at discerning how these strategies may impact technology development in China. China's offshore wind industry here serves as a case in point as we aim at elucidating how certification procedures are introduced and welcomed in a new setting, and how these impact innovation and technology development in China.

2. Certification, Intermediaries and Technology Development

Risk is a central concept to certification agencies. Risks are evaluated differently depending on criteria that are open for interpretation in different contexts (Pesendorfer 2011). Therefore, success in selling services related to risk reduction depends on the persuasive power of risk management companies such as certification agencies in convincing others that their knowledge will make products and processes safer. A subsequent question arises: How do these companies provide legitimacy for their endeavour? Legitimacy within an auditing system is nested in a circle wherein involved actors check on each other to ensure that standards are maintained (Busch 2011). In this circle, certification agencies certify according to internationally acknowledged standards, and certification agencies are, in turn, accredited (i.e. certified) by international organisations and governments (Gustafsson and Tamm Hallström 2013). Hence, as European certification agencies attempt to access China, they must make sure that: 1) risks are assessed similarly and 2) they, as certification agencies, are acknowledged as legitimate actors to carry out the certification process.

Certification agencies certify products and processes according to a given standard. The development of standards is always contingent on local work, in the sense that each location develops and interprets their own standards. Thus, standards are not automatically universal, and Timmermans and Berg (1997, 275) have instead referred to *local universality*, as standards emerge from 'localized processes of negotiations and pre-existing institutional, infrastructural, and material relations'. Tensions between local practices and the universality of standards are central to this paper. A recent study by Ponte and Cheyns (2013) has shown that complying with standards or partaking in the development of standards can be more

difficult in developing countries, as such countries lack resources or are not familiar with the 'rules of the game'. Although China is not a developing country per se, complying with or developing standards may be more difficult for 'latecomer countries' such as China, as it has not had as much influence over and experience with the international standardisation system as Western countries (Ernst 2013).

In terms of technology development, certification agencies can be grouped under the more general concept of 'intermediaries'(Stewart and Hyysalo 2008). Intermediaries can play various roles in an innovation process, but generally act as brokers between two or more parties at any stage in the process (Howells 2006). Moreover, it is generally established that intermediaries are important in the process of transferring knowledge and technology 'across people, organizations and industries' (Hargadon and Sutton 1997). Within innovation studies, various types of intermediaries functioning as knowledge brokers have been proven central in technology development as facilitators of knowledge exchange and learning processes (Bessant & Rush 1995; Howells 2006; Kivimaa 2014). Intermediaries can be people or organisations that adapt a technology to better fit with user needs (Russell & Williams 2002), and they can be said to perform three main roles: configuring, facilitating and brokering (Stewart and Hyysalo 2008). They facilitate by providing opportunities to others. They configure by providing interpretations, and by actively creating content, setting rules and defining priorities of use, and they broker by representing and raising support for spokespeople of a technology (ibid.). Some studies have focused on the way in which certification agencies participate in the development of international standards (e.g. Gustafsson and Tamm Hallström, 2012; Higgins and Tamm Hallström, 2007), and there have been several studies on the role of consultants in innovation processes (e.g. Sturdy and Wright 2011; Wright et al. 2012). However, little research has been done on the way in which intermediaries perform their work and how they work to get new clients (Pollock and Williams 2010). This form of active work to recruit clients becomes central in a new market context, such as China, where certification services are not as common as in Europe.

To be sure, several factors are relevant to understand innovation and technology development in a Chinese context and all cannot be covered in a short paper. Two factors relevant to certification and standards are 1) China's focus on 'indigenous innovation' and 2) the role of knowledge sharing. First, through China's 'indigenous innovation' programme, expressed in the 15-year plan issued in 2006, China aims to transform into an 'innovation-orientated nation' by 2020. The plan details how it will deal with issues such as technological

dependency and domestic innovation, environmental concerns and resource utilisation, as well as human resources and education (Cao et al. 2009). This also involves an effort to develop international standards to enhance national power and international influence (Kennedy et al. 2008; Ernst 2011). Second, Chinese actors have been claimed to 'believe in the positive role of science and technology while there is a weakness in social capital—values, norms and trust that are shared by the social community' (Gu et al. 2009, p.385). Briefly put, the strategies Chinese actors employ to collaborate with others impact their learning processes (Korsnes 2016a). Given that intermediaries seek to fulfill a role as brokers, their importance may be influenced by Chinese actors attitudes to knowledge sharing.

Hence, knowing that certification agencies are intermediaries, we may ask what role they play when they approach the Chinese market. What strategies do European intermediaries employ to convince the Chinese of the necessity of their service? Do Chinese actors view certificates as advantageous? If not, how do they deal with them? Before we try to answer these questions, we shall explain the data and methods employed.

3. Method

This study is based on a one-year long fieldwork in Shanghai, China between May 2013 and April 2014, where one of the authors conducted altogether 31 interviews (see Table 1). The label 'certification company' describes the six European advisory and certification companies that were trying to establish themselves in the offshore wind industry in China. Each of these companies had both European and Chinese employees, and in each company Chinese, European or both nationalities were interviewed. 'Chinese industry and government' refers to the various domestic Chinese actors related to the offshore wind industry in China.

Table 1: Overview of interviewees

Group	Industry segment	Interviews
European employees of certification companies	Certification	6
Chinese employees of certification companies	Certification	6
Chinese industry and government	Government	7
	Turbine manufacturer	6
	Project developer	5

	Local certification bureau	1
	Total	**31**

Six of the interviews were conducted during two months of participant observation in Shanghai at a large multinational certification company that had originated in Northern Europe. In order to anonymise the company, it is here simply referred to as the Certification Agency (CA). CA classifies, certifies and provides advisory services within oil and gas, maritime and energy industries. All names of interviewees have been changed to cater for anonymity.

Interviewing in China can be challenging, as Chinese respondents are very careful about saying something wrong or out of line with official policy (Solinger 2006). For this reason, it is more common for respondents to answer in less concrete ways and to leave room for interpretation in their responses. Thus, in the analysis, some of the 'hints' and vague utterances from Chinese interviewees can be regarded as fairly strong indicators of opinions, though they may not sound like it. The language barrier (lack of English skills or interpreter-related issues) was another challenge. The interviewer attempted to deal with this challenge by asking questions in various ways or repeating the interviewee's response and asking for confirmation.

The data were analysed with the assistance of the analytical software NVIVO. Most interviews were audio recorded and transcribed verbatim, whilst some were recorded in notes. The interview data were analysed according to principles of 'abductive reasoning', meaning that both field data and existing theory were allowed to influence the researcher, but, ultimately, instead of forcing either the theory or the data into a framework, the researcher left space for his own logical reasoning (Reichertz 2007). The analysis is also inspired by constructivist grounded theory (Charmaz 2006), implying that the analysis started already at the data collection stage, and interview structures changed as a better grasp of the topics to be pursued was developed.

The paper uses narratives as a way of analysing and grouping the data collected in Shanghai. The narrative method is useful for distinguishing different modes of knowing and communicating in the interaction between European and Chinese actors (Czarniawska 2004). The narratives that are highlighted in this paper are 'stylised' and appeared throughout the analysis of the research in Shanghai. They are referred to as narratives because they are

stories that have been shaped, reshaped and negotiated over time, and they can be attributed to attitudes or worldviews that cover more than one person (ibid.). In practical terms, this means that each interview is examined for patterns, similarities and differences in argumentation in relation to other interviews. Single, standalone arguments are not emphasised as much as the series of arguments that link events and ideas between actors (Riessman 2008) as stories are 'produced by the setting, in the broad sense' (ibid, 68). When a story is told and retold, some narrative building blocks become accepted ingredients, whereas others are excluded (Deuten and Rip 2000). In this sense, narratives are 'meaning-making devices' that connect available elements and link them into a meaningful whole (Gubrium and Holstein 1997) Moreover, they are performative, as they can mobilise people into action (Garud et al. 2014). The narratives identified in this analysis are therefore recognised to provide meaning to the activities of the different actors, and, at the same time, to navigate their desired future outcomes through the means of communication.

4. The organisation of offshore wind industry certification procedures in China and Europe

'Certification' in this paper refers to a procedure performed by a third party to ensure that the practices used in the production of a product conform to industry best practice (Busch 2011). Best practice is often codified in the shape of international standards. The International Electrotechnical Commission (IEC) has, since 1987, had a technical committee (TC 88) working on setting international standards for wind turbines, the IEC 61400 series (IEC 2010). As of 2011, the committee had 24 participating countries, including China, and 12 observing countries, all of which contributed to the development of standards for design requirements, engineering integrity, measurement techniques and test procedures of wind turbines (ibid.). These standards, in turn, are used as the basis for the certification of turbines, which can be performed by an accredited third party.

In the wind industry, there is a distinction between 'type certificates' and 'project certificates'. A type certificate attests that a wind turbine and its components have been manufactured according to certain requirements. A company may also choose to get a design assessment (or evaluation), and this assessment is less comprehensive than a type certificate since it overlooks certain stages related to testing and manufacturing the design (Woebbeking 2008). A project certificate is intended for a project with more than one turbine, and includes

certification of not only a turbine, but also all of the necessary installations such as measuring masts, electricity transmitters, transformer stations and so on. A project certificate therefore ensures that the different components of a wind farm project are compatible, suitable and adequate. In Europe, project certificates are often necessary to get insurance, to comply with government regulations, and to attract finance. In China, however, the scope for such certificates is to a large extent covered by the government, and government-affiliated agencies, as shown in Figure 1.

Within China, testing new designs and selling turbines is possible without an international certificate. Project developers, design institutes and construction agencies are the three most important actors in developing Chinese offshore wind projects. Especially design institutes such as Shanghai Investigation Design & Research Institute, Guangdong Electric Power Design Institute and HydroChina Huadong Engineering Corporation cover much of the work of European certification agencies. These agencies are government affiliated, as are most of the construction companies and all the developers of offshore wind projects (Korsnes 2016a) . Moreover, since project developers in China are large state-owned enterprises (SOEs) with strong financing opportunities and a long history of project development, it is easier for them to get loans from state-owned banks. Chinese developers also need approval from provincial and central governments for new projects in the offshore wind sector; however, they also influence the development of offshore wind projects directly by providing a more realistic view of what type of development is feasible (Korsnes 2016b).

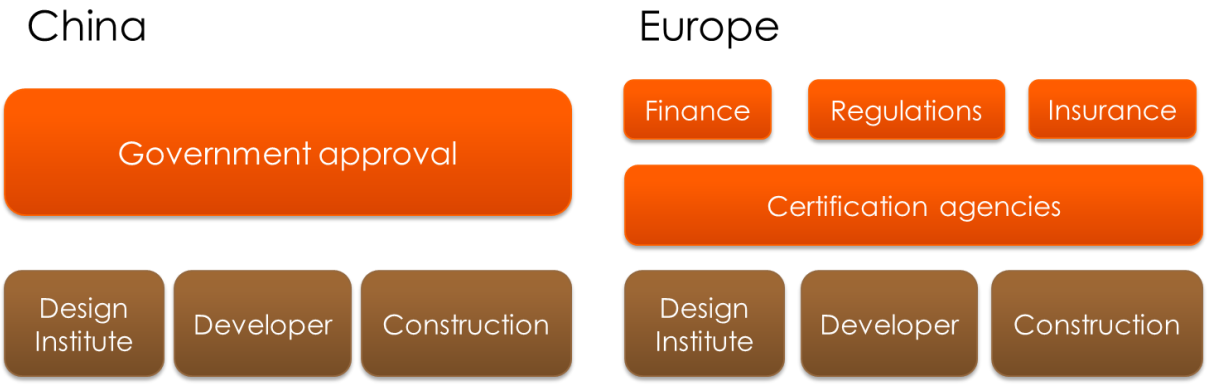

Figure 1: Simplified overview of involved parties in project development in China and Europe

China also has two domestic certification bureaus: China General Certification (CGC) and the China Classification Society. Similar to the foreign companies, these bureaus provide

certificates; however, they do not have experience with offshore wind projects. They certify wind turbines and turbine components according to the same international standards but their certificate is less acknowledged internationally. So far, they have certified only Chinese turbine designs. As was emphasised in many interviews, in order for Chinese turbines to be exported, clients demanded a certificate from a European certification body; this, in practice, limited the role of the CGC considerably.

In the next section, we crystallise the narratives that each of the identified groups of actors circulated and negotiated. These narratives are: the narrative of the Chinese industry named 'Leave us alone!'; the narrative of the European certification companies saying 'We are necessary!'; and the mediating narrative of the Chinese employees of the European certification companies called 'There is a middle way!'.

5. Three narratives on the role of certification agencies in the development of offshore wind in China

5.1 Chinese offshore wind industry narrative : 'Leave us alone!'

We observed an active resistance to European certification practices by Chinese industry actors. The narratives of the Chinese industry were quite specific on their ability to develop this industry on their own terms. They agreed that much could be learned from the European experience, but they wanted to perform the actual operations, themselves, as illustrated in this quote:

> Sometimes I have dinner and drink with the vice president of [a Chinese design company]. I talked with him and just made a joke that the developers say I can assess some design from your side, and he says 'What, are you kidding? We are the best in China; we don't need your assessment!'(Chinese employee CA)

This quote represents a view put forward by many of the Chinese design companies: they were confident that their competence was on the same level as that of the Western companies, and therefore did not need help despite their lack of experience with offshore wind projects.

On the other hand, some Chinese turbine manufacturers viewed international certificates as symbolic proofs of technology mastery, and therefore as important for learning how to build the technology:

> Certification is taken as a symbol that a manufacturer has established its own capability for the design of a wind turbine. (…) In the early stage people follow the certification process to acquire knowledge; know-how of what the procedure should be like, to educate their people of what kind of procedure they will have to follow (interviewee China General Certification)

As the interviewee pointed out, Chinese companies pay close attention to international standards and certification procedures in order to learn the internationally accepted procedures. In this way, they learned the lay of the land and what was expected of companies elsewhere. However, as certificates were not needed in the domestic market, spending valuable time to gain a full certificate was seen as a waste. As the interviewee from China General Certification clarified: 'A design assessment (for wind turbines) will do on the market, and it needs less time compared to full type certification. Full type certification is not

a must currently.' The Chinese companies only considered getting a certificate from a European company if they wanted to export their turbines.

Conversations with project developers – all large state-owned enterprises – emphasised the difference between Europe and China in their approach to project development. These developers pointed out that they would go to some of the seminars and workshops that foreign certification firms would hold to get 'inspiration', but their own experience with onshore wind energy was rated more important: They only found a couple of points to be different compared with the onshore wind industry and therefore found it only necessary to 'focus on these very important points, and then it will be no problem'. From this we take the point that the European knowledge was perceived as useful, but not needed. Moreover, challenges in offshore wind were not regarded to be large and not very different from onshore wind projects. This mind-set was widely shared amongst the interviewed Chinese developers. Clearly, they were aware of some of the risks, but were eager to develop their own projects without the direct and detailed involvement of European firms. In other words, reducing risk was perhaps not desired precisely because, by accepting the European service, learning opportunities would escape the Chinese project developers.

Another interviewee from the large project developing company underlined that local and political challenges were the main reason why foreign companies were inept to participate in projects:

> We have borrowed some ideas and experience from abroad too, but for the intertidal projects their technology wasn't very useful, so we had to construct our own vessels. In terms of technology there's much to learn from abroad. But for the pre-construction processes, such as policy, planning and approval, it is something we need to sort out here first.

The intertidal projects referred to here were projects constructed along the Chinese coast with no sea cover during low tides. European companies did not have any experience with such conditions, and Chinese developers had to develop their own designs for these projects. Since the intertidal challenge was overcome with domestic competence, Chinese firms were reluctant to accept advice from European companies with expertise in deep-water offshore wind projects.

Moreover, the above quote demonstrates that there was a difference between early-phase project development and project involvement. The Chinese saw themselves as knowledgeable

about local policy and planning processes, and believed that foreign companies would not be able to assist in such processes. This was also probably a strategy to give domestic players more time to get established, so they ultimately would not need foreign consultants. On the one hand, foreign service suppliers claimed that they needed to be included earlier in the planning process so that risks and costs could be reduced early on. This early-phase learning was emphasised as important by most of the interviewed Chinese developers, including Southern Offshore Wind Power Joint Development, a consortium of offshore wind project developers in the south of China. They pointed out that they had hired some European certification companies for inspections and consultancy before, but emphasised that 'now in the beginning we have to test and do some experiments on our own in order to learn how to develop an offshore project'. Thus, we found that the local Chinese industry underlined the need to have time to do their own experiments with developing offshore wind projects. Following this, they were clearly reluctant to let European companies take a role early on in development. This means that Chinese companies largely resisted the effort of European companies to access the market and to introduce practices and procedures that had been acquired from European projects.

Indeed, we may say that Chinese companies assessed the risks differently than did the European companies. Chinese companies were interested in learning from European projects, but they were not interested in giving up responsibility for developing Chinese projects and the opportunity to learn how to develop these projects themselves.

5.2 The European certification agency narrative: 'We are necessary!'

In general, certification companies struggled to gain a foothold in the service industries in China. The certification companies were acutely aware of the difficulties of getting access to the market. Several of the interviewees pointed out that a big barrier was that the market was protected and that Chinese companies were often privileged. For instance, some project tenders demanded only Chinese project managers and some tenders were published only in Chinese, which made them hard to discover in time and to forge the right contacts by European certification companies. Another challenge was tied to the fact that employees had to be available to a much higher degree than what would be demanded in Europe: Adaptation to the local situation and customs appeared to be a large part of the certification companies'

struggle to gain access. The European certification companies were nonetheless certain that there was need for their services in the Chinese offshore wind industry as the Chinese generally had not done offshore wind projects before and did not know how to get from A to B, according to the certification agencies. The European certification company claimed to have experience that the Chinese did not have and therefore needed to avoid large costs, risks and use of time. This made Certification agencies think they should be considered valuable. Chinese industry actors were, however, perceived to be a bit stubborn, preferring to solve things without the help of others. In fact, the attitude towards Chinese companies in the offshore wind industry was that they were 'arrogant':

> We have connections with many of the big players, such as [large Chinese developer] and some provincial governments. But [large Chinese developer] are quite arrogant currently in the sense that they think they can do everything on their own. 'We have never done this before, but we are sure we can', you know. Perhaps attitudes might change if, or when, they experience the first big fail, and then realise the true value of experience and consultancy services. (Regional manager, European certification company)

Hence, one of the strategies of the entering certification companies appeared to be waiting for the Chinese industry to fail. It is interesting to note, moreover, that there was a firm belief that Chinese companies' lack of attention to risk would, in the end, lead to disaster – disaster that could be avoided, the European companies argued, should their services be welcomed.

Compared to the advisory business, which had a small selection of offshore wind clients, the certification business was the industry that the European companies put the most effort into selling. European companies were quite confident that they would succeed in providing project certificates to local customers. The challenge was identified as the Chinese offshore wind project developers' lack of prioritisation:

> In Germany you need project certification because otherwise you will not get permission to build the wind farm. So there it is quite obvious that you need project certification. In China, they just start, and they do not really think about risks. So project certification is not needed. But anyhow, we want to establish some services, like risk assessment. What we are trying now is to make them aware of some risks, and identify some of our services that we can offer separately. (European advisor, CA).

We see from the above quote that, though the employees were aware that their services were not really wanted in China, they still tried to offer some of the same services they offered in Europe. One strategy was therefore to make the Chinese aware of the perceived risks. The need for certification was displaced with a new goal: minimising risk and the extra costs that

accidents would create. Moreover, in order to appear less intimidating and to gradually make Chinese customers realise the value of their services, they chose to offer smaller service packages instead of large ones (such as project certificates). The idea was clearly that it was only a question of time before their services would be asked for, since the Chinese were perceived not to care as much about risk as did Europeans. One of the advisors in CA expressed that: 'The Chinese style is just really different to what we do in Europe. In Europe we are very risk averse, but here they are much more, you know, "Just get on and do it!".'

The European company believed that they could make the Chinese more concerned about risk, as managing risk appeared to be crucial for achieving development. Chinese potential customers, on the other hand, appeared to be willing to take more risks and to learn and adapt during the process. These opposing stances of risk-taking in order to learn versus containing risk were also recognised by the European employees of CA.

An interview with a European regional manager of a European certification agency made it clear that the company was afraid of losing relevance in China should their local competitors no longer see a need for them:

> Another risk is that we are training our own competitors. We need to make sure we train them in a way so that we are not out of business in some years. Chinese engineers are good engineers, and they learn quickly.

The training referred to was a service the European certification company provided to local design institutes: training in basic offshore wind development techniques, risks and procedures. The danger was, therefore, that the Chinese company would acquire enough competencies to render the European company unnecessary. The overall strategy of consultancy and certification companies trying to enter China was naturally to profit from their European experience and to convince potential Chinese customers that their services were sorely needed. However, they failed to see how getting involved early conflicted with the goal of making the Chinese clients understand the risks: if the Chinese were indeed allowed to 'try and fail', the Chinese companies might learn enough to make the European companies obsolete. This was the implicit concession the European companies made by recognising the importance of entering China early.

Hence, the European certification companies were not very successful in soliciting Chinese clients. Their services were not perceived as needed and the strategy of waiting for an accident did not prove effective. Another strategy had to be found, and one such strategy was

promoted by a third narrative performed by Chinese employees within the European Certification agencies, as we will see in the next section.

5.3 The mediating narrative: 'There is a middle way!'

All the interviewed European certification companies had a majority of local Chinese employees in their Chinese offices. Throughout the fieldwork it became apparent that the Chinese employees were constantly exposed to the narrative of the European entrant, but at the same time very much in touch with the local Chinese understanding of the situation at hand. Chinese employees of the entering companies therefore took on a mediating role between the entering European certification companies and the domestic Chinese industry. As one Chinese manager expressed it: 'I try to harmonise expectations from both sides, and sometimes the expectations need to be controlled.' The Chinese employees appeared to have a good perception of the local Chinese clients' wants and needs, and consequently what they thought about acquiring services, such as certification and advice, from a foreign company. The general observation was that these kinds of services were not easily sold in China, as expressed by several of the interviewees:

> The developers have little desire to hire consultancy or supervision services. This is a general mind-set of Chinese people because the consultancy service is like additional, an extra cost. (Chinese manager, European certification company).

As this quote shows, the extra cost related to consultancy was regarded as unnecessary, since the companies believed they were capable of fixing most problems themselves. A similar, but yet, different sentiment was voiced by another Chinese manager from a European consultancy company:

> It is quite hard to sell services in China, because the Chinese prefer physical things that you can see, and not only what's in your brain. So we really need to convince people of the necessity of our services.

Hence the technology, *as a physical entity*, counted most in China, and any accompanying *mental activity* was considered something that could be learned quickly. Consequently, it was difficult to sell the consultancy service as such service was first and foremost regarded as an additional cost that was intangible and perceived unnecessary by the Chinese companies.

As we saw in the previous section, the certification companies were concerned with entering early, before local Chinese companies had learned enough to make their services superfluous. This was also stressed by the Chinese employees:

> If we do not join the first projects or we do not deliver properly, then we may also lose this market totally. You can see this in the construction industry […] there are no Western companies there. […] So we have to give them a similar price to the local companies, easy communication, and localise. (Chinese business developer, CA).

Offering competitive prices and facilitating communication by hiring local employees were strategies employed by the entering European certification companies to attract clients early on. Interestingly, this interviewee drew a comparison with the construction industry, which had no foreign consultancy; hence, his interpretation was that European companies had not entered early enough. The idea seemed to be that entering European companies could integrate only by forging a business relationship early on, because after three to five years the Chinese would be able to do everything alone:

> After three to five years with several project experiences, the developers or manufacturers can deliver or implement the project themselves individually. But, if we get involved in the first stage, we would develop some kind of relationship, and we can always provide some service. [...] The basis is that you already have a relationship with Chinese offshore [companies]. (Chinese consultant, European entering company).

As the quote shows, Chinese manufacturers were, over time, expected to be able to produce most of their projects alone, without the help of foreign firms. In order to become interesting quickly, the European companies saw the need to 'develop a relationship' with local companies. The strategy was quite unclear, however, as to exactly how such relationships would be established and developed.

One of the topics that created some friction between the European and Chinese employees of the entering certification companies was the suitability of offering project certification in the Chinese market. On the one hand, European employees were quite certain that they should aim to provide the service, like in Europe. Chinese employees, on the other hand, were not so enthusiastic about the idea:

> The first time I had a meeting with [the European headquarters] in 2009 the boss told me, 'you have to develop a project certificate'. My answer was no. At that moment it was quite clear. No market, no driver, no clients. I said we have to start from the type certificate (Chinese certification manager, CA).

Thus, a type certificate was seen to be easier to sell than a project certificate. This was in 2009, and the European strategy was to provide project certificates for Chinese offshore wind projects. The interviewee was quite confident that this was not the right strategy. Instead, he approached the issue differently. The Chinese certification manager of CA chose to rebrand the service by calling it 'risk management', rather than issuance of a project certificate. In other words, he replaced the European practice of certification to a more general concern over risks:

> I tried several times to advertise the project certificate [to Chinese clients] and they were not really interested, because they do not need financing from a bank. But they care about the risk, and they care about the cost. Also a lot of developers do not really understand what a project certificate is. So I just repackaged it and do not talk about project certificates. Instead, I refer to it as risk management; (…) and developers are really interested in that.

As this quote shows, risk perception was again at the centre of the story. Chinese clients cared about risk, but they did not pay attention to how project certificates would reduce risk. It appeared that risk, to the Chinese, was connected more to costs, and project certificates did not address this concretely enough. In any case, we see that the narratives of Chinese employees of European companies were modified so that Chinese interests were accommodated. Chinese employees were more consolidating and less certain about the 'right' approach to the market, acknowledging that the narrative needed to be amended in order to succeed. In other words, they were aware that the strategies needed to be translated in accordance with the visions and needs of Chinese companies and their local practices and understanding of services. However, over the year spent in Shanghai, the Chinese CA manager quoted above enrolled more and more into the narrative of the European company, going from being quite certain that project certificates were unsuitable in China to being more convinced that project certificates could be sold there. To the European employees of the certification companies, however, it appeared impossible that their procedures and standards would not be wanted in China. Hence, local Chinese employees were needed in order to make their approach fit with the Chinese market. In this way, the narrative of the European certification companies was negotiated and adapted to local matters of concern.

6. Unveiling the intermediaries

This paper has shown through the narrative 'We are necessary!' that European certification companies have been relatively unsuccessful in making Chinese clients see the necessity of

their services. In our analysis, the narrative ‘There is a middle way!’ suggests that some Chinese employees of these companies are trying to reframe the necessity of the European experience in China by referring to potential risks related to developing offshore wind technology. Nevertheless, the narrative ‘Leave us alone!’ demonstrates that the local industry evaluates the involved risks differently, as they want to learn from own experiences. Altogether, this urges us to question role of European certification companies in China. As we have seen, Chinese companies are already taking international standards into consideration when manufacturing products. They are using codified standards to learn about procedures that are required for certification by an international company. Although knowledge about best practice is useful, a certificate from a foreign company appears to be neither required (no official requirements) nor desired (no need for ‘nonphysical’ things) in the Chinese market.

The major contribution of this paper is to demonstrate how and give some answers to why European certification firms fail in selling their offshore wind services to Chinese clients. Project certifications are essential in a European context, so it is clearly surprising to the European companies that their services are not considered important in China. We can learn from this analysis that the Chinese innovation strategy in the offshore wind area and probably other areas as well, is radically different to that of the European one. This is true on a government and on an industry level. As pointed out in section 4, several of the procedures that could provide scope for European certification agencies are either taken care of by Chinese government-affiliated institutions, such as banks, developers, construction firms or design institutes, or provided by Chinese certification agencies. Hence, the position of the Chinese government in developing Chinese offshore wind projects demonstrates a notable difference between Europe and China.

On an industry level, Chinese offshore wind companies do not see it necessary to rely on European companies for the more complex parts of a project, as they believe they are independently capable of understanding the technology and developing domestic procedures and standards. For Chinese companies to gain access to European experience they must give European actors more control; this would imply less tangible learning for Chinese firms. In this sense, European companies want to be seen as a necessary gateway for Chinese companies to comply with the international standards that have been developed by the same European certification agencies. However, as the analysis shows, they have not succeeded in achieving this position. From a Chinese perspective, the European innovation strategy relating to offshore wind looks like over-engineered project development. This stands in contrast to

the Chinese innovation strategy wherein taking risks is seen as a precondition for development.

This paper finds evidence that intermediaries coming from abroad are not important in China's offshore wind industry, and this is also likely to be the case for other Chinese industries. Certification agencies were some of the first European agents to become involved with the learning attempts of Chinese offshore wind firms. These agencies appear to be intermediaries, as defined within the innovation literature, by helping Chinese companies to develop wind turbines and gain certification. However, European certification agencies also attempt to enrol Chinese actors into a global system of certification and standards. Intermediaries may, in other words, also be promoting their own interests, and these interests are not necessarily beneficial to innovation processes since they may slow down or hinder learning attempts by Chinese actors.

Instead of accepting intermediaries as 'knowledge brokers' we must ask; between whom is knowledge shared? What from a European point of view is necessary to innovating is from a Chinese point of view ceding the initiative. Therefore, risk in a Chinese context relates to more than poorly functioning products or mismanaged projects. For Chinese government and industry actors engaged in offshore wind development, there is also a risk connected to engaging in too much help from abroad – a risk that is perhaps regarded larger than the risk of failing to develop a project the first time around. In other words, keeping control of the process, learning and gaining own experiences, are more important to Chinese offshore wind actors than managing risks perceived from a European perspective. An implication of this paper is therefore that the right design for innovation policy and risk regulation must be evaluated locally.

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