
Why don't one maximizes database utilization in product and service development in manufacturing?

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Structured Abstract

Purpose This case study purpose is to identify those factors that could promote external or organization internal information system data utilization, customer co-creation with external networks. The focus of this case study is on how organization can utilize existing databases with identified best practices to create added value for the customer in order and supply processes.

Design/methodology/approach This paper describes the pilot of the case study that explicates the status or restrictions and challenges of the databases' utilization. These descriptors are derived from the literature and the pilot survey of the identified challenges.

Originality/value This methodology puts in evidence that more effort could be dedicated developing organization internal practices. Identified challenges guide the core operators in sale and marketing and product development into integral practices for order and supply processes to realize customer oriented and productive processes.

Practical implications Through this study, the function is to expand understanding how the databases are capitalized to create added value together with the customer. The forthcoming process model guides how to use databases efficiently internally but also with the customers.

Keywords – technology adoption, database, customer oriented approach, practice, development

Paper type – Academic Research Paper

1. Introduction

The global business world is full of information and it is available. Therefore, it is very important to utilize and use information as efficiently as possible to be able to convert information for business purposes. Companies are facing challenges due to the competition and need for quicker responses to market demands. This forces organizations to find new ways to act, run their daily processes and produce innovations to maintain competitiveness.

The conceptual definitions of innovation differ with research area, like the innovation of the idea of a new device or process that are implemented, innovation can emerge in different situations and sources (Schilling 2010) or innovation as culture that in the employee aim at to be innovative (Dobni 2008). Organizational ability for innovations can be appointed innovativeness as risk taking (Denrell and March, 2001) or individual pioneers that try to promote change with personal characteristic or attribute dependent behavior (Hurt et al., 1977). Wang and Ahamed (2004) identified the product, market, process, behavioral and strategic innovativeness those areas that define the overall innovativeness of the organization, of which process innovativeness is the vital condition in innovation capability altogether. In this paper, innovation definition is leaning on Rogers' (2003) description of "an idea, practice or object perceived by its adopter to be new and an improvement" that is realized in manufacturing product and service design context.

Knowledge management improves processes in organization, like collaborative decision making, innovation, collective and individual learning. These organizational processes create as the process outcome better products, services and relationships and decisions as well as organizational behaviors and these issues and process outcomes lead to improved organizational performance.

In organization knowledge processes we refine, storage, share, transfer, create, acquire and re-use information. (E.g. Nonaka and Takeuchi, 1995). Through efficient and good planning of knowledge management processes, we increase and improve the processes of innovation, individual and collaborative learning, as well as decision making processes within organization (e.g. Moustaghfir and Schiuma, 2013), and improve our organizational performance and behavior on the level of decisions, services, processes and relationships. Vital issue for achieving the best possible result is to find causes for disturbance factors in knowledge management and organizational processes. We need to find new practices and methods of improving these processes within organization. (King, 2009)

When bringing knowledge to product and service perspective in organization environment, it can be said that new products and efficiencies are difficult to sustain. Utilizing knowledge we provide a sustainable advantage. Competitors can in the period of time match the quality and price of a market leader's current service or product. When that happens, the knowledge intensive, rich and knowledge managing company will proceed on to a new level of creativity, efficiency and quality. The knowledge advantage is sustainable because when efficiently used, knowledge increasing returns and continuing advantages. Knowledge increases when used as ideas and will breed new ideas. Knowledge, which is shared, stays with the giver and at the same time enriches the receiver. The potential key information for new ideas will be found the stock of knowledge. This stock is in any organization practically limitless if the people in the organization are given opportunities to talk, think and to learn with one another. (Davenport and Prusak, 2014)

The fast development of the information technology systems (ITS) lead the change of the organizational practices in general and require rapid technology adoption in manufacturing processes to maintain competitiveness. (Schilling, 2010) The baseline of this paper case study is that the employee don't utilize the existing database for innovative solutions in the customer oriented co-creation and product and service innovation. They do not recognize those possibilities that the system can offer or what are their own capabilities to utilize technology (Ramamurthy 1995) in their marketing and sale and product development functions. There may be technology resistance behind (Joshi, 1991; Martinko et. al. 1996; Lapointe and Rivard., 2005) but the other side of the coin is technology adoption (Kim and Kankanhalli, 2009). When the coin is flipped, the reasons behind the behavior are based on the individual evaluation of the technology and choice (e.g. Laumer and Eckhardt, 2012). Jalonon (2012) has identified lack of focus on the factors that in innovation processes engender uncertainty. His argument is that in the innovation processes actions are to be made under "unknown uncertainty" conditions that arise "from incomplete information, but also from ambiguous and equivocal information about innovation" (ibid).

Especially information systems (IS) research field has identified technology usage models but fewer researches are focused on those barriers that hinder maximizing available data and information. (Lapointe and Rivard 2005) Managerial aspect or managers as starter in technology implementation and innovation processes are often the focus in innovation or technology adoption literature (Ramamurthy, 1995; Kothandaraman et. al, 2001; Martensen et al., 2007; Jundt et al., 2015) but management in engineering change need to

analyze to support innovation processes as well. (Tavcar and Duhovnik, 2005) However, individual and his decision making with choices enable technology acceptance in the end (Kim and Kankanhalli, 2009) and individual need to be accountable to the possibilities in the change situation (Dobni, 2008). As Laumer and Eckhardt (2012) notice, individuals with diverse experiences need to investigate more to provide company's technology and information utilization.

This paper combine Bhattacharjee and Hikmet model of technology acceptance and resistance (2007) and organizational change (Oreg, 2003; Laumer and Eckhardt, 2012) literature with value creation literature to discover explanations why individuals reject information databases that could help them to advance knowledge sharing and innovation practices in product and service development.

This pilot case study purpose is to identify those factors that could promote external or organization internal information system data utilization, customer co-creation with external networks. The focus is on how organization can utilize existing databases with identified best practices to create added value for the customer in order and supply processes. The sale and marketing and product development groups, who are working on the customer interface, are in core, using databases to create new concepts, products and marketing material for support sales, and that could initiate the employee to pro-innovation thinking.

The paper is organized as follows. First, we describe some reasons why technology possibilities do not become the optimal resource. Next, we add customer value creation for innovation processes and introduce the measurements of information technology and customer value creation to make organization innovativeness. Our pilot case study sample and measurement are declared before the results. Finally, we deduce the practical and theoretical implications of our study.

2. Technology utilization in innovation process

Technologies, organizations and social structures and practices adjust transformation continuously during technology implementation (DeSanctis and Poole, 1994). The IT database of the case company includes the customer segments with the different industries, package solutions and newness with detailed information and reports and future analyses of the industry development. However, the employee do not recognize those possibilities that the system can offer in their marketing, sale and product development functions. The

customer-oriented data could promote new product improvement, direct marketing to core target group and broaden understanding about the customer (Kothandaraman and Wilson, 2001). The case company innovation process and product and service development process (Figure 1) is described so that we could ensure that every unit would follow the same footsteps when doing their own development and innovation actions, and information would be systematically collected and shared to others.

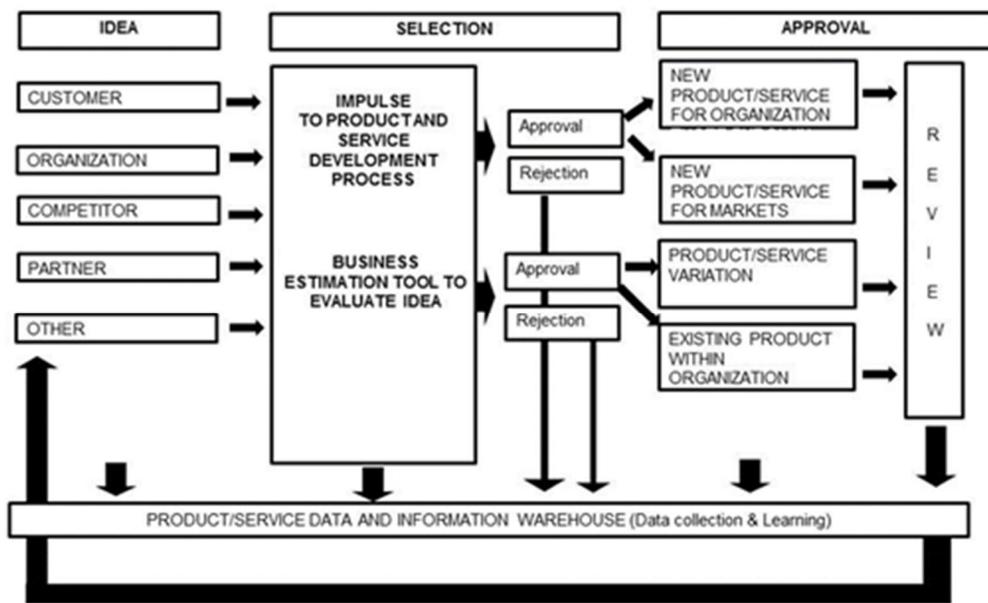


Figure 1. Product and Service Development process.

The product development process includes four phases: Idea, Selection, Approval and Review. Ideas can be received from the customer, internally within company through internal development ideas, personnel having problem solving ideas etc. Competitors may have some good ideas which can be suitable for taking further development to process. Ideas can be also given by other partners, suppliers or even for example government through laws and legislative.

After the idea is received, next step is to make pre-evaluation whether the idea is something that can be seen as worth to develop further. After this evaluation if the idea has passed, it is categorized by the type of the newness of the idea (new product for the

company portfolio, the new product for the markets, product variation or existing product within company) and passed further for review (Figure 2).

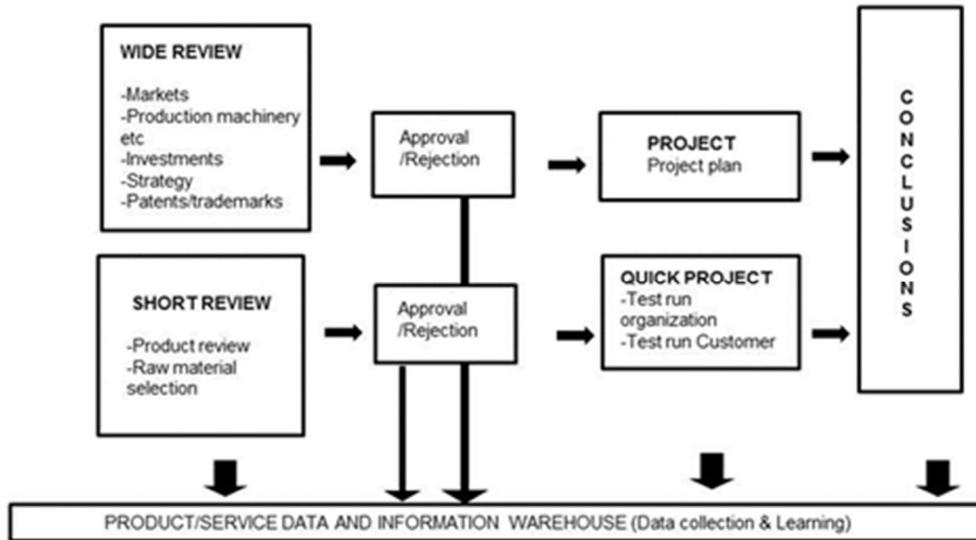


Figure 2. Review on Product and Service Development process.

On the review phase depending on the newness of the idea, evaluations are to be done with two different scopes. If the idea is seen NEW (new to the markets or for the company's product portfolio), product review is to be done very extensive. Markets will be reviewed and needed production equipment are to be reviewed, as well as needed investments. The strategy and decisions done on each level will be checked and reviewed whether the new product will support company's strategy. The needs of the product brand, as well as patent or trademark, will be reviewed at this phase. After this detailed phases, the project is to be launched with the specific project plan.

If the idea is less new, the existing product of variation of it, product review is to be done lightly with basic product definitions and material decisions. After this, tests are to be done within the organization and customer to verify the product. When all projects are at the phase that tests and all needed approvals are finalized, conclusions should be summarized what are the findings of the project; why it was or not the commercialized,

how, what or were the main lessons learned themes and subjects are. The process definition at organization level is not enough to be adopted at the individual level.

Rogers' innovation diffusion theory is one strong basics of organizational level technology adoption theories. Rogers' express five technological attributes that effect on individual adoption decision: relative advantage, technology compatibility, complexity, trialability and observability. (Rogers, 2003) Jundt et al. (2015) thematized adaptive performance as external impacts that cause changes, optimize performance despite changes, both proactive and reactive performance to forthcoming change and the organization level resource of the required competence to achieve performance objectives that are settled.

Early information technology implementation researchers have recognized reasons how and why technology resistance appears in technology implementation (Joshi, 1991). Lapointe and Rivard identified as resistance modes: the behavior, the object of resistance, subject that resists (an individual or a group), perceived threats that are reacted to and initial conditions e.g. regarding social power relations (2005). New technology induces distinct reactions (Martinko et al., 1996) and emotions (Beaudry and Pinsonneault, 2010), and Martinko et al. propose throughout the attributional explanation model by examining organizational internal and external factors that resistance appeared indifference, lack of interest or an active resistance behavior. (1996) Individual evaluates the forthcoming change analyzing benefits and losses comparing outputs between himself, organization levels and other technology users (Joshi, 1991) but determines the possibilities and threats of the new information technology (IT) (Beaudry and Pinsonneault, 2010).

3. Value co-creation in innovation process

External-firm networks are increasingly considered as one significant part of firms' customer value creation. However, Kothandaraman et al. argue that the future competition will change the focus from network level to firm level and the value-creation process with core competence need to be understood as comprehensive processes (2001). The co-creation value process needs an interaction between the customer and supplier in product and service level but also in process level from order to delivery.

What are value creating networks? There are definitions like supply chains or market networks, value chain or value nets (ibid). When defining customer value, it can be defined so that it presents the trade-off between sacrifices and benefits from provider's relationship

and product resources of which customers think and believe to be facilitating their goals. At the same time, quite often customer value changes because customers are changing their own expectations. This aspect is a critical challenge for the providers. Failing to meet customer expectations may lead to dissatisfaction and terminate the customer relationship. (Blocker et al., 2011)

Value and value propositions have become very important factors when organizations are defining and renewing their processes to be more competitive on the markets. Anderson et al (2006) has classified value for resonating focus, all benefits and favorable points of difference. Resonating focus consists of one or two points of differences whose improvement will deliver the biggest value for the customer for the near future and answers to question “ what is the most worthwhile for our firm to remember about your offering “. All benefits mean those all benefits customers received from market offering and answers to question “why should our company purchase your offering? “ Favorable points of difference consist of all the favorable points of differences that a market offering has relative to the next best alternative, and answers to the question “why should our company purchase from you instead of your competitor? “ (Anderson et al., 2006)

New product development needs a customer and a market. Jalonen classified uncertainty that occurs in the market into customer behavior, the uncertainty of competitors’ behavior and the competing products and services in the market (2012). Gutman (1982) emphasis with his Means-End Chain Model that to create understanding how the individual consumer’s and group level customer’s choice of the product or service facilitates to the desired customer expectations and value.

4. The measurement of the innovation process

Ramamurthy emphasizes that IT-system or capacity utilization measurement is useful when the use of the system is participatory (1995). Oreg’s routine seeking of the individual seemed to be the strongest component of resistance to change, and further could predict one’s negative attitude to try on new technology (2003). Tavcar and Duhovnik (2005) explored less attention paid to process and developmental design improve accents based on “product complexity analysis, design level and change engineering.” Change engineering management is constructed of concurrent engineering methods, communication practices, organization and changes in different phases, how the processes

are understood, how decisions are made and how the information systems support organization processes (ibid.)

To understand and measure customer value, firms need to revise and understand their marketing processes (Kothandaraman, 2001). The multi benefit model of choice by Kothandaraman et al. consider individual benefits and firm performance in supply but the value is reflected of customer expectations and weight of benefits. Value network analyses guide the firm to identify the network state or weaknesses and improve the firm position in the network. (Ibid) Regarding value orientation Dobni (2008) examined employee's activity to interaction and for new ideas and common understanding about the best process practices creating value. However, Dobni measured customer and market orientation from the new product and service development capability of the flexibility aspect, like Oreg (2003) suggests their indicator to application with considering consumer behavior.

In all, to promote innovation processes the next researches show an example to which is worth to pay attention. Hurt et al. the baseline for the innovation measurement was individual willingness to change and innovate (1977), the organizational learning to improve capabilities and innovation propensity (Dobni, 2008) and the flexibility and forward way to update old thinking and practices. (Wang, 2004)

4.1. Sample and data collection

This paper express the pilot survey for the smaller respondent group in the case company of those actors which interact with the customer interface, consisting of sale, marketing and customer service actors of 10 respondents because this paper focus is on the external network value creation in product and service design. The later stage the sample is going to include the rest of the units of the internal processes of the case company.

The study was carried out as a quantitative survey during March and April 2017 during one and a half week. For theory verifications and generalizations, quantitative research generally employs a survey design (Creswell 2003), which has been utilized in this research. The data was statistically analysed using SPSS. Frequencies were used to examine the distribution of responses.

4.2. Measures

The survey was based on previous, validated researches with the similarities of the content to this study (e.g. Oreg, 2003; Tavcar et al., 2005; Dobni, 2008). The questionnaire was divided into the themes of the technology adoption and customer value creation that promotes innovation practices. The first theme addressed the understanding and the clarity of the organization technology processes covering the various functions of technology as such, communication practices, organization structure to support development processes, process definition in change situations and the IT-systems that enable knowledge sharing. The second theme focused on knowledge utilization and knowledge sharing. The third part explored organizational flexibility and development, while the last part thematized value creation processes.

5. Results and discussion

The results are expressed as follows: first technology change management in the company is introduced in general, next the information platforms utilization and thereafter how the customer value creation is succeeded.

Engineering change management (Tavcar et al., 2005 model) in the company was very homologous in every criterion: concurrent engineering methods, communication practices, organization and changes in different phases, how the processes are understood, how decisions are made and how the information systems support organization processes. The rank was between 5.1 and 6 of the scales from one to ten (Figure. 3).

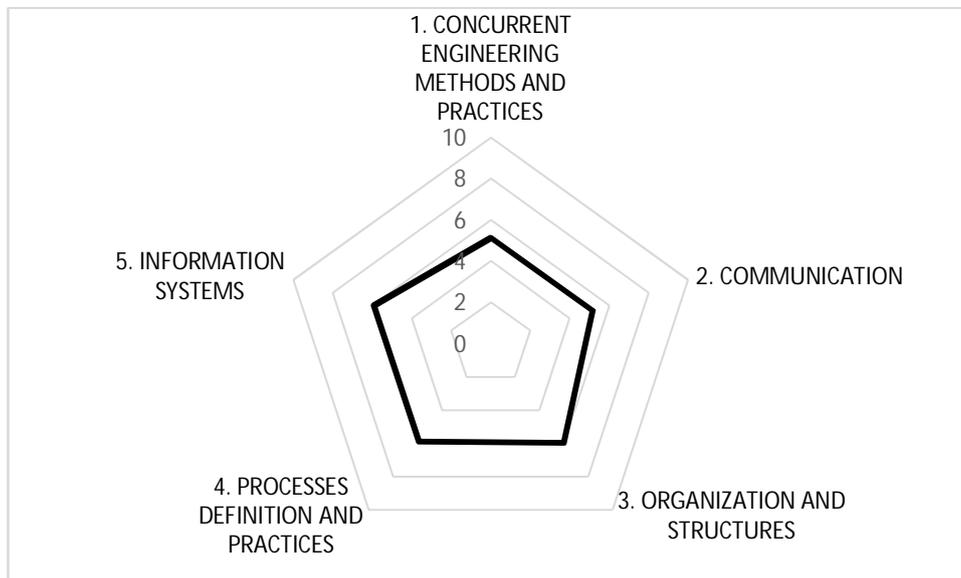


Figure 3. Customer value-creation in innovation process in the case company

Despite the respondents did not give very high scores when evaluated the general technology change management, technology, structures and practices of the company seem to support the innovation processes manifold. Tavcar et al. (2005) showed that access to data especially in the design process and open communication are needed in the change implementation process.

The information systems and database utilization was asked of six existing systems with the scale of zero to ten. Only the company production systems were utilized well though the different unit systems were not integrated. That makes the challenge for the market and sale people because the comprehensive customer history is not visible. Even though the respondents think that the company's practices are flexible to turnabout when necessary with the customer demands. The databases of innovation and ready-made products were quite unknown for the respondents. However, the one who has used the system saw the good potential especially in the customer appointment. The real time information sharing platform was seen very potential in customer interaction and co-creation to exhibit the products and services of the company. The reporting databases were seen very useful which promotes the marketing and sales men work. The biggest gap for the utilization of the databases seemed to be passivity, either the respondents did not know the system or the

explanation was the lack of time resources. Lapointe and Rivard's model explained that individual behavior and resistance in early stage IT implementation to focus on rather than the group entity. (2005) However, Jundt et al. (2015) noticed that earlier studies do necessary not verify that individual differences underpin adaptability in general (e.g. new knowledge and skills).

However, the most potential customer value co-creation environment was seen the place where the stuff and the customers gather and develop the products together into the necessity of the customers. Ramamurthy expressed that systematic planning model could support to consider organization productivity and technological potential but support those attitudes to technology utilization that promote innovation practices (1995) with the customers.

External pre-interaction with e.g. with retailers, distributors or suppliers was not very active to promote value creation. The emphasis is that employee identify what in the process produces value for the customer and in what processes need to be at best to create value. The respondents think that there are no resources enough to forecast competitive and industry environment. Jalonen (2012) emphasis that market uncertainty can occur from the customers, competitors or from other products and services in the market. As Kothandaraman et al. notes, information is becoming the environment (2001), and it has to be considered as integrated into the firm's processes.

Martinsen et al. (2007) noticed in her research that the biggest gaps in the innovativeness of the firms were the lack of the continuous scanning of the possible forthcoming change, the activity of new knowledge and skills sharing, the attitude and willingness to adopt external ideas or create innovations with external partnerships. Their results reveal that focusing on leadership and innovativeness could promote innovation results. (Ibid)

6. Conclusion and theoretical and practical implications

This pilot study identified some challenges in information database utilization that influence on case company innovation practices. Generally, the case company's processes are very functional in business. Operational systems and databases are utilized well but product and innovation databases could be capitalized more for the customer value creation. The access to the information systems and data that are needed is to be ensured as well.

However, for company internal innovation processes and practices could be dedicated more effort and more bravely build customer co-creation opportunities with the partners. For theoretical contribution, our study modifies Martensen et al. (2007) leadership focus on his “conceptual model for measuring innovation excellence” combining people and leadership as one transformer – self-starter, beside the partners and resources in the innovation process while strategic planning is the ongoing process during the innovation process (Figure 4).

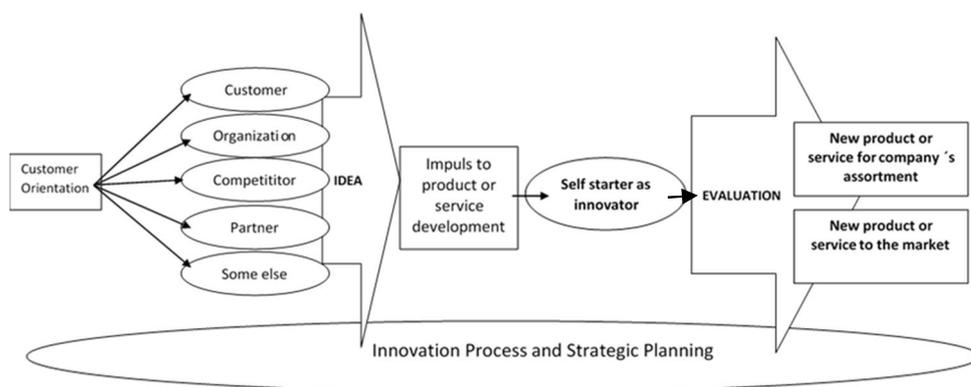


Figure 4. Customer value-creation in innovation process in the case company. (Modified Martensen et al, 2007).

Under innovation uncertainty, as Wang et al. (2004) states, “measuring overall innovativeness ... prescribes the underlying elements of innovation outcomes.” The elderly studies advocate their theoretical status because latter studies repeatedly focus on them (E.g. Hurt, 1977; Joshi, 1991; Martinko, 1996; Denrell et al., 2001; Lapointe et al., 2005; Dobni, 2008; Kim et al., 2009; Lauemr et al., 2012) and thus can guide for the continuity development of the practices. For practical implication, this pilot study guided the research to the next step. From the customer interface challenges in the product and service development process that are identified, are regarded to the self-starter as the innovator in the internal organization practices. The pilot study outcomes are compared that how the customer interaction challenges are understood at organization internal process level and how those individual tasks and choice effect on customer value creation and product and service development. For company level the next step research need to explore how to identify those practices that support individual level innovation capability.

Our research has inherent limitations. The sample is limited to certain organization functions, marketing and sale representatives in certain company. Even though the results reflect the same kinds of specifics, the thesis should be seen as descriptive, rather than universal. Second, the sample is very small, being pilot study, so the results need to establish with next step broader internal organization process research.

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