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**The role of employee participation in generating and commercialising innovations: Insights
from Chinese high-tech firms**

by

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**The role of employee participation in generating and commercialising innovations: Insights
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ABSTRACT

To date, employee participation finds very little recognition in China in research as well as in management practice. It seems to fundamentally contradict traditional values in Chinese culture. The effect of employee participation on innovation is completely unknown, not only for China, but also for many other emerging economies. In contrast, employee participation finds a lot of recognition in the western world for quite some while. Research suggests that employee participation is particularly relevant for innovations in skilled labour contexts which are becoming increasingly important also for China. Based on a survey of 620 medium-sized and large companies we are investigating the effect of employee participation on innovation generation and commercialisation in China. In the formulation of our hypotheses we take the moderating effects of incentives into account. The contribution of this paper is to give evidence on the explanation power of the western concept of employee participation outside the western world. This allows for a better understanding of the robustness of the concept towards cultural context factors.

Keywords: China, employee-driven innovation (EDI), employee participation, innovation, monetary incentives, non-monetary incentives,

Introduction

There has been a long tradition for different forms of employee participation in the ‘Western’ world. The first thing that comes to one’s mind in this regard is perhaps corporate suggestion schemes and different forms of their implementation (Slee Smith, 1981; Lasrado, 2013), which indeed take a prominent position in research and practice. However, various other forms of employee participation have been discussed, including employee involvement, industrial democracy, empowerment, commitment, self-managed teams, communities of practice, or differences in work arrangements, to name just a few (Alutto and Belasco, 1972; Castrogiovanni and Macy, 1990; Schweiger and Jago, 1982; Anand, Gardner, and Morris, 2007; Giannetti and Madia, 2013). There are also relevant developments outside the ‘Western’ world, particularly in Japan, where ‘*Kaizen*’ and continuous improvement have been in focus (Bodek, 2012).

Employee-driven innovation (EDI) has been defined as an involvement of ordinary employees (i.e. employees with no decision competence at the strategic firm level) in decisions about innovations (Kesting and Ulhøi, 2010). Conceptually, EDI is a sub-category of employee participation, distinguished by the subject of participation (i.e. innovation). However, innovation concerns decision making at the strategic level and is typically a genuine leadership function. Therefore, EDI is also a quite far-reaching form of participation.

How do these ideas relate to China? On the one hand, it has been noticed many times that China has rather little participatory tradition, but one of strong leadership and clear power structures (Chen and Aryee, 2007; Huo and Von Glinow, 1995). Organisational practice is dominated by forms of directive (Sagie, Zaidman, Amichai-Hamburger, Te’eni, and Schwartz, 2002) and paternalistic leadership (Cheng, Chou, Huang, Wu, and Farh, 2004), and leaders put

less emphasis on employee participation, particularly with regard to innovations – as it seems. Accordingly, there is almost no research on EDI or other forms of employee participation in the organisational context in China. The same applies to research on corresponding leadership styles like participative, interactive, shared, and distributed leadership (Song, Wu, and Zhou, 2012; Zhang, Yuan, Kesting, Luo, and Li, 2012).

On the other hand, China is going through a fundamental transition in which high-tech environments and firm innovativeness are becoming increasingly relevant, and employees more and more educated. There are several indications that developments like this have an implication for the effectiveness of different forms of work organisation in different countries (Lundvall and Lorenz, 2012). What does this mean for China? Is it possible to enhance firm innovativeness by implementing employee participation as in the ‘West’? What is the role of incentives in this connection? How does the ‘Western’ concept of EDI fit in with Chinese reality? These questions are highly relevant for three reasons: First, the effects of EDI are basically untested – and therefore the explanation power of a whole research stream is vastly unknown – not only for China, but for most parts of the non-western world. It is not known, how robust EDI is towards cultural context factors like power distance. Secondly, EDI is an innovation driver – according to Lundvall and Lorenz (2012) quite an important one for emerging economies. Therefore it might be a relevant aspect for the future prosperity of emerging economies. Thirdly, the potential of EDI is vastly underutilized, not only in China, but also in many other emerging and even industrialized economies. Knowledge about its benefits might change that.

Based on a survey of 620 medium-sized and large Chinese companies, we are investigating the effect of different forms of employee participation on innovation generation and commercialisation in China. In the formulation of our hypotheses we also take the moderating role of incentives into account. The main contribution of this paper is testing the exploratory power of EDI for the non-western world. On top, this paper offers a systematic investigation and theoretical conceptualization of the role of incentives (monetary and non-monetary) for EDI.

Research background and hypotheses

Employee participation and employee-driven innovation (EDI)

The overarching idea of employee participation is based on democratic principles of employee inclusion in key organisational processes (Heller, Pusic, Strauss, and Wilper, 1998; Knudsen, 1995). Besides ‘participation’, different labels have been used to denote the wide range of existing practices, including ‘involvement’, ‘employee voice’, ‘empowerment’, ‘engagement’, and ‘industrial democracy’ (Wilkinson, Townsend, and Burgess, 2013). Experiences from a ‘Western’ context indeed speak for the exploration of internal human resources as a source of competitive advantage and a solution to workforce challenges (Newell, Robertson, Scarbrough, and Swan, 2002; Stewart, 1997). Basically, two broader benefits are discussed in connection with employee participation in general:

A better information flow and better decisions. Employee participation is recognised as an important channel in fostering communication and interaction between employees and between subordinates and superiors, thus eliciting cooperative behaviour, information sharing, and trust

generation (Levine, 1995). Repeated interactions spread tacit knowledge, thus contributing to problem solving, idea generation, and workforce qualification (Harter, Schmidt, and Hayes, 2002; Kahn, 1990). Additionally, consultative participation increases group diversity and hence the variety of choices and the number of ideas. In consequence, participation contributes to creative and innovative decision-making processes by providing alternative choices outside of the managerial scope.

Higher work satisfaction. Research suggests that employee participation increases job satisfaction and, as a consequence, work performance (Wagner, 1994; Judge, Thorensen, Bono, and Patton, 2001). Affective theory emphasises the motivational aspects of participation. It can invigorate commitment and taps into intrinsic needs for job satisfaction, thus increasing employee effort, productivity, and innovative behaviour (Blake and Mouton, 1964; Wallance, 1995). In fact, participation and commitment are interwoven and mutually reinforcing concepts as both act as motivational mediators through empowerment, autonomy or self-realisation, as well as perceived meaningfulness of work (Kirkman and Rosen, 1997; Spreitzer, 1995). Higher commitment and thus participation influence employees' decisions to stay with an organisation and increase dedication to task, vision, and managerial leadership (Wilson and Peel, 1990). Participation evokes insider status, confidence, and a feeling of organisational acceptance, which strengthens employee risk-taking behaviour and fosters creative thinking (Chen and Aryee, 2007). In this regard, participation encompasses crucial motivational factors, cementing commitment and motivation for extra-role initiatives.

However, employee participation also has its flipside: It can lead to an erosion of power structures, inconsistent decisions, and conflicts between different individuals and units.

Additionally, employee participation can undermine the benefits of specialisation and labour division (Kesting and Ulhøi, 2010), and possibly distracts from employees' in-role performance (Conway and Calzi, 1996). These counterproductive tendencies shape the limits of employee participation. Furthermore, the change effort associated with employee participation can encounter managerial resistance, when managers have egoistic motives to withhold power and control (Adler, 2001).

Employee-driven innovation (EDI) is a special form and therefore a subset of employee participation (Kesting and Ulhøi, 2010). The distinctive criterion from other types of employee participation is the subject of participation, innovation. Consequently, we use the expressions “employee-driven innovation (EDI)” and “employee participation in innovation” interchangeably. The focus of EDI is on direct participation (in contrast to financial participation), designed in order to enhance firm innovativeness (Poutsma, Hendrickx, and Huijgen, 2003). Direct participation is including employees in decision-making processes for large or specific work tasks by means of formalised programmes of consultation and task delegation (Wagner, 1994). Consultation means that employees are entitled to provide their input for organisational decision-making procedures, but have no decision power as such. In contrast, task delegation means to assign (temporary) decision rights to employees. Two specific forms of task delegation are autonomy and empowerment. Autonomy is typically related to a specific work task, giving employees some freedom to operate (Langfred, 2013). Empowerment is more generally related to the employees' status within the organisation.

The study of EDI is relevant, particularly for two reasons: First EDI concerns the strategic and not the operative level of decision making. This strategic level is the genuine domain of leaders,

possibly supported by special functions. In this sense, EDI is a far-reaching type of participation, requiring particular openness of leaders towards participation. This might clash with non-participative cultures like in China, India, Russia and many other emerging economies. Second, EDI is an innovation driver, for knowledge intensive industries, possibly even an important one (Lundvall and Lorenz, 2012). It can be highly relevant for success on the firm as well as on the industry and economy level, particularly in emerging economies. This creates an interesting tension between cultural backgrounds and economic needs.

Innovations, however, are complex processes, consisting of a multitude of different activities. One important structuring factor is the distinction between different innovation stages, particularly that between innovation generation (or ideation) and commercialisation (or implementation) (Shipton, West, Dawson, Birdi, and Patterson, 2006). This distinction is relevant as different stages have different demands on organisations and individual employees. This also has an impact on employee participation.

Innovation generation is, first of all, a creative process. The contribution of employees as ‘idea agents’ has been specified in three directions: (a) highly contextualised operational knowledge to improve efficiency and to map out business opportunities (Henderson and McAdam, 2001); (b) an increased potential for unique, original, and novel ideas as all employees bear creative potential; and (c) knowledge and ideas through the employees’ external networks (Galbreath, 2002). Research finds that empowerment and allowing autonomy are indeed conducive to idea generation in employees (Avolio, Waldman, and Yammarino, 1991; Russel and Stone, 2002; Frischer, 1993). All in all, there is solid evidence that employee participation stimulates idea generation and is therefore conducive to the generation of innovations.

However, it is commonly believed that *innovation commercialisation* rests on a top-down approach with clearly delineated roles and timely and efficient execution (Evan and Black, 1967; Howell and Avolio, 1993; Kanter, 1982). This goes clearly against EDI principles. With time and resources being scarce during market implementation, increased employee participation can be seen as a resource-consuming activity which leads to market delays resulting from prolonged decision-making processes. Uncoordinated employee input, ideas, suggestions, and information can undermine decision-making consistency and expose an organisation to anarchic and conflicting interests. Lastly, employees may lack competence, skills, and experience to make decisions on the highly specialised implementation level, relating to marketing, technical specification, or market and product regulations. Therefore, there is no clear evidence for the effectiveness of EDI on innovation commercialisation; on the contrary, there is some evidence pointing towards the effectiveness of directive (non-participatory) leadership in the commercialisation phase (Burningham and West, 1995; Damanpour, 1991). Consequently, the distinction between innovation generation and commercialization has to be also taken into account for the investigation of EDI and its effects in China.

EDI in the Chinese context

The Chinese traditional context is influenced by the philosophies of Confucianism, Taoism, Buddhism, Legalism, and the Art of War stream of thought (Pan, Rowney, and Peterson, 2011). Many traits of Chinese traditionalism – whether cultural, social, individual, or organisational – go against the basic values on which employee participation and innovation are founded. Organisational structures are typically characterised by high power distance, hierarchy, and top-

down and centralised leadership, which is essentially counter-participatory (Chen and Aryee, 2007; Huo and Von Glinow, 1995). Workplace relationships are based on particularisation determined by status, position, or social class (Farh, Early, and Lin, 1997; Redding, 1990; Smith and Wang, 1996). Moreover, Asian cultures generally prioritise cognitive closure (such as taking things for granted) over the need to explore. Therefore, individuals are less inclined to uniqueness, expressing novel ideas, seeking variety, and deviating from normative behaviour as compared to ‘Western’ cultures (Harzing and Hofstede, 1996; Ip, Chen, and Chiu, 2006; Kim and Drolet, 2003). Compliance, benevolence towards authority, and conflict avoidance lower individuals’ propensity to voice dissatisfaction or concerns, or to suggest new ideas. Both conformity and controlling supervision have a negative impact on creativity and innovative behaviour (Kirkman and Shapiro, 1997).

However, it is well known that China is currently undergoing a fundamental political and economic transformation. Three developments are particularly relevant in this context: First of all, firms are exposed to increasing innovative pressure. This is mainly a consequence of changing market conditions and increasing wages (Cai, Park, and Zhao, 2008; Li, Zhao, and Liu, 2006). Secondly, an increasing share of firms is operating in a high-tech, knowledge-intensive context and technological requirements are generally rising for employees (Zhou and Xin, 2003). Thirdly, and closely related, is the structure of the workforce changes for many companies. The demands for labour qualification are tending to increase and as a consequence there is an increasing competition for qualified employees among the companies. In reaction, employees develop ever increasing work expectations (Zhang and Bartol, 2010). This has resulted, among other things, in a high workforce turnover rate in China (Zhang and Zhang, 2007).

Moreover, one can currently observe some socio-cultural and political developments that change Chinese traditionalism in line with that: First, Chinese Confucius culture is known for the value of high power distance (Hofstede, 2001) and traditionalism (Yang, Yu, and Yeh, 1991). However, in more recent times, such practices more often foster employees' resistance due to bureaucratic attitudes and inefficiency (Ding and Akhtar, 2001; Wei, Liu, and Herndon, 2011). Second, in contrast to power distance, Confucian culture also emphasises the organisations' and leaders' *Ren* (benevolence) to employees. The philanthropic principle of Confucianism stresses the sharing of power with employees and satisfying employees' humanistic needs in order to be reciprocated by employees' positive job attitudes and behaviours (Han, Chiang, and Chang, 2010). Third, along with the market economy development of China since 1978, Chinese firms are in fact gradually removing hierarchical levels and starting to delegate more to the employees with participation and involvement of decision-making (Peng and Luo, 2000; Zhu, 2005). Fourth, communist doctrine is consistent with the Confucius culture of *Ren* (Lin, 2008). Fu and Tsui (2003) cited the Chinese Communist Party's constitution to present the Chinese leaders' nature of serving the employees: "Party members must first of all serve people whole-heartedly, even at the expense of themselves" (pp. 425–426). Such communist doctrine embraces democratic socialist principles, such as employee participation in firm decision making and daily management.

Thus, viewing from historical, social, culture and political perspectives, we argue that Chinese employees originally adhering to traditional and high power distance values are now gradually more receptive to democratic practices such as employee driven innovation. It is therefore valuable and important to figure out whether EDI is a feasible practice in China nowadays for promoting innovative idea generation.

As a result, we adopted cultural values to argue that EDI is positively related to the generation of innovative ideas since Chinese Confucian and Communist Party values also encourage benevolence and serving people. It is therefore advantageous for leaders to encourage more idea generation.

However, this only relates to idea generation. Damanpour (1991) suggests that successful market implementation requires coordination and effectiveness which can be attributed rather to more centralised and formalised structures, with strong managerial decisions, than to participatory ones. This also applies to Chinese individuals who strongly rely on leadership when it comes to task execution. In this line, a study by Zhou, Qin, and Hong (2012) confirms that, like in ‘Western’ countries, bureaucratic structures also have a positive impact on innovation commercialisation in China. Participation is a time-consuming process of great complexity the effects of which are assumed to evolve over a long period of time. Additionally, employees might lack sufficient ability, resources, or political support to promote and implement their ideas, as Amabile’s (1995) study suggested. Thus we argue that EDI is negatively associated with innovation commercialisation.

Based on the above arguments, we put forward the following hypotheses:

Hypothesis 1a: There is a positive relationship between EDI and the generation of innovations.

Hypothesis 1b: There is a negative relationship between EDI and the commercialisation of innovations.

However, these relationships are somewhat basic because they are global and do not take the moderating effects of incentives into account.

The moderating effects of incentives

As Lawler (1986) and Cheung, Baum, and Wong (2012) have pointed out, for the high employee involvement and empowerment model to be effective, it must include a reward system to motivate people. In this line, research suggests incentives to be conducive to greater effort and participation in idea generation, such as number of proposed ideas, frequency of participation, and response to other members (Toubia, 2006), thus having indirect effects on innovation through participation and EDI. In this sense, the success of EDI depends on the existence of underlying incentives such as bonuses, performance pay, promotion, training and development, job security programmes, or communication in enhancing organisational performance and innovation effort (Strauss, 2006; Tausky and Chelte, 1988). In the pursuit of innovation, EDI is interdependent with incentives based on reinforcing mechanisms. Specifically, incentives can improve participation in innovation. At the same time, incentives for innovation can require participatory programmes to be successful.

Deci (1972) distinguishes between extrinsic motivating factors, which are individual preferences for the satisfaction of individual needs (chiefly through tangible rewards), and intrinsic motives, which relate to a psychological state of contentment and satisfaction with the value of the activity in itself or its outcome. Following this classification, incentives have been grouped into monetary and non-monetary incentives respectively (Jeffrey and Shaffer, 2007; Chiang and Birtch, 2012). Monetary incentives are tangible financial rewards, often referred to as ‘pay for

performance’, or non-cash rewards such as merchandise or travel, often focussing on short-term motivation due to their extrinsic nature. In contrast to these, non-monetary incentives often focus on long-term motivation by rewarding employees through opportunities and relate to intrinsic needs for achievement, recognition, autonomy, and responsibility (Herzberg, 2003). Research findings suggest that monetary as well as non-monetary incentives may play different roles at different innovation stages, such as innovation generation and commercialisation. Let us first turn to monetary incentives:

Monetary incentives. Many scholars consider monetary incentives as negatively influencing innovative behaviour by undermining intrinsic motivation (Deci, Koestner, and Ryan, 1999) and thus creativity, specifically in view of ambiguous and explorative tasks (Amabile and Conti, 1997; McGraw, 1978; Kohn, 1993). Moreover, extrinsic rewards may erode innovative behaviour by diverting attention from autonomy and self-realisation towards economic gain, reputation, and compliance (Deci and Ryan, 1985; Amabile and Conti, 1997). Yet, the strongest argument against monetary incentives in innovation is connected with findings of principal-agent theory – namely, imperfect information about agent performance and thus imperfect reward distribution (Holmstrom and Milgrom, 1991). In order to reward agents, principals must have accurate information about the agents’ work and be able to monitor their actions. However, individual performance is hardly measurable in innovation processes that are typically long-term oriented, often intangible, and organised in interdependent teams.

Innovation commercialisation is not so much a creative process as a task-oriented one. It focusses on getting things done. Thus, it is typically associated with top-down leadership. Leaders can provide visions for long-term innovative task fulfilment and resources for the implementation of

innovations (Amabile, 1995). Monetary incentives increase innovative behaviour by eliciting risk-taking and creativity when based on long-term orientation (Eisenberger and Cameron, 1996; Honig-Haftel and Martin, 1993; Laursen and Foss, 2003). A few studies also evidence a positive impact of monetary incentives on innovation outcomes, though with variation between types of rewards, and sector (Alexy and Leitner, 2011; Smayling, 1987). So there is much to suggest a positive effect of monetary incentives at this stage.

We argue that monetary incentives moderate the linkage between EDI and innovation generation, as well as that between EDI and innovation commercialization. EDI practices can stimulate employees to be intrinsically motivated. Monetary incentives might undermine the effect of intrinsic motivation on innovation generation and commercialisation since they signal extrinsic motivation. According to cognitive evaluation theory (Deci and Ryan, 1985; Deci et al., 1999), the interaction of intrinsic and extrinsic motivations is negative because extrinsic motivations lead employees to feel that their efforts devoted to innovation generation and commercialisation are aimed at gaining a bigger bonus, thus decreases their perception of autonomy and competence in contributing new ideas or realising their ideas of innovation commercialisation.

In addition, we acknowledge the generally weak prevalence of financial distribution models (such as bonuses, salary differences) in mainland China (Zhang, Song, Hackett, and Bycio, 2006). This might weaken the linkage of EDI and innovation generation and commercialisation.

Hypothesis 2: There is (a) a negative direct relation between monetary incentives and innovation generation and (b) a positive direct relation between monetary incentives and commercialisation.

Hypothesis 3: Monetary incentives moderate the relationships between EDI and (a) innovation generation and (b) innovation commercialisation, such that the relationships are negative or non-significant when the level of monetary incentives is high.

Non-monetary incentives. There is a broad agreement among researchers that non-monetary incentives promote creative behaviour and that they are conducive to innovation generation (Amabile and Conti, 1997; Deci and Ryan, 1985). Non-monetary incentives build an innovative organisational atmosphere, set lenient innovation targets and modest challenges, and build commitment, trust, tolerance, and affiliation (Chen and Aryee, 2007; Martins and Terblanche, 2003; Shalley and Gilson, 2004; Stamper and Masterson, 2002). They act on intrinsic human motives to attain an interesting and satisfying job, self-development, professional accomplishment, and self-realisation at work. Furthermore, employees' internal development via non-monetary incentives directly affects innovation outcomes since it enables employees to learn, adapt, and acquire firm-specific knowledge. This in turn contributes to competitiveness (Subramaniam and Youndt, 2005). Acquiring new skills motivates people by providing long-term career horizons, regardless of whether this is tied to a particular company or not.

However, less can be said about the impact of non-monetary incentives during the commercialisation stage of innovations. Successful commercialisation typically means firm execution, associated with a broad spectrum of task specialisation and coordination. Yet, to date, research does not present clear indications for the motivating role of non-monetary incentives. Against this background we acknowledge the historical legacy of non-monetary incentives in collectivist Chinese society where long-term objectives such as promotion and associated status,

development and attained skills, or extensive network and workplace relationships have been more prevalent in governing employees' motivation (Zhang et al., 2006).

It is important to note that by acting on intrinsic needs, non-monetary incentives enhance job involvement and elicit participation grounded in individuals' needs for satisfaction, competence, empowerment, and autonomy. In other words, non-monetary incentives are closely aligned with participation and EDI by acting on the same motivational need of pursuing autonomy (Deci and Ryan, 1985) according to self-determination theory. It can be said that non-monetary incentives act as moderators to facilitate and strengthen the main effects of EDI on innovation outcomes in two ways. Firstly, they facilitate and strengthen the effects of EDI by means of increased participation and effort within innovation processes. Secondly, non-monetary incentives breed continuous learning, personal development, and knowledge exchange through interaction, thereby contributing to the EDI effects on innovation outcomes. Interaction of non-monetary incentives and participation should result in reinforcing motivational mechanisms, acting on employee efforts to participate in innovative tasks both during generation and commercialisation, thus increasing innovation outcomes at both stages.

Hypothesis 4: There is (a) a positive relationship between non-monetary incentives and innovation generation and (b) a non-significant relationship between non-monetary incentives and innovation commercialisation.

Hypothesis 5: Non-monetary incentives moderate the relationships of EDI and (a) innovation generation and (b) innovation commercialisation in China, such that the relationships are positive when the level of monetary incentives is high but negative or non-significant when it is low.

In conclusion, this paper investigates a model of EDI with participation as driver of innovation generation and implementation, moderated by monetary and non-monetary incentives (see Figure 1).

 Insert Figure 1 about here

Data and method

Our sample includes high-tech companies located in China, selected from publicly listed organisations, a directory of large organisations, and a directory of ‘Top indigenous innovation companies and industry associations’ via the help of China Enterprise Evaluation Association (CEEA).¹ A total of 10,000 questionnaires were distributed via mail to the head office of each firm. The questionnaire was initially developed in Chinese by Chinese management scholars, and translated back to English by bilingual scholars to check for reliability and accuracy of the translated questions. The questionnaire was answered by representatives of human resources departments, administration, financial offices, and to general managers. In order to avoid common method bias, we used the multiple source method addressing relevant questions to the

¹ We distributed the questionnaire via the CEEA. CEEA is affiliated with the Development Research Center of the State Council and it is the only incorporated organisation registered with the Ministry of Civil Affairs specialising in evaluation and research on enterprises nationwide (China Enterprise Evaluation Association, 2013; China Daily, 2013). We invited firms in the overall database to participate in our survey. The overall population in our sampling is corporations from the following lists: Chinese Listed Companies, which was 2,342 firms in total at the time we surveyed (China Securities Regulatory Commission, 2012); Chinese Large Firms List; Key Firms List of Ministry of Science and Technology of the PRC; and Key Firms List of Provincial Association for Science and Technology. In addition, there are many small and medium-sized firms registered in the association. The CEEA covers firms in sectors such as transportation, telecommunication, finance, architecture, tourism, and imports and exports. Altogether, the population from which we sampled is over 9,271 firms in China.

personnel responsible for each of the above-mentioned functions. We have collected only one questionnaire per firm. The questionnaire was anonymous and confidential; the respondents were asked to return it in a sealed envelope or, in case of procedural questions, to contact the researchers directly. The return rate of 6.2% yielded 620 responses which is within the permissible response rate of 6%–28% for firm-level data collections (Becker and Huselid, 1998). The share of state-owned enterprises among the firms was 45.7%; foreign invested enterprises and joint ventures accounted for 27.2%; while private enterprises accounted for 27.1%. The average firm age was 19 years, and the companies had an average annual revenue of more than 20 million RMB. The firms were equally distributed across major high-tech industries, including energy, information technology, biotechnology, equipment manufacturing, and renewable energy, each accounting for approximately 125 responses. The geographical location varies, but due to the high concentration of high-tech industries in coastal regions, a large share of the firms comes from the Beijing, Tianjin, Shanghai, and Guangdong areas.

Measurement – dependent, independent, and control variables

Our sample includes innovative companies in China, with innovation being measured on a firm level as opposed to individual or team performance levels. All human resources questions relate to R&D personnel in general terms, including participation components. For measurement of innovation outcomes, we use the ‘*number of new developed products and services*’ as well as the ‘*number of commercialised new products and services*’, which is a widely accepted approach for measuring the firms’ innovation generation and commercialisation (Benner and Tushman, 2003; Crossan and Apaydin, 2010; Damanpour, 1991). Certain limitations are recognised, especially as

regards China. While this approach allows for tangible innovation measurement, it does not necessarily account for the quality or novelty of products and services. Furthermore, one equivalent way of measuring innovation-generation, the number of patents, was not included because of the potential number bias. This is due to the poor record of intellectual property protection in China which can result in negligence in patent application filing. On the other hand, when the government encourages companies to file and patent offices to accept patents, a serious overestimation can occur through the submission of ‘junk’ patents. Finally, innovation success measured in sales revenue or profit is beyond the scope of this research, as it needs a thorough market and institutional analysis.

Our approach combines both the consultative and delegative forms of participation, developed by Geary, Rees, and Sisson (1994) to account for situations where employees are encouraged to express their opinions (consultative) and also given additional autonomy and decision-making power (delegative). We measured employee participation based on four variables: The ‘*formal platform for employees to express their suggestions*’, which reflects expression and knowledge sharing opportunities; the ‘*employees’ right to modify and suggest changes in management information systems*’, i.e. empowerment; ‘*self-management teams*’ manifested in the delegation of decision-making; and ‘*job-rotation opportunities*’, which allow for knowledge sharing, team-building and employee skills to be matched with adequate positions. Each of the variables is a dichotomous one, with 1 meaning “our firm has this practice” and 0 refers to “no such practice”. Then we added up the variables to form corresponding constructs. For instance, the four items of EDI were added up to form the construct accordingly.

In our approach, monetary incentives can be seen as purely financial rewards: Namely, ‘*appraisal-based bonus*’, ‘*special compensation policy*’, and ‘*share of unfixed extra-pay in total income*’. The non-monetary construct derives from Stamper and Masterson’s (2002) definition, which encompasses promotion, training, and reward for skills, incorporating variables such as ‘*appraisal-based promotion*’, ‘*promotion qualification: ability to learn*’, and ‘*skill-based rewards*’. Performance-based promotion can be a major driver of increased social status. Promotion opportunities solely depend on the employees’ abilities to learn and acquire knowledge, which can be a functional outcome of established training programmes. Skill-based rewards act as a non-monetary incentive, inasmuch as they motivate employees to acquire knowledge and skills. Promotion and development-based performance appraisal combined with skill-based pay can be associated with internal employee development (Chow, Huang, and Liu, 2008), facilitating acquisition of unique firm-specific knowledge (Wernerfelt, 1984). Each of the items was also dichotomised, and we added the items up to form constructs of monetary and non-monetary rewards accordingly.

Following Damanpour (1991), our study accounts for a possible conflicting effect by controlling for revenue and R&D investment, and both a lagged 2009 variable and firm age and firm size, based on the number of R&D personnel. In order to account for variation between Chinese enterprises, we used a natural logarithmic scale to normalise and transform the variables.

Analysis validation

The analysis started by pre-examining the variables using exploratory factor analysis in SPSS, which suggested a structure based on one principal factor – participation – and two supportive

monetary and non-monetary incentives. The participation factor had one eigenvalue greater than 1, which explained 40% of the variance. The two incentive constructs, each with eigenvalues greater than 1, explained 26.9% and 24.5% of the variance respectively, cumulatively explaining more than 51%. Subsequently, we used confirmatory factor analysis to validate the reliability of the conceptual constructs of participation and incentives using AMOS19. Participation yielded a good construct fit of $CMIN/DF = 0.751$, $RMSEA = 0.000$, $PCLOSE = .818$, and $CFI = 1.000$, with all factor components being significant. On the other hand, the two factor structures of monetary and non-monetary incentives also produced a good model fit of $CMIN/DF = 2.593$, $RMSEA = 0.051$, and $CFI = 0.963$, with significant statistical levels. Since we assumed that incentives have a supportive role during the participation process, we combined both constructs into one baseline model of three factors, which yielded a fairly good fit, with $CMIN/DF = 2.785$, $RMSEA = 0.054$, and $CFI = 0.937$. We also checked whether our model allowed a distinction between monetary and non-monetary incentives when combined with participation. However, in this case the results showed less well fit values.

 Insert Table 1 about here

Table 1 shows descriptive statistics on means, standard deviation, and correlations for our factor constructs, and dependent and control variables. Our dependent variables displayed strong correlations between the conceptually delineated generation and commercialisation stage. Yet, including the variables '*number of patents*' and '*sales of new products and services*' enabled us to observe a multi-stage dimension of innovation progress. The strong correlation (.80) between '*patents*' and '*new products*' indicates a generation stage, which is followed by a lower

correlation between ‘*marketed new products and services*’ (.66) and ‘*new products and services sales*’ (.45). The independent constructs showed moderate correlation levels. The multicollinearity problem was avoided because neither monetary nor non-monetary incentives were highly correlated with participation, despite the conceptual closeness of the constructs. Furthermore, the VIF values from each regression analysis were within the range of 1–2, which is well below a rule-of-thumb threshold of 10 (Neter, Wassermann, and Kutner, 1990).

Insert Table 2 about here

Table 2 presents the main hierarchical regression results. The dependent variables are ‘*number of new products and services*’ (generation) and ‘*number of commercialised new products and services*’ (commercialisation). Firstly, we checked the null model, which only contains control variables. Secondly, we added the following independent predictors to our basic model: Participation, monetary incentives and non-monetary incentives. Table 3 summarises the findings of the hypothesis testing.

Insert Table 3 about here

Results

The direct effect of employee participation

The regression results of models 1 and 3 show that employee participation has a significant positive impact ($\beta = .087$, $p < 0.01$) during the generation phase of the innovation process. On the other hand, participation turned out to have a negative impact on the commercialisation of innovations ($\beta = -.094$, $p < 0.01$). Hypothesis 1a and b are therefore supported. The positive impact of participation on ideation means that the creative phase of innovation is supported by employee initiatives and contributions. Therefore, even in China, allowing EDI is a successful method to increase idea generation. On the other hand we found that participation did not support innovation commercialisation directly. On the contrary, the more employees participate, the lower the number of commercialised products and services. In other words, employees are more likely to generate new products and services if they are given a voice, autonomy and decision-making power by the organisation in the form of increased participation. However, successful participation during the generation phase turns out to be dysfunctional during the commercialisation stage.

The moderating effect of incentives

As we have observed, incentives do not necessarily have a supportive role in the innovation processes. The results indeed suggest that monetary incentives have a significantly adverse effect on generation ($\beta = -.192$, $p < 0.01$), but also on commercialisation ($\beta = -.210$, $p < 0.01$). This is a little surprising and goes against our expectation of a positive effect of monetary incentives in the commercialisation phase. Hypothesis 2 was therefore only partly confirmed and partly rejected. On the other hand, non-monetary incentives have a significant positive impact on

innovation generation ($\beta = .130$, $p < 0.01$), but no significant impact on commercialisation. Therefore, Hypothesis 4 could be supported by the data.

Models 2 and 4 illustrate the moderating effect of our independent variables. Monetary incentives accompanying higher participation during the generation as well as the commercialisation phase do not seem to be relevant (Figures 2 and 3). Hypothesis 3 could therefore be neither supported nor rejected. It appears that the specific ambiguity of monetary incentives in China makes them less counter-productive to participation than expected. In China, the collectivistic culture leads team leaders to distribute monetary rewards in a more equality-based approach (Leung and Bond, 1984; Hui, Triandis, and Yee, 1991). Such a distribution principle is consistent with Chinese people's emphases of harmony and avoidance of interpersonal conflicts. It might soften the undermining effect of monetary incentives on the intrinsic motivation with regard to both innovation generation and commercialisation. In addition, the synergistic perspective of Amabile (1993, 1997) argues that extrinsic motivation might even encourage the generation of ideas and their implementation (Eisenberger and Cameron, 1996) since extrinsic motivation leads employees to feel that they are valuable and important to the organisation.

 Insert Figures 2 and 3 about here

In contrast to that, significant results were obtained for the interaction between participation and non-monetary incentives for innovation generation ($\beta = .196$, $p < 0.01$) and commercialisation ($\beta = .209$, $p < 0.01$). These findings suggest that the efficiency of participation rests on the existence of sufficient non-monetary incentives to motivate increased employee involvement.

This interplay between participation and incentives is shown in Figures 4 and 5. Significantly, the previously negative impact of participation on commercialisation was not only nullified, but even turned into a robustly positive interaction coefficient.

 Insert Figures 4 and 5 about here

We did not formulate hypotheses on that, but we did investigate the effect of a three-way interaction between participation, monetary incentives, and non-monetary incentives to get a deeper understanding of the interaction of the different variables. This construct yielded a significant negative result for generation ($\beta = -.099$, $p < 0.05$) and commercialisation ($\beta = -.121$, $p < 0.01$). This indicates that an appropriate balancing between participation and incentives is needed to spark innovations. Figures 6 and 7 show the convergence of the EDI effect on generation and commercialisation, conditional on key motivational interactions. For both innovation types, strong participation is compatible with low monetary and high non-monetary incentives, which can boost innovation outcomes. Second-best practice for strong participation structures is a combination of monetary and strong non-monetary incentives, although this has a less perceptible impact during commercialisation. Finally, in both cases we observed an adverse effect of the absence of incentives. Weak monetary and non-monetary incentives do not foster high employee participation. These results highlight the significance of the configurative nature of employee participation in innovations and incentives schemes.

 Insert Figures 6 and 7 about here

Discussion and conclusion

“Employee participation in China? There is none!”: This is a widespread attitude in research and practice that we were presented with many times in our interviews and expert talks inside and outside China. In this paper we show that this attitude is fundamentally wrong. Employee participation is already pursued in China and it is a relevant innovation driver there. More generally, the effects of employee participation on innovation are very similar in China and the ‘Western’ world.

What is the significance of this finding? It is broadly acknowledged that besides theory building, theory testing is one of the key tasks of empirical research (Friedman, 1953). The explanatory power – and therefore the value – of a theory can only be assessed by confronting its assertions with empirical data (Schumpeter, 1908). As long as its explanatory power is not systematically tested, a theory has only very limited value for research and practice. Before this study, this was exactly the case for EDI: it was simply not known if the insights of research on EDI apply to large parts of the world. This is relevant, because there were reasonable doubts if the concept of EDI is applicable for hierarchical societies like China. The general attitude in research and practice indicated a deep scepticism regarding the applicability of EDI, not only in China, but also in many other countries. After this study we know that this scepticism is not justified and that EDI can very well enhance firm innovativeness, also in hierarchical cultures like China – if supported by appropriate incentives.

More research is needed to test the relevance of EDI for other emerging countries like India, Brazil, Russia etc. who also build up knowledge intensive industries and increasingly depend on

their innovativeness. However, the key contribution of this paper is to show that EDI applies beyond the western world. It has been shown that the effectiveness of EDI is robust towards cultural context factors, at least for the case of China. The contribution in this paper is therefore to challenge existing views and to show the need to turn to this topic in research and practice. In this regard, the findings of this paper support the more general research findings of Lundvall and Lorenz (2012) according to which traditional, low-participatory work organisations are counterproductive for innovations carried out in knowledge-intensive contexts.

This implies an important perspective change: Employee participation is not to be seen in relation to social movements and employee rights anymore, but in relation to innovativeness and competitiveness of firms and even whole economies. This has vast implications on the status of individuals in the organisational context and in the society in general. We present the study to show that the effectiveness of employee participation and EDI is consistent with the awareness of the need to innovate in China.

To become effective, EDI has to be accompanied by incentives. This is known from previous research in a 'Western' context and was expected to apply to China, too. However, our data indicate differences in the effects of monetary incentives between China and the 'Western' world with regard to EDI. That such differences exist is generally known. Especially in China, climbing the ladder is of prime importance for employees. This type of reward is a form of acknowledgment, trust, and acceptance. The finding, however, that monetary incentives have an outright negative impact on innovation commercialisation is still surprising and appears to be in contradiction with what research indicates for the 'Western' world. Another contribution of

this paper is to conceptualize monetary as well as non-monetary incentives systematically in our model and to expose this difference.

Practical implications

In sum, this study provides guidance for managers of Chinese firms, or multinational firms located in China, on how to increase innovation performance by allowing for employee participation (EDI) in high-tech firms. The main findings suggest that, in order to increase idea generation, firms need to involve employees, particularly during the ideation stage of innovation projects. Major advantages include a larger, diversified pool of ideas, which allows CEOs to spot new innovation growth opportunities. Participation can help to leverage human creativity and problem-solving abilities by providing expression and modification platforms, enhancing employee job satisfaction and retention rates. The innovative ability of individuals can be capitalised on, even in overly traditional organisational structures in China. By tailoring organisation measures like job rotation or small self-managed groups, information sharing and brainstorming can be increased, and employee competence and insider status reinforced. Lastly, participation can ease the bureaucratic burden on senior management by allowing the delegation of decision-making and empowerment to lower echelons.

For the implementation stage, matters are less straight forward. Yet it seems that even here participation can be beneficial when accompanied by appropriate incentives. Given the impact of hierarchical structures on market introduction procedures, we conclude that, although a command and execution style leaves less room for workable participation, participation can be enhanced by the deployment of non-monetary incentives if senior management decides to trim its

sails towards greater creativity. Significantly, the talent development component of non-monetary incentives plays a decisive role in making employees familiar with their firm's code of conduct and product implementation techniques, which enables smooth market introduction.

Limitations and implications for further research

There is a clear limitation in the analyses presented in this paper. Our data provide a rather strong case for the relevance of EDI in a non-western culture and the moderating role of incentives. However, these insights are highly aggregated and merely offer insights about EDI and incentives as such. What is missing is a differentiation of various forms of EDI and incentives. It is not too speculative to expect that the effect of different EDI/incentive bundles on innovation generation and commercialisation will vary significantly. This is where the particular Chinese context comes into play. It is more than likely that the distinct cultural background in China has an impact on forms and effects of EDI and incentives. It can be speculated that one aspect of this are processes to align strong leadership and participation (which do not structurally contradict each other). But there is certainly more to find than this.

Globalisation has resulted in a new dimension of managerial science interested in the transferability of social science models and concepts between cultures. Establishing a universal model for innovations, e.g. based on EDI, is a challenging task that must not only take account of differences between innovation strategies, but also of human and endowment factors differing between cultures, organisations, and institutions. Apart from paternalistic leadership research (Cheng et al., 2004), research on indigenous Chinese management theories (inside-out) has been scarce so far. Up to now, scholars have been mainly occupied with transplanting 'Western'

management thoughts and assessing their applicability in China, flavouring them with ‘Chinese characteristics’ (Zhang et al., 2012). Barney and Zhang (2009) argue that the similarity of principles between countries, and the fact that there are only differences between elements such as cost-orientation, employee relationship, or motivational factors, means that Chinese management practices can be examined based on existing theories and ‘Western’ concepts. On the other hand, scholars such as Huo and Von Glinow (1995) and Chow et al. (2008) are sceptical about wholesale transplanting because, as pointed out by Winter (2008), success depends on convergence with local values, norms and beliefs associated with a given culture. The Chinese value system is changing. A longitudinal study based on 12 years of data shows that the mainland Chinese cultural values have been converging with Hong Kong values but diverging with the values of the U.S. (Ralston et al., 2006). More research is therefore needed to identify and specify non-western approaches to EDI and different incentives and their effect on innovation generation and commercialisation, not only with regard to China, but also to other emerging economies.

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Figure 1: Conceptual Visualization

Figure 2&3: Two-way interaction effect – monetary incentives

Figure 4&5: Two-way interaction effect – non-monetary incentives

Figure 6&7: Three-way interaction effect

Table 1: Descriptive statistics

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Firm Age	2.75	.57										
2. Revenue 2009	12.52	1.6	.13*									
3. R&D Invest 2009	6.75	2.93	.03	.49**								
4. R&D Staff	5.50	1.63	.08*	.65**	.33**							
5. Total workforce	8.02	1.53	.12*	.76**	.33**	.80						
6. Participation	1.92	.94	-.04	-.12**	-.01	.14**	-.07					
7. Monetary Incentives	.82	.68	-.03	-.14**	.17**	-.01	-.03	.09**				
8. Non-monetary incentives	1.18	.71	.01	.09*	.08*	.05	.01	.02	-.31**			
9. New Products & Services	1.57	1.52	.04	.17**	.17**	-.01	.25**	.10**	-.32**	.22**		
10. Market New Products & Services	1.93	1.66	.04	.16**	.20**	.04	.22**	-.09*	-.31**	.23**	.68**	
11. NPS Sales	7.02	5.52	.00	.03	.12**	-.06	.05	.11**	-.21**	.14**	.45**	.63*

Table 2: Results of hierarchical regression analysis

Dependent Variables Independent Variables	New Products & Services (Generation)			Commercialized New Products & Services (Commercialization)		
	Null	Model 1	Model 2	Null	Model 3	Model 4
Control						
R&D Staff	-.624**	-.538**	-.543**	-.389**	-.353**	-.355**
R&D Investment 2009	.144**	.115**	.097**	.161**	.140***	.121***
Revenue 2009	-.048**	-.065	-.080*	-.037	-.081*	-.098*
Firm Age	.010	.003	.012	.007	-.001	.008
Firm Size (workforce)	.727**	.653**	.672**	.496**	.474***	.493**
Factors						
Participation		.087**	.066**		-.094**	-.114**
Monetary Incentives		-.192**	-.195**		-.210**	-.224**
Non-Monetary Incentives		.130**	.144**		.050	.064
Interactions						
Monetary*Non-Monetary			.010			-.049
Participation * Monetary			.011			-.002
Participation * Non-monetary			.196**			.209***
Participation*Monetary*Non-monetary			-.099**			-.121**
R^2	.214	.289	.322	.121	.189	.233
Adjusted R^2	.207	.280	.308	.112	.179	.218

Note: Standardized regression coefficients are reported. *p<0.10, **p<0.05, ***p<0.001

Table 3: Hypothesis testing

Hypothesis	Generation	Commercialization	Results
1. EDI	Positive	Negative	Accepted/Accepted
2. Monetary Incentives	Negative	Positive	Accepted/Rejected
3. Interaction: Monetary * Participation	Negative/non- significant	Negative/non- significant	- / -
4. Non-monetary incentives	Positive	No effect	Accepted/Accepted
5. Interaction: Non-monetary * Participation	Positive	Positive	Accepted/Accepted