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ABSTRACT

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Abstract

This research deepens and expands the study of different antecedents leading to the resistance to process innovation within the firms. It concentrates on analysing the correlations between four independent variables: employee's commitments, strength toward the existing habits, self-esteem, knowledge management and three dimensions of resistance of employees in response to the proposed innovations: cognition, emotion and behaviour. The empirical study was conducted in the context of the Textile and Garment industry in Vietnam by utilizing a sample of 96 employees working in the enterprises undergoing the changes in manufacturing process. The outcomes of the study confirmed the influence of loyalty to the organization (a construct of employee's commitment), strength toward the existing habits and self-esteem on three dimensions of resistance to innovation. In terms of knowledge management, only the organizational memory construct affects to the opposed thought, emotion and behaviour of employees while the knowledge acquisition element only impacts on the behavioural perspective of the resistance to innovation. Likewise, essential practical implications are offered for the company's board of management when they deploy changes in business processes.

Key words	resistance to change, process innovation, dimensions of resistance, employee commitment, strength toward existing habits, self-esteem, knowledge management
Further information	

MANAGING EMPLOYEE RESISTANCE TO PROCESS INNOVATION

Case: Textile and Garment industry in Vietnam

Master's Thesis
in International Business

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1 INTRODUCTION

1.1 Background

The contemporary context of business witnesses an increase in innovation, and innovativeness is considered as one of the most important drivers of competition in the industries (Acar & Günsel 2008, 1). Therefore, no company could survive among today's business environment without innovation. Companies implement the changes because of two major reasons. It could be due to both external and internal factors which are over the control of the firm; or innovations are deployed because of the planned and intentional implementation from management. (Singh, Saeed, & Bertsch 2012, 66.) However, whatever the origin of change, employee resistance is a barrier against necessary innovations proposed for the development of the firm (Zwick 2002, 542).

Strebel (2009, 86) mentioned his empirical experience from working with more than 200 managers from 32 distinctive countries who coped with the shocks coming from the rapid change in the market development and technology. The common root cause was the difference in the view toward the change between managers and their own employees. Top-managers recognize innovations as opportunities to enhance the business evolvement and they are willing to confront the challenges to create the breakthrough in their careers. In the other hand, for employees and middle managers, innovations are neither needed nor appreciated because of disruption, intrusion and unbalance. Based on statistics, among Fortune 1000 companies, which applied radical corporate restructuring, the success rates are very low, from 20% to 50%. The reason comes from the resistance to innovation from their own employees. (Strebel 2009, 86). In the similar vein, resistance to the change program is frequently considered as the number one cause leading to the difficulties or even failure of initiative implementation within the firm (Erwin & Garman 2010). In a different aspect, employees do not always resist the changes, they even show positive attitudes if they understand the benefits of innovations clearly. However, it is popular to find an employee committing any types of resistance to change. (Berna-Martinez & Macia-Perez 2012, 153.)

The origin of innovation is from the word "novus" in Latin, which means that making something new (Gopalakrishnan & Damanpour 1994, 95). For decades, there have been many definitions about innovation. According to Drucker (1998, 21), innovation is con-

sidered as the benefits which are created by utilizing new resources or enhancing the capacity of existing resources. OECD (2005) defined innovation as a process making business ideas to the commercial products or services in the market, the new ways or improvements in producing or distributing, or a new method of social service. In the other words, innovation is considered to be a process including several different steps from idea formation to implementation (McAdam & McClelland 2002, 114).

Schumpeter (1934, 66) divided innovation into five distinct kinds. Two types: (1) utilization of cutting-edge methods in manufacturing and (2) new supplier acquisitions for raw material or semi-finished goods are recognized as process innovation. The other three kinds are: (3) product innovation, in which new items or new qualities of existing products are launched in the market, (4) setting up a new market, and (5) newly-established construction of the industry, such as formation or elimination of monopoly position. (Schumpeter 1934.) While OECD (2009) categorized innovation into four kinds: "product innovation, process innovation, marketing innovation and organizational innovation". This study will focus on the process innovation, which refers to the great changes in the method of manufacturing or delivery. It consists of huge improvements in techniques, machinery, equipment and/or software. (OECD 2009.) The reasons why process innovation is concentrated on will be explained in the following section.

Employee's resistance to innovation is considered as a psychological form determining whether the implementation of the change within the organization is successful or not (García-Cabrera & Hernández 2014, 442). Giangreco & Peccei (2005, 1819) suggested the model of resistance to change, which was assumed as the classic model of this phenomenon (Peccei, Giangreco, & Sebastiano 2011, 186). That model demonstrated the relations between resistance to changes and two other factors. They are, first, the level that employees perceive the benefits of the changes and, second, the extent to which individuals get involved in the change initiatives. (Giangreco & Peccei 2005, 1819.) It is concluded that these two mentioned factors negatively correlated with the resistance to innovation in employees (Giangreco & Peccei 2005).

There have been many researches which approached employee's resistance to innovation from unidimensional construct. That means resistance to change has just been analyzed from different single angles, which are cognition (e.g. Watson 1982), emotion (e.g. Argyris & Schön 1978), and behavior (e.g. Coch & French 1948). In the other hand, the term of resistance to innovation was also approached from multidimensional perspective (e.g. Piderit 2000). An employee could express behaviors, which are in favor of change

initiative, but he or she could have the thoughts and/ or emotions of rejection. (García-Cabrera & Hernández 2014, 442).

Majority of innovations within the firms would face the opposed attitudes from their own employees (Oreg, 2006). This could pose threat to the competiveness of the company (Zwick 2002, 550). If management do not figure out the signals of resistance and solve them promptly, the level of resistance to innovation will be intensified (Berna-Martinez & Macia-Perez 2012, 154). Thus, if employees mistrust the changes and the problem is not treated, they would be highly possible to commit higher level of resistance which are non-cooperation and hostility (Berna-Martinez & Macia-Perez, 154). The change itself poses threats to the current positions and benefits of employees, both from the manager level to worker level. The uncertainty feeling – cynicism – coming from the inside causes a big effect to the outside behavior. Even if a firm has a good plan in deploying innovations, the plan cannot be successful without support from their own employees. (Langton & Robbins 2007.) Resistance to change might hinder the change process and it is linked with various negative consequences, such as reduced productivity, decreased job satisfaction, absenteeism and turnover (Van Dam, Oreg, & Schyns 2008, 314). Therefore, it is really important that organizations have the perceptions about this phenomenon (Giangreco & Peccei 2005). In the other words, management should know in advance when their own employees are easy to resist innovations deployed in the company to have suitable responsive strategies (Zwick 2002, 550).

1.2   Research gap and purpose of the study

Resistance to innovation in the organization has grasped great attention of many scholars, which is showed through long-standing interests in the nature, causes of resistance to change and strategies to overcome them. In spite of increased interest in resistance to change, studies in this field, and particularly, antecedents of resistance to innovation within the organization are still insufficient. Much of resistance to change literature just identified the ways in which opposed attitudes are best alleviated, in lieu of figuring out the precedents leading to this phenomenon within the firm. As a result, there are not many available studies reflecting the insightful analysis about antecedents generating the resistance to innovation inside the firms. (Giangreco & Peccei 2005, 1812.)

Process innovations are at "the heart" of improving the performance of production process (Acar & Günsel 2008, 2). It can bring many benefits for enterprises: (1) minimiz-

ing the process time leading to higher productivity and efficiency; (2) increasing the competence to produce variety of products; (3) enhancing the quality of production output, thus creating remarkable products; and (4) reducing wastage and rising the reliability of products (Acar & Günsel 2008, 2). Furthermore, to gain competitive advantages, firms need to improve both product and processes. Especially, in manufacturing companies, the relationship between product and process innovation is reciprocal. The quality of products cannot be improved without innovation in manufacturing process. However, despite the important role of process innovation, most of related researches have just focused on product innovation while process innovation has not been paid attention sufficiently. (Frishammar, Kurkkio, Abrahamsson, & Lichtenthaler 2012, 519.) In the similar vein, although the product and process innovation are the focal points of innovation, much of previous studies about innovation concentrate on general product innovation. It would be a missing point to perceive the innovativeness in the boundary of product development. (Acar & Günsel 2008, 2.) These above arguments are the reasons why this study concentrates on figuring out the antecedents of employee's resistance to process innovation, which could be partially fulfill the gap of major previous researches. Thus the main research question of this study is: What are the barriers preventing employees from adopting the process innovations within the firm?

Resistance to change could be generated in different levels, which are organizational level, group level, and individual level (Singh, Saeed, & Bertsch 2012, 68-69). This study will approach the resistance to process innovation from individual level. Previous literature about the innovation mentioned that employee's resistance in response to the proposed changes within the companies is influenced by several antecedents coming from both employees themselves and their organizations (García-Cabrera & Hernández 2014, 442). Employee's traits, qualities, and self-perception affect to the extent to which they are able to cope with the changes (García-Cabrera & Hernández 2014, 443). Similarly, the differences between individuals could explain for the unequal inclination to accept the changes within the firm (Holt, Armenakis, Feild, & Harris 2007). However, there are not many studies focusing on analyzing the characteristics or personalities of employees and their impacts on resistance to innovation (García-Cabrera, Álamo-Vera, & Hernández 2011, 232). Therefore, the first sub-question for the study is proposed: *What are the individual barriers preventing employees from adopting the process innovation within the firm?* This question would not only support for the main one, but also make a contribution

to increasing the number of studies approaching the relations between individual attributes and resistance to change initiatives.

Organizational context refers to the conditions or environment within the firm where employees conduct their jobs or responsibilities related to their functions (Holt et al. 2007, 234). The characteristics of the organizational context play important role to the success of innovation implementation (Holt et al. 2007) because they possibly influence on how the change initiatives are deployed, and how employees' reactions to the change events are (Van Dam et al. 2008, 314). In fact, the need to include the organizational causes into the researches about resistance to change should be emphasized (García-Cabrera et al. 2011, 232).

On the one hand, previous researches have paid much attention to several attributes of organizational context and their relations with employee's reaction to change initiatives, such as leadership (Whelan-Berry, Gordon, & Hinings 2003; Van Dam et al. 2008), organizational climate perception (Van Dam et al. 2008), and organizational culture (García-Cabrera et al. 2011; Abdul Rashid, Sambasivan, & Abdul Rahman 2004). On the other hand, Van Dam et al. (2008, 330) suggested that future studies should discover the possibility that employees commit resistance to change is affected by new factors in the organizational context. Therefore, this study will not focus on these organizational antecedents mentioned above. Instead of that, knowledge management, or in other words, learning organization is selected to support the main research question.

There are a couple of reasons explaining for this selection. First, knowledge management plays a crucial role to motivate employees to support the continuous changes within the firm (Holt et al. 2007, 234). Secondly, although learning organization has been appeared in many prior researches, it has just been studied from the aspects of how knowledge is created, absorbed and diffused within the firm. There has not been any conceptual approach about the relation between knowledge management and uncooperative attitudes of individuals when they confront with the change events. (Rahe & Morales 2005, 49.) Thus, the second sub-question will be included in this study: *How does knowledge management affect to the process innovation adoption of employees within the firm?*

1.3   Structure of the research

In chapter 2 and 3, two primary concepts: process innovation and employee's resistance to innovation will be discussed respectively. Then, the hypotheses about the antecedents of resistance to innovation of the study will be suggested in the end of the chapter 3. Subsequently, the initial framework of the research is built based on theoretical background.

Chapter 4 will mention the strategic research approach, the introduction of the Textile and Garment industry of Vietnam as the study's context followed by the demonstration of how empirical data was collected and analyzed. The findings of this study will be revealed and compared to theoretical background in chapter 5. Subsequently, the research conclusions and the final framework will be suggested in chapter 6. Finally, the summary is proposed to help the readers wrap up the most important points of the research.

2 PROCESS INNOVATION

Chapter 2.1 mentions the different views of the process innovation from prior researches, as well as distinctions between innovation and related terms, such as creativity and invention, which are usually applied interchangeably. Subsequently, chapter 2.2 will discuss two kinds of process innovations, which are radical and incremental process innovation.

2.1 Definitions of process innovation and related terms

First and foremost, a process is a particular chain of activities occurring across the time and place. It is considered as a structure of actions which includes the starting and ending points with clear inputs and outputs. (Papinniemi 1999, 95.) Business process is an organized chain of actions constructed to manufacture particular products or services for internal or external customers. The activity in business process is a consolidation of people, raw materials, methods, environment and technology. Business process emphasizes on how the thing is done in an enterprise while the product focuses on what. (Papinniemi 1999, 95-96.) Process innovation is also defined as the improvement in the manufacturing process including the application of new equipment, methods, materials and work systems (Cunliffe 2008, 106). From another approach, business process innovation is considered as the capability to form new processes by applying the cutting-edge technologies in prediction of, or in response to the customers' demands (Scannell, Vickery & Droge 2000, 32).

From the view of relation between companies and their strategic suppliers, process innovation is the competence to develop new processes by utilizing the state-of-the-art technologies to predict or meet the requirements of suppliers (Schniederjans 2018). Especially, in manufacturing companies, process innovations are deployed to produce new products with lower level of pollution to save energy and more importantly to enhance productivity (Baily & Chakrabarti 1985, 610). At the bottom line, by combining the views of researchers mentioned above, process innovation in this study refers to the development in business process including input material, equipment, and technology applied for product or service formation. The underlying roles of process innovation are to improve the output productivity, to meet the demand of external customers, and to create the economic impact for enterprises.

In many previous studies, the terms of innovation and creativity are usually applied interchangeably leading to the confusion (McAdam & McClelland 2002, 113). Therefore, it is important to distinguish the differences between them. Creativity is simply perceived as new ideas formation while innovation requires a chain of complex actions, which are analyzing, refining and critically implementing the ideas from creativity process. Divergent thinking is the feature of creativity while innovation requires the convergent thinking ability. In general, innovation is the process transferring creative ideas into actions, which makes innovation much more complicated than creativity. (Gurteen 1998, 6.)

Another two terms which are also understood interchangeably are innovation and invention. An invention might be asleep for many years before entrepreneurs discover innovation applying for mass production. (Hacioglu, Akdemir, & Sener 2017, 204.) Inventions become innovations when they involve in manufacturing process and make contribution to productivity resources (Rosenberg, 1974). In other words, Schumpeter (1912) defined invention as new ideas formations, which are changed to technologies systematically while innovations turn the invented ideas into the forms of products and commercialize them in the market. This example clearly differentiates between invention and innovation. With the effort to help the deaf, Graham Bell invented telephone. This does not have any economic motive. However, the iPhone definitely was an innovation because Steve Job had turned the new ideas into mass production and the new products created a significant economic value amount to the original invention. (Hacioglu et al. 2017, 204.)

2.2   Types of process innovation

Innovation in previous researches consists of several kinds varying in scope, depth and objective. It could be categorized into administrative and technical, technological and architectural, product and process, and incremental and radical. (Koberg, Detienne, & Heppard 2003, 23.) In the scope of this study, radical and incremental innovation would be discussed.

2.2.1   Radical process innovation

In fact, there are several viewpoints about the definition of radical innovation among innovation literature (Reichstein & Salter 2006, 655). Radical process innovation refers to considerable development compared to the current rate of progress (Gatignon, Tushman, Smith, & Anderson 2002, 1107). Process innovations are radical if they are developed by the companies and they are new to both firms and industries (Reichstein & Salter 2006,

656). This term also refers to huge enhancements in production or assembly processes of the firm (Schniederjans 2018, 637).

From another different approach, Koberg et al. (2003, 23) supposed that radical innovations include the changes with higher level, which could generate new industries, products, or markets. They consist of dramatic technological innovations that "no increase in scale, efficiency, or design" could make the older ones competitive (Tushman & Anderson 1986, 441). In the similar vein, Henderson & Clark (1990, 9) argued that radical innovations would develop, shift the technological processes of the firms and "open up new markets and product applications" whether these innovations are created internally or externally. Combining the work of Tushman & Anderson (1986) and Koberg et al. (2003), the radical innovation in this study refers to the strategic developments in "product/services, markets served, and technological breakthroughs used to produce a product or render a service based on significant innovation".

2.2.2 Incremental process innovation

Incremental process innovations refer to those innovations making the improvement in "performance at a rate consistent with the current technological trajectory". It is when the firms apply the changes, which are new to them, but available in the industry. (Reichstein & Salter 2006, 656.) Furthermore, incremental business process innovation also refers to the change of the tool, adjustment in information technology infrastructure, or a slight change in training of employees (Schniederjans 2018, 637). However, from another different approach, it is argued that incremental innovation is categorized into three different kinds: continuous, modified, and process. Continuous innovation refers to "augmented changes to products" (e.g., extended product line), modified innovation is defined as the minor change, for example, the launching of a new technology whose functions are basically similar to the current ones (e.g., updated computer software). Process innovation refers to more advanced method to produce the existing products. (Herbig 1994.) Based on the work of Herbig (1994), Koberg et al. (2003) suggested a broader definition of incremental innovation, which is referred in this study. Thus, incremental process innovations consist of: (1) procedural (innovations in rules and procedures are ratified by management); (2) personnel-related (changes in human resources practices, such as selection or training people); (3) process (new production methods); and (4) structural (adjustments to equipment and facilities involved into manufacturing) (Koberg et al. 2003).

3 EMPLOYEE RESISTANCE TO INNOVATION

Chapter 3.1 aims to create boundary of resistance to innovation by discussing the defini-tion of this term from various approaches while chapter 3.2 provides the multi-dimen-sional nature of individual resistance to innovation. The following chapters 3.3 and 3.4 will discuss barriers preventing employees from adopting process innovation within the organization. In these two chapters, the hypotheses are suggested based on the theory leading to the formation of initial framework of the research in chapter 3.5.

3.1 Definition of employees' resistance to innovation

Resistance to change has been studied by many researchers. This term is often considered as a stumbling-block of implementation or failure of innovation in the firms (Erwin & Garman 2010, 39-40). That is the reason why employees' resistance to innovation has been cited as the most important factor when management implements the innovations inside the company (Bovey & Hede 2001, 372). Prior studies have suggested broad and divergent definitions of employees' resistance to innovation (Erwin & Garman 2010, 42). Many scholars assumed that resistance to change refers to negative reactions and hostility aiming to oppose against or prohibit the proposed innovations (Erwin & Garman 2010, 40; García-Cabrera & Hernández 2009, 444). It can be perceived from such definition that resistance to innovation among employees' is a problem that management of the firm needs to solve and defeat (Piderit 2000).

In fact, resistance to innovation is commonly portrayed as a behavior state in many prior studies (Piderit 2000). For instance, resistance behaviors refer to specific actions or deliberate inactions that employees defy, fight against, or avoid the proposed changes inside the firms (Brower & Abolafia 1995, 151). Resistance behavior was also defined as intentional action of disobedience or omission (Piderit 2000, 785). Giangreco and Peccei (2005, 1816) defined employees' resistance to innovation as a form of dissent to changes reflected through unpleasantness and disagree. Anti-change behaviors could be exposed as various forms, such as explicit versus implicit (Giangreco & Peccei 2005, 1816) or active versus passive (Erwin & Garman 2010, 42).

On the other hand, many scholars approached resistance to innovation from emo-tional perspective (Piderit 2000, 785). For example, Coch and French (1948) suggested their preliminary theory about resistance to change in which there are forces or common

patterns of feeling producing the frustration among employees and leading to undesirable behaviors. Besides behavioral and emotional perspectives, prior studies pointed out that resistance to innovation can be solved cognitively. That means negative thought might be the antecedent of resistance to change. (Piderit 2000, 786.) For instance, Armenakis, Harris, and Mossholder (1993), in their study, emphasized on the role of readiness of employees in adopting the innovations in the firms. They mentioned that the formation of readiness for changes includes the individual cognition transformation. (Armenakis et al. 1993, 683).

Piderit (2000) mentioned the forms of resistance to innovation in a different approach. Thus employees' opposition to innovation is perceived as tri-dimensional phenomenon: (a) cognitive dimension refers to negative perception of the change leading to the opposed opinion; (b) emotional dimension consists of negative emotions about the change, such as anxiety, frustration, etc.; and (c) behavioral dimension determines the actions against the innovations of employees. By that way, employees could oppose to the proposed changes within the organization with these three facets of resistance simultaneously. (Piderit 2000.)

Nevertheless, resistance to innovation of employees in many prior researches has been approached actively, directly, and positively. Thus, resistance to change might have positive effects on firms in terms of refining the strategic business plan (Mabin, Forgeson, & Green 2001, 168.) and supporting management of the firm in making decision (Erwin & Garman 2010, 40). Resistance to change among employees could be perceived as the source of information, which is beneficial for the companies to learn how to make the change process better (Pardo Del Val & Martínez Fuentes 2003, 148).

The main research question is to figure out barriers preventing the employees from adopting process innovations within the firms. Therefore, the term of resistance to innovation will be approached negatively. Thus resistance to innovation in this research is defined as negative attitudes which include cognitive, emotional, and behavioral elements. Individuals resisting the changes might logically assess the innovations as being atrocious, they might feel anxious when they learn about the change, and they might oppose the proposed innovations explicitly through bad behaviors, such as speaking among the other colleagues, or trying to influence them to inhibit the proposed innovations inside the firms. (Piderit 2000.)

3.2   Multi-dimensional nature of employee resistance to innovation

It can be said that the nature of resistance to innovation has been approached from a number of dimensions. They are categorized by many different ways in prior researches, such as (1) cognitive, emotional (affective), and behavioral (intentional); (2) conscious/ unconscious or deliberate/ not deliberate; (3) active/ passive. (Smollan 2011, 830.) However, the approach of categorizing resistance to change into conscious/ unconscious or deliberate/ not deliberate; and active/ passive were included in three dimensions: cognition, emotion and behavior in prior researches. For example, among resistance thoughts, feelings, and behaviors mentioned by Piderit (2000), employees may consciously resist the changes within the firms or they are not aware of their responses to change to be considered as resistance. Many prior cognitive and social psychology researchers assumed that conception, emotion, and behavior normally exist as unconscious or semi-conscious forms (Smollan 2011, 831). Moreover, the terms of active and passive resistance have been attached to behavioral dimension (Smollan 2011, 832). Therefore, in the context of this study, three dimensions of resistance to innovation: cognition, emotion and behavior would be focused on. With this tridimensional approach, the study will provide a subjective and complex viewpoint about employee's resistance to innovation (Oreg 2006, 74).

3.2.1   Cognitive dimension

The cognitive element of resistance to innovation refers to the "negative interpretation of innovation leading to an opinion to resist the changes" in the firms (Piderit, 2000). Likewise, it is argued that cognitive dimension includes how employees conceptualize or perceive about the innovation (Erwin & Garman 2010, 43). Thus, there are many questions asked by employees about the innovation, such as: Is it really necessary? Will it be beneficial? (Chung, Su, & Su 2012, 737.) Or which values and benefits do the innovations bring to? Will they do more harm than good to the department, the organization, or employees themselves? (Erwin & Garman 2010, 43.)

According to the fundamental theory of cognitive approach, employees have tendency to form irrational automatic internal thoughts, which are based on misperceptions and wrong assumptions. Those could lead to the emotional and behavioral confusions. In the similar vein, Ellis, who is considered as one of the pioneers of cognitive approach, also suggested that the emotions and behaviors of each individual rely on the way their

thoughts are structured. (Bovey & Hede 2001, 373.) Beck (1988) argued that individuals tend to create negative self-schema about themselves resulting in the pessimistic attitudes. These systematic errors are defined as cognitive distortions (Bovey & Hede 2001, 373). Beck (1988) suggested "11 cognitive distortions: tunnel vision, selective abstraction, arbitrary inference, overgeneralization, polarized thinking, magnification, biased explanation, negative labelling, personalization, mind reading and subjective reasoning". They are automatically created in mind rather than reality reflection, because they happen internally without being tested and people perceive them as the true things resulting in the distorted reality. During the innovation process, if there is not sufficient information about the proposed innovations, employees who feel under threat or anxious are more likely to form their own perceptions about what are going to happen and assume themselves what the others are thinking or intending. (Coghlan 1993, 11-12.) If these cognitions and distortions are wrong, employees will have inadequate commitment and negative assessment toward the innovations leading to resistance to change (Erwin & Garman 2010, 43).

In line with Coghlan (1993), Lazarus (1991, 353) argued that the available information about the innovation is considered as the great source for employees to interpret and evaluate the importance of innovations and potential personal consequences. Prior researches pointed out that perceived benefits could impact most on cognitive evaluation toward innovations because this factor is considered as the main reason for resistance. Thus, the recognition of potential benefits of the innovation would support the positive thoughts and resistance reduction. (García-Cabrera & Hernández 2009, 445.)

3.2.2   Emotional dimension

Emotional dimension refers to emotions of individuals which are related to actions (Piderit, 2000). Emotions is defined as a "state of arousal" including "facial and bodily changes, brain activation, subjective feelings, cognitive appraisals, which can be either conscious or unconscious, rational or irrational, and with tendency toward action" (Bovey & Hede 2001, 374). Oreg (2003, 683) generalized that the affective dimension consists two elements: (1) the amount of anxiety and stress that employees might deal with; and (2) the extent to which employees are distracted due to the temporary inconveniences caused by the innovation. Fundamental emotions which employees experience during innovation process include sadness, fear, anger, or joy, etc. (Bovey & Hede 2001, 374). In the similar vein, the emotional perspective of individual reactions to change refers to how

people feel about the change. It consists both positive (e.g. supporting or enthusiasm) and negatives (e.g. anxiety, anger, or fear) attitudes. (Erwin & Garman 2010, 43.)

Employees might have the anger, loss, denial, and frustration when they experience organizational fluctuation (Spiker & Lesser 1995, 17), or the changes in the way of doing things (Bovey & Hede 2001, 374). When employees fail to adopt the change emotionally, they will start to commit the resistance to innovation (Spiker 1995, 45). Similarly, individuals whose emotions fluctuate are supposed to have less belief in their abilities to cope with the change events. This makes them easier to resist the change initiative. (Oreg 2003, 684.)

3.2.3 Behavioral dimension

Resistance to innovation has been perceived as observable behaviors in many prior researches (Mumby 2005). This is because it is easier to observe the behaviors while thoughts and emotions of individuals are much more difficult to detect (Smollan 2011, 830). Behavioral dimension includes "how an individual behaves in response to change, for example: embracing it, complain about it and/ or sabotaging it" (Erwin & Garman 2010, 43). The behavior of resistance to change exists as the form of dissent. Anti-change behavior is often expressed passively rather than explicitly. (Giangreco & Peccei 2005, 1816.) Thus, employees will not actively support the change, or by implicit way, they hinder the rate of innovations within the firms (Erwin & Garman 2010, 42-43). Lines (2004, 198) argued that the resistance to innovation includes behaviors with aim of slowing down or eliminating the changes within the organization.

Active resistance to change is often visible. It refers to unequivocal rejection or insurrection or it could be showed as complaints and counter-suggestions. (Smollan 2011, 832.) Employees might resist the innovation within the firms passively by hesitation, absentmindedness, or apathy, which might be considered as unconscious or undeliberate form (Smollan 2011, 832). However, resistance to change is approached from a more deliberate perspective, for instance, pretending ignorance or restraining information (Hultman 2006). While employees who ignore, postpone the changes, or even give up the responsibility of their jobs and leave the company commit the passive form of resistance, individuals who threaten to resign from the organization are showing the active and overt resistance. (Smollan 2011, 832.) Middle managers have tendency to commit resistance to innovation passively or cautiously. Thus, instead of voicing their refusal about the

changes, they will try to find the way not to support and facilitate the changes within the organization. (Giangreco and Peccei 2005.)

3.2.4 Relation between three dimensions of resistance to innovation

Chung et al. (2012, 743) pointed out that among these three dimensions, both cognitive and affective resistance could connect with the behavioral resistance. Affective resistance could lead to behavior of resistance. For example, the dissatisfaction could lead to the labor strikes in the firm. Cognitive resistance is also able to trigger the behavioral resistance. (Chung et al. 2012, 738.) For instance, an employee who is absent-minded in the meeting is more likely to resist the proposed changes mentioned in the meeting (Armenakis et al. 1993).

Additionally, it is suggested that there is a connection between cognitive state and emotional state. For example, feeling anxious about being laid off is more likely to "drive employees to cast doubt on the decision-making process". (Chung et al. 2012, 738.) However, Piderit (2000) mentioned that these three dimensions are often misaligned leading to the ambivalence. For instance, employees might think that the innovation is beneficial and they even feel excited because they see the potential opportunities created by the change, but simultaneously, they could present the anxiety and the fear due to new responsibilities required by the innovation (Smollan 2011, 830-831). An individual might enthusiastically agrees with the innovation while he or she does not concentrate on taking essential actions for implementation of the change (Erwin & Garman 2010, 43).

3.3 Individual barriers of the employees' resistance to process innovation

The term of individual attributes is one of important instruments associated with resistance to innovation within the firms. Because of different individual traits between employees, some of them are more likely to express the favor attitudes toward the change events while the others are not. (Holt et al. 2007, 234.) This chapter will focus on analyzing three different individual antecedents of employee resistance to changes: employee commitment comprising two constructs: loyalty to organization and loyalty to direct manager, strength toward existing habits, and self-esteem.

3.3.1 Employee commitment

Organizational commitment is defined as the "psychological attachment of employees" to their organization (Allen & Meyer 1990, 2). In the similar vein, Strebel (2009) argued that it is the mutual expectations and commitments, which are built from the feelings of

trust and dependence between employees and employer. This term is associated with positive effects, such as "job satisfaction, motivation, and job-related performance". However, organizational commitment of employees also was found to correlate negatively with "absenteeism and turnover". (Becker, Billings, Eveleth, & Gilbert 1996, 464.)

The term of organizational commitment was initially suggested by Mowday, Porter, and Steers (1982). According to them, organizational commitment consists of three constructs, which are the acceptance of firm's goals or values, the attempt on behalf of the company, and the willingness to attach with the organization. However, according to Becker et al., (1996), the commitment of employees to their company should be focused on two dimensions: identification and internalization. Organizational identification happens when employees admire and feel proud of their own organization because of its values and achievements. Internationalization occurs when employees adapt the values, the norms of their organization with the condition that these values should be similar to their own value systems. (Becker et al., 1996.) Organizational commitment is a direct factor influencing on resistance to change (Peccei, Giangreco, & Sebastiano 2011, 190). Because of employee's psychological desire of attachment to the identification of the firm and the firm's internalization, individuals who have higher levels of commitment to the company are more likely to perceive the working environment and organizational events positively and engage in innovation activities (Meyer and Allen 1997).

According to Chen, Tsui, & Farh (2002, 340), the loyalty to supervisor is developed from the organizational commitment theory. Becker et al. (1996) also viewed the employee's loyalty to supervisor under two dimensions: identification with supervisors and internalization of supervisor's values. Thus identification refers to the thing that employees admire the attributes, attitudes, behaviors, or personalities of their supervisors and desire to be associated with them. Internalization is considered as the adaption of employees to attributes of supervisors if those meet their value system. (Chen et al. 2002, 340.)

Moreover, in a research about antecedents of employees resistance to change of Strebel (2009), he also brought the loyalty to supervisors and organizational commitment into the discussion. Thus, from the psychological dimension, managers expect their employees to show their loyalties and willingness to do whatever to complete the tasks, and they also observe and assume which kind of commitment their employees show. The employees could determine their commitments to their companies by asking these kind of questions:

- "How hard will I really have to work?"

- "What recognition, financial reward, or other personal satisfaction will I get for my efforts?"

- "Are the rewards worth it"

Employees will form the set of response to these questions by assessing the relationships between them and their managers. The loyalties and commitments of employees will closely become their beliefs, which are connected with the willingness to recognize their efforts from their managers. (Strebel 2009, 88.) From the social dimension referring to what employees perceive the main goal of their company, employees will interpret the values of the firm into their beliefs about the operation of the company, implicit rules applying to career development, promotions, risk-sharing, lay-off. Company's statements should be lined up with behaviors of management. Because this alignment is the key for company to gain employee's loyalty. (Strebel 2009, 88.) Hence, based on existing researches mentioned above, this study expects that employees who have strong commitments to their organization and supervisor are more likely to engage in innovation activities of the firm. Thus a set of hypotheses is suggested to test through this research.

Hypothesis 1: The higher loyalty of employees toward their managers and their organization, the lower cognitive resistance (hypothesis 1a), emotional resistance (hypothesis 1b) and behavioral resistance (hypothesis 1c) employees commit in response to process innovation within the organization.

3.3.2 Habit toward existing practice

Habit is defined as a learned process in which the responses to specific context are generated automatically (Polites 2005, 265; Gardner, Sheals, Wardle, & McGowan 2014, 1) to acquire certain goals or end-states (Polites 2005, 265) and as the tendency of past behaviors repetition in the stable and supporting context (Ouellette & Wood 1998). While some researchers assumed that habit is "nonvolitional" and unconscious, habit is also approached as automatic and routinized behaviors (Polites 2005, 265).

Many earlier researches have mentioned the term of habit toward the existing practice. For example, this term is defined as behavioral steps, in which employees choose, acquire and use the existing practice (Sheth 1981, 275). Changing habits, which is to alter the ways individuals actually conduct their work, is essential for organization (Lorenzi & Riley 2000, 120). However, it will be extremely hard for the firms to grab the voluntary attentions to innovation communication and commitments to try it out from employees without any incentive motivation (Sheth 1981, 275).

Strength of habit linking with the current routines is assumed as the single most powerful factor in resistance to innovation among employees. This is because human being has tendency to turn the perceptions and cognitions into their habits. (Sheth 1981, 275.) Employees feel comfortable with the existing practice in their jobs and do not want to adopt any changes (Singh, Saeed, & Bertsch 2012, 69). The origin of resistance to technical changes is from the habit of pursuing the common process and "the consideration of pass effort in maintaining the status quo" (Singh et al. 2012, 68). As mentioned in the chapter 2.1, innovation process includes the development input material, equipment, and technology applied for product. Therefore, employees have tendency to follow the existing practices in material, equipment and technology. Thus, hypotheses below will be examined in this study.

Hypothesis 2-1: The greater strength of habit toward existing practices in input material in manufacturing process, the higher cognitive resistance (hypothesis 2-1a), emotional resistance (hypothesis 2-1b), and behavioral resistance (hypothesis 2-1c) employees commit in response to process innovation within the organization.

Hypothesis 2-2: The greater strength of habit toward existing practices in equipment and technology in manufacturing process, the higher cognitive resistance (hypothesis 2-1a), emotional resistance (hypothesis 2-1b), and behavioral resistance (hypothesis 2-1c) employees commit in response to process innovation within the organization.

3.3.3 Employees' self-esteem

Self-esteem has been mentioned in many earlier studies. For example, Korman (1976, 51) assumed that self-esteem is " the extent to which one sees the self as competent, need-satisfying individual". Self-esteem is evaluated based on the expectation of the others to the level they (a) consider any individual is capable of doing specific things, and (b) they show these thoughts through their behaviors toward individual, which makes the self-perceived capability of individual about the tasks increase. (Korman 1976, 51.) Within the organizational context, self-esteem refers to the employees' perception of their own values in the company. Self-esteem could be a key quality to differentiate any employee from the others in terms of how they confront and adapt to stressful situations. (Taylor & Brown 1988.) Employees who have high self-esteem level will perceive themselves as important, worthwhile and competent members of the organization, therefore, they will maintain and develop more favorable attitudes toward activities in the firms (Pierce, Gardner, Cummings, & Dunham 1989, 625). Pierce et al. (1989, 622) emphasized that

individuals would develop the attitudes and behaviors which are compatible with their self-esteem level. In other words, these attitudes and behaviors are consistent with the perception they hold about their level of individual competence (Pierce et al. 1989, 622). However, individuals without or with low rate of self-esteem at work have tendency to be passive, as well as resist new challenges or responsibilities, because they think that they do not have adequate capabilities to tackle them successfully (García-Cabrera, Álamo-Vera, & Hernández 2011, 237).

In fact, among the change program within the organization, the research of Ashford (1988) suggested that self-esteem negatively correlates with the stress that employees commit in one week before the introduction of the change inside the firm. The change itself brings stressful experiences for individuals, however, employees possessing higher self-esteem level are able to overcome the challenges with positive attitudes (García-Cabrera et al. 2011, 237). From that, another hypothesis will be experimented in this study.

Hypothesis 3: The higher self-esteem of employees, the lower cognitive resistance (hypothesis 3a), emotional resistance (hypothesis 3b), and behavioral resistance (hypothesis 3c) employees commit in responses to process innovation within the organization.

3.4   Knowledge management and employees' resistance to process innovation

Knowledge management is defined as "the managerial efforts in facilitating activities of acquiring, creating, storing, sharing, diffusing, developing and deploying knowledge by individuals and groups" (Zheng, Yang, & McLean 2010, 764). Previous studies have identified many frameworks of knowledge management (Zheng et al. 2010, 764). For example, Zheng et al. (2010) mentioned three types of process of knowledge management, which are knowledge creation, sharing and utilization. Knowledge creation refers to the knowledge acquisition from external sources and self-creation by individuals of organization. Knowledge sharing or knowledge diffusion includes activities in which knowledge is diffused from person to person, or from person to group, or from group to group. (Zheng et al. 2010, 764.) Finally, knowledge utilization or knowledge implementation refers to the processes which manage the actual use of knowledge (Gold, Malhotra, & Segars 2001, 191). From a broader view, Hughes, Morgan, and Kouropalatis (2008, 1375) argued that knowledge management consists of not only three mentioned components: information acquisition, knowledge distribution and knowledge utilization, but

also the retrieval of memory referring to database where employees could access to and keep updated what is happening within their own organization.

In fact, knowledge sharing capability can affect to innovation transferring (Darr, Argote, & Epple 1995). Traditionally, the term of knowledge sharing has been dominated by information technology. However, it can be seen that there is an increasing in the role of individuals in the knowledge sharing process. (Ipe 2003, 338.) Knowledge sharing is essential because it creates the link between organization or management and their employees leading to the distribution of innovative ideas within the firms (Ipe 2003, 342).

Knowledge management capability refers to the ability that information from different sources is absorbed and integrated into organization. It can create the sense-making system in which employees reorganize, accept, and share new information. (Zheng et al. 2010, 765) Moreover, in the section of cognition dimension of this study, the importance of information about the proposed innovations in terms of reducing the anxiety among employees was clearly emphasized. From that, it is argued that once company introduces new innovations, knowledge management plays important role to capture how information about innovation is absorbed, digested and diffused, which can help company mitigate the resistance to change among employees. Thus another hypothesis is suggested.

Hypothesis 4 (H4): The better knowledge management, the lower cognitive resistance (hypothesis 4a), emotional resistance (hypothesis 4b), and behavioral resistance (hypothesis 4c) employees commit in responses to process innovation within the organization.

3.5 Initial framework of the study

The literature review in chapter 2 and 3 explained in detail the process innovation, multidimensional aspect of resistance to change of individual employee, and more importantly the causes leading to the negative reactions of employees in response to the proposed process innovation inside the organization. Based on the literature background, the initial framework of this study is suggested as the figure 1 below.

28
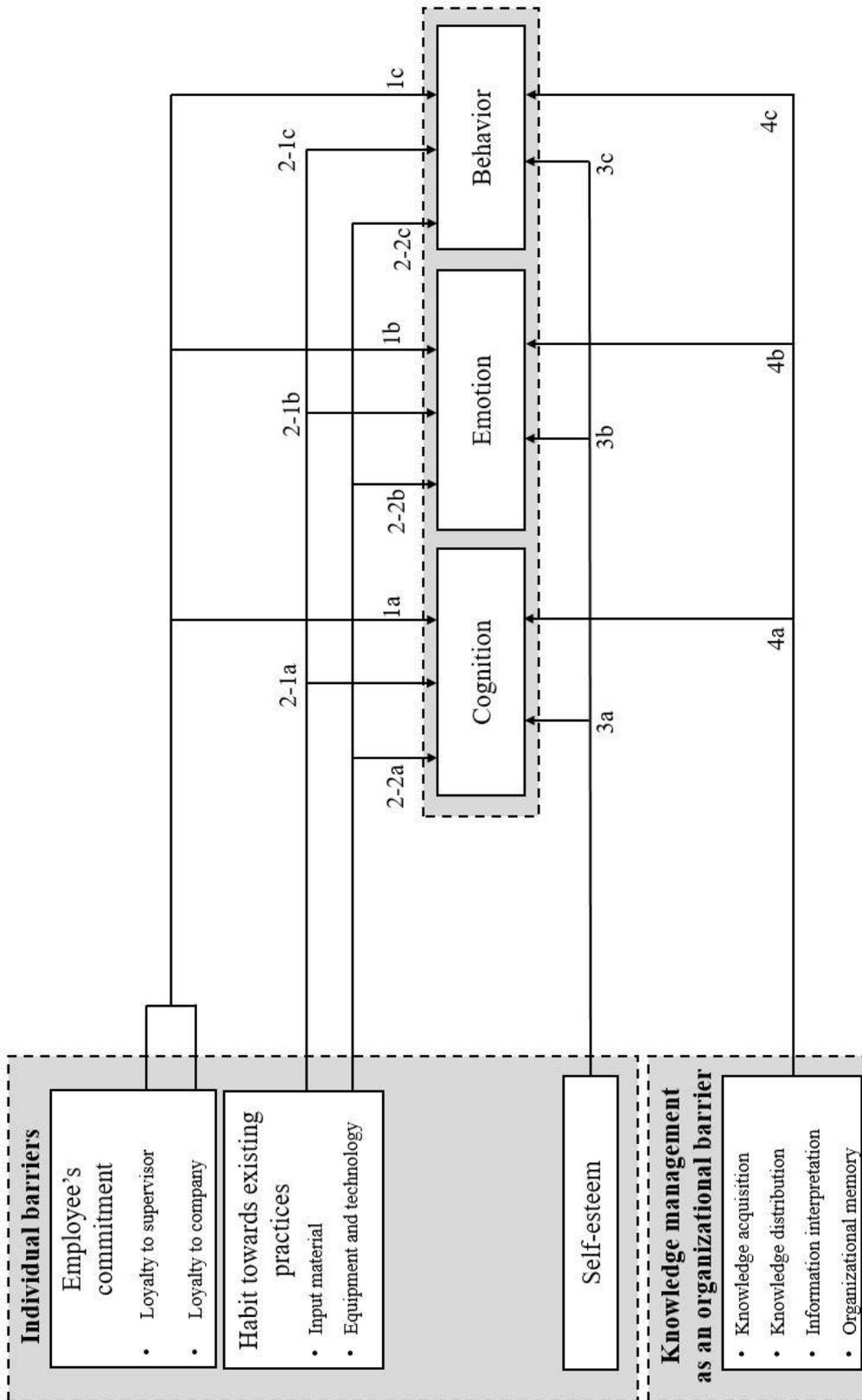
Figure 1: Initial framework of the study

The initial framework is built in the context of process innovation, in which management of the firm deploys two major changes in manufacturing process: new input material and advanced equipment and technology application. In every change event, employee might commit three perspectives of resistance to innovation: cognition, emotion and behavior. This situation is perceived as the ambivalence of resistance to change (Piderit 2000; Oreg 2006). The sub-question 1 of this study links with three different individual barriers: (1) employee commitment with two constructs: loyalty to direct manager and loyalty to organization, which is assumed to be negatively correlated with resistance to process innovation; (2) strength toward two existing habits in input material and technology usage are supposed to have positive correlations with resistance to innovation and (3) self-esteem which is hypothesized to be negatively correlated with the outcomes. The sub-question 2 of the study is associated with the rest of the framework, which demonstrates the relation between knowledge management and three dimensions of resistance to change.

4 RESEARCH DESIGN

4.1 Overall research strategy

According to Creswell (2007), a research is often approached by either qualitative or quantitative method. In quantitative research, the aim is often "testing objective theories by examining the relationship among variables" (Creswell 2014, 32). This goal is often achieved by examining the hypotheses, which are supposed from the literature review through quantifiable result (Creswell 2007, 16). In another way, the quantitative data allows the researchers to test the correlations between provided variables and the consequences (Choy 2014, 99). On the other hand, qualitative method is preferred when the problem is complex and people need to understand in detail through talking with the others to acquire their insights (Creswell 2007, 40). In this study, the correlations between these four main variables, which are employee commitment, the strength toward existing habits, self-esteem and organizational knowledge management, and resistance to process innovation as the consequence need to be clarified, therefore, this research applied the quantitative method.

4.2 Data collection

Data in this research was collected through the pre-code questionnaire-based survey. Saunders, Lewis, and Thornhill (2003, 92) pointed out that survey method allows researchers to acquire a large amount of data from a sizeable population. In addition, it could show a certain percentage of population thinks or behaves in a particular way because the data would be analyzed quantitatively (Fisher 2010, 207). Moreover, the quantitative research is specific in the survey or experimentation (Williams 2007, 66). Those are the reasons why survey method was utilized in this research.

There are three broad categories of quantitative research: descriptive, experimental, and causal comparative (Leedy & Ormrod 2001). Descriptive research is favor to identify the characteristics of a specific phenomenon by observing or figuring out the correlations between factors (Williams 2007, 66). Based on that, this research could be considered as a descriptive study because it mainly focuses on finding the relations between barriers causing the resistance to innovation of employees. Saunders et al. (2003, 281) argued that the questionnaire could be beneficial for descriptive research. Those evidences reinforced the decision of utilizing questionnaire to collect the data for this study. The questionnaire

was created through online platform. After that, the link leading to the questionnaire was sent to respondents.

4.3 Selected context for the study

This study chose the context of the Textile and Garment industry of Vietnam for data collection and analysis. In recent years, companies in this industry have grown up strongly and made significant contribution to the development of economy of Vietnam. In 2016, the Textile and Garment industry ranked top ten in exporting revenue of Vietnam. Among the context of contemporary business, many enterprises in this industry in Vietnam have to adapt to the fluctuations of the market. (Long & Cuong 2017, 440.) This has motivated more and more companies in the industry to restructure the business process and focus on innovation, which is prerequisite for them to maintain the competitive advantages in the oriented-market environment in Vietnam (Long & Cuong 2017). In other words, many companies in this industry have been undergone the changes in manufacturing process, which is ideal to carry out the data collection and analysis for this research.

In the context of the Textile and Garment industry in Vietnam, the innovation in input material refers to the application of "new fibers, finishes, and dyes, overlap with the chemical" leading to the formation of new yarns or fabrics (Baily & Chakrabarti 1985, 614). In a broader view, the development of inbound material consists new kinds of cotton, silk, fibers, yarn, etc. and new accessories, dyeing and chemicals (Le & Wang 2017, 2). The definitions of equipment and technology changes in the context of this industry could be interchangeable, because the technical changes which improve the manufacturing productivity in the textile industry are principally through new textile machinery (Baily & Chakrabarti 1985, 614). Technology which is currently being utilized in the Textile and Garment of Vietnam consist of spinning, weaving, dyeing, knitting and printing (Le & Wang 2017). A new equipment is supposed as an innovation with the condition that it brings dominant benefits, such as operational speed enhancement, capability of handling new input materials, decreased input requirements, and higher quality of output products (Baily & Chakrabarti 1985, 614).

All the respondents of this study are Vietnamese, therefore, the content of questionnaires was translated into local language. There were two main ways to approach the respondents. First, the online link of questionnaire was sent directly to employees of two selected organizations. They are the people who involve in manufacturing process and new product development. Thai Tuan Fashion Group and Thanh Cong Group are two

chosen companies because they are the leading manufacturers in the industry with high number of employees working in production department ensuring the sufficient data collection. Additionally, the author has strong networks with these two organizations, especially, Thai Tuan Fashion Group is the company where the author used to work. Thai Tuan Fashion Group specializes in manufacturing Jacquard fabrics, floral digital printing fabric, monochrome fabric, multicolored fabric, etc. from diverse kinds of yarn, such as polyester, spandex, viscose yarn with cutting-edge technology from Japan and Europe. The company was established in 1993, up to now, Thai Tuan has been a trustworthy brand in both domestic and foreign markets. Thanh Cong Group is another leader of the Textile and Garment industry in Vietnam. The company is running its own business in fibers, fabrics, garments, dyeing substances and other supplies and equipment used in production. The second method of approaching respondents was to post the link of questionnaire in the groups of employees working in the Textile and Garment industry on social medial, Facebook particularly. Table 1 and 2 below demonstrate the characteristics of the sample cases and demographic features of the data used in this study respectively.

Table 1. Characteristics of the sample cases

Company	Approaching respondents	Questionnaire sent	Questionnaire received	Response rate
Thai Tuan	Email	108	42	38.89%
Thanh Cong	Email	80	30	37.50%
Others	Social media		24	

Table 2. Demographic features of the data

Variable	Category	Frequency	Total	Percent	Cumulative Percent
Age	30 or under	57	96	59.4	59.4
	Between 31 and 40	26		27.1	86.5
	Between 41 and 50	13		13.5	100.0
Managerial Responsibility	No	70	96	72.9	72.9
	Yes	26		27.1	100.0
Job Related	Sales	36	96	37.5	37.5
	RD	26		27.1	64.6
	Production	34		35.4	100.0

As can be seen from the table 2, 60% of the respondents in this study are 30 or under 30 years old while previous researches argued that resistance to innovation would be lower among younger employees (Wanberg & Banas 2000; García-Cabrera & Hernández 2014). This might affect to the quality of corresponding of the study. However, the outcomes of this study which is mentioned in the chapter 5.4 showed that employee's age is not correlated with their resistance to innovation deployed within the firm. Therefore, the feature of 60% of participants belong to 30 or under age group does not affect to the quality of corresponding of this study in general. Moreover, the labour force of Vietnamese Textile and Garment industry is young, which is reflected through 75% workers are under 30 (https://www.cnvinternationaal.nl, retrieved 25.04.2020). This is the reason why the number of employees in this age group accounts for majority of respondents.

Additionally, employees in this study have been working in three different positions: Sales, Research and Development (RD), and Production. Employees of RD department in the research are the people who directly create new products from designing (input yarn and technical-related matters) to experiment (equipment, different weaving technology, or chemical tests). It can be said that they are the experts in their fields. Employees working in Sales department of Thai Tuan Fashion Group and Thanh Cong Group are holding the Bachelor's Degree. They are not only the key players in terms of transfering the information about the market and feedback of the customers for RD department, but also cooperating with RD staff in new product development projects. Respondents belonging to Production in this study are employees responsible for

planning and operation. Most of them have backgrounds relating to the industry. From those, it is considered that the respondents are sufficiently qualified for this research.

4.4 Measurement

This research consists of three kinds of variables: independent, dependent, and control variables. Except control variables consisting of two constructs: age and managerial responsibility, both independent and dependent variables were measured through related list of items in existing researches (see table 3).

Table 3. Operationalization summary

Sub-question	Variable		Literature (Chapter number)	Surveyed questions	Author	Notes
SQ1	Independent	Employee commitment	3.3.1	1.1, 1.2	Becker, Billings, Eveleth, & Gilbert (1996, 469)	
		Strength toward existing practice	2.1, 3.3.2	2.1, 2.2	Verplanken & Orbell (2003, 1329)	
		Self-esteem	3.3.3	3	Pierce, Gardner, Cummings, Dunham (1989, 634)	
SQ2		Knowledge management	3.4	4	Hughes, Morgan, Kouropalatis (2007, 1382)	
	Dependent	Resistance to change in three dimensions, cognition, emotion, and behavior	3.1, 3.2	5	Oreg (2006, 101)	4 positive items were deleted from this study
	Control	Age and Managerial responsibility	n/a	6, 7	García-Cabrera, Hernández (2014, 454-455)	

The employees in the survey were required to indicate their answers to the questions measuring both independent and dependent variables through seven-point scale of Rensis Likert ranging from 1 (strongly disagree) to 7 (strongly agree). The content of the questionnaire used in this study is showed in the appendix 6. The answers of respondents were scored after data collection. Within one particular question, the statements indicating negative attitudes were reversed scored. Thus, if the respondents ticked "strongly agree" for negative statements, the scores were given as 1. Once all the items for each scale have been scored, the overall score was calculated as a mean (Fisher 2010, 215). Each measurement instrument of independent and dependent variables had to undergo the factor analysis to examine the reliability of the instruments and extent to which they are related to this study. The outcomes of this analysis are summarized in table 4 and their interpretations are showed in detail in the following sub-chapters: 4.4.1 and 4.4.2.

4.4.1   Independent variables

In terms of employee commitment, this study applied the scale consisting of identification and internalization invented by Becker, Billings, Eveleth, & Gilbert (1996) to measure the loyalty of employees toward their immediate managers and organization (see Appendix 1). Thus, there would be four combinations: supervisor-related identification, organization-related identification, supervisor-related internalization, and organization-related internalization. The first five items in the scale would be used for identification measurement, which includes (1) "When someone criticize my supervisor/ organization, it feel like a personal insult"; (2) "When I talk about my supervisor/ organization, I usually say 'we' rather than 'they'"; (3) "my supervisor's/ organization's success is my success"; (4) "When someone praises my supervisor/ organization, it feels like a personal compliment"; and (5) "I feel a sense of belonging for my supervisor/ organization". The remaining four items would be used to measure the internalization. It comprises (1) "If the values of my supervisor/ organization were different, I would not be as attached to my supervisor/ organization"; (2) "my attachment to my supervisor/ organization is primarily based on similarity of my values and those represented by my supervisor/ organization"; (3) "Since starting this job, my personal values and those of my supervisor/ organization have become more and more similar"; and (4) "The reason I prefer my supervisor/ organization to others is his or her/ its values". (Becker et al. 1996, 469.) The reliability test with Cronbach alpha for supervisor combination showed satisfactory level while that for organization demonstrated an excellent level, at 0.756 and 0.817 respectively. Moreover,

an exploratory factor analysis was carried out with varimax rotation. The results illustrated that the Kaiser–Meyer–Olkin (KMO) test, total variance explained (TVE) and Bartlett Sphericity ($\chi 2$) for the employee's commitment were satisfactory (KMO = 0.843, TVE = 66.5%, $\chi 2$ = 961.396*).

Regarding the strength of habit, the earlier researches suggested various methods to measure it. Each method has its own limitations discussed by many scholars. (Polites 2005, 265.) (1) *Habit as frequent past behavior* (Ouellette & Wood 1998) is the most common way to measure the strength of the habit. It was argued that habit strength is positively related to the number of times of repeated performance of a behavior in the past. (Polites 2005, 265.) However, Ajzen (2002, 109) suggested a contrast view about this method. According to him, it is not adequately evident to conclude that repeated behaviors are habituated. He stated that "Whether a frequently performed behavior has or has not habituated is an empirical question, and to answer it we need an independent and validated measure of habit". (Ajzen 2002, 109.) (2) *Habit as a self-reported measure* (Verplanken & Orbell 2003) is the method which has been applied in many studies. Respondents are directly required to self-reflect the frequency of specific behaviors they conducted "without awareness". (Verplanken & Orbell 2003, 1316). While this method has a defect because it combines the behavior repetition and habit strength into a single measure, it is emphasized that "there is no reason why habit strength might not be measured by self-reported measure" (Polites 2005, 265). Because it is feasible to let individuals self-reflect on their behaviors about the degree to which they are habitual (Verplanken & Orbell 2003, 1316). Verplanken and Orbell's scale (see appendix 2) is considered as a promising method for measuring the habit strength (Polites 2005, 266), which is utilized in this study. As mentioned in the section 2.1, process innovation refers to the development in input material and equipment and technology. Therefore, the self-report method was utilized to measure the strength of employees toward two habits, which are practices in input material (habit number 1) and practices in equipment and technology (habit number 2). The results of reliability test showed that Cronbach alphas were excellent with 0.924 and 0.946 for habit number 1 and 2 respectively. Additionally, an exploratory factor analysis was carried out with varimax rotation. The results illustrated that the KMO, TVE and Bartlett Sphericity of both habits were good for this study (KMO = 0.904, TVE = 64.96%, $\chi 2$ = 718.394* for the habit 1 and KMO = 0.900, TVE = 73.03%, $\chi 2$ = 962.610* for the habit 2).

Regarding the self-esteem factor, this study used 10-item scale of Pierce et al. (1989, 634). The content of this measurement is mentioned in appendix 3. Respondents were required to think of the messages conveyed through the attitudes and behaviors of their supervisors about themselves and signify their opinions about these assumptions: "I count around here; I am taken seriously; I am important; I am trusted; there is faith in me; I can make a difference; I am valuable; I am helpful; I am efficient; and I am cooperative" (Pierce et al. 1989, 634). These 10 items were applied in this study because of successful application in related researches (e.g., García-Cabrera et al. 2011; García-Cabrera & Hernández 2014). The result of reliability test demonstrated an excellent Cronbach alpha, at 0.953. Especially, through the factor analysis, there was only one factor extracted. That means the factor was significant and it could explain 71.89% of total variance. The KMO was excellent with 0.900 and the Bartlett Sphericity was significant at 974.807* with $p < 0.001$.

In terms of knowledge management, this study used the item-scale utilized in the research of Hughes, Morgan, and Kouropalatis (2008) (see appendix 4). Thus, the term of knowledge management was measured through four constructs, which are knowledge acquisition, information distribution, information utilization/ interpretation, and organizational memory. This study is conducted from individual level, therefore, items with "We" would be changed to "I". Knowledge acquisition originally had 5 items, however, the item "We receive regular intelligence reports on the economy, markets, technological developments, socio-political events and general trends, and examine how these may affect our business" would be splited into two items: "I receive regular intelligence reports on the economy, markets, technological developments, socio-political events and general trends" and "I examine how these may affect my business". The other constructs: information distribution, information utilization and organizational memory were kept the original number of items with 3, 4, 3 respectively. This measure was applied in this research because its success was confirmed through prior study, such as Hughes et al. (2008). More importantly, the results through factor analysis were positive. The reliability test demonstrated excellent Cronbach alphas of information acquisition and organizational memory, at 0.861 and 0.860 respectively while Cronbach alphas of knowledge distribution and utilization were at acceptable levels, at 0.717 and 0.766 respectively. However, the combination of these four constructs acquired an excellent reliability score with Cronbach alpha = 0.906. In overall, the KMO = 0.877, $\chi^2 = 845.606$*

significant with p value < 0.001, and TVE = 63.89% after conducting an exploratory factor analysis with varimax rotation. Those strongly supported for the confirmation of applying these four constructs in this study.

4.4.2   Dependent variables

The resistance to process innovation of employees was measured through the scale invented by Oreg (2006, 101) (see appendix 5). Originally, this scale consists of 15 items of three dimensions of resistance to change: cognition, emotion and behavior. There are 11 negative items and 4 positive items in this scale. However, as mentioned in the section 3.1, resistance to innovation in this research is approached from negative perspective. Therefore, 4 positive items of the original scale were not included in this study. The scale of Oreg (2006) was applied in this study because it was successfully utilized in prior researches with the similar topic (e.g., García-Cabrera & Hernández 2014; García-Cabrera et al. 2011). Thus, there were total 11 items applied in this study (cognitive resistance: 3 items, emotional resistance: 4 items, and behavioral resistance: 4 items). This 11-item scale acquired an excellent Cronbach alpha, at 0.962. In overall, the factor analysis demonstrated good results with KMO = 0.917, χ^2 = 1111.850* significant with p < 0.001, and TVE = 72.97%. Thus, the results confirmed the existence of three dimensions of resistance used in this research. Moreover, each dimension of resistance to innovation also acquired an excellent reliability score with Cronbach alphas at 0.891, 0.929, and 0.901 for cognition, emotion, and behavior respectively.

Table 4. Factor analysis result

Variable	Total Variance explained	Cronbach alpha	KMO	Bartlett's Test of Sphericity
Employee commitment	66.5%	0.861	0.843	961.396*
• **Loyal to supervisor (9 items)**		0.756		337.885*
• **Loyal to organization (9 items)**		0.817		476.062*
Strength toward existing habit				
• **Input material (12 items)**	64.96%	0.924	0.904	718.394*
• **Equipment and technology (12 items)**	73.03%	0.946	0.900	962.610*
Self-esteem (**10 items**)	71.89%	0.953	0.900	974.807*
Knowledge Management	63.89%	0.906	0.877	845.606*
• **Information acquisition (6 items)**		0.861		
• **Knowledge distribution (3 items)**		0.717		
• **Information utilization (4 items)**		0.766		
• **Organizational memory (3 items)**		0.860		
Resistance to process innovation	72.97%	0.962	0.917	1111.850*
• **Cognition (3 items)**		0.891		
• **Emotion (4 items)**		0.929		
• **Behavior (4 items)**		0.901		

*p < 0.001

In overall, there are three primary outcomes from the factor analysis, which has been demonstrated in the table 4. First, the Cronbach alpha of every instrument ranges from 0.717 to 0.962 and many of them are higher than 0.800, which are much higher than the acceptable value, at 0.7 or 0.6 (Taber 2017, 1278). Thus, this research confirms that the data collected through these measurements is reliable for the analysis. Second, the KMO test and Bartlett's Test of Sphericity are useful in terms of examining the adequacy of the sampling (Rasheed & Abadi 2014, 302). Both of them are prerequisite tests for the factor analysis (Tahtali 2019, 6). There are different views about the minimum value for KMO in prior researches. For example, the sample is adequate with the condition that KMO value should be higher than 0.7 (Rasheed & Abadi 2014, 302) while some researchers assumed that the values of KMO are 0.6, 0.7, 0.8, and 0,9 are acceptable, good, great, and excellent respectively (Tahtali 2019, 4). It can be seen from the table 4, KMO values of measurements are in the great and excellent range. The Bartlett index of every instrument

is significant (p < 0.001). From those, the study concludes that the correlations between variables are sufficient for factor analysis (Rasheed & Abadi 2014, 302). Finally, the total variance explained of every instrument is higher than the minimum level, at 60% (Obadić & Tijanić 2014, 124). Thus, this study could have a good confirmation for the factor analysis.

4.4.3 Control variables

This study consisted of two control variables, which are employees' age and their managerial responsibilities. Employee's age was categorized into four groups: (1) 30 or under, (2) between 31 and 40, (3) between 41 and 50, and (4) 51 or over. Age was controlled in this research due to the fact that the older employees are, the more resistance to change they commit (Wanberg & Banas 2000, 135). Furthermore, this study was also controlled whether employees were holding any managerial position in their organization or not (dummy, 0: No, and 1: Yes), as suggestion of Oreg (2006). Managerial responsibility was taken as control variable because managers have greater access to information about the change, as well as more opportunities for participation than the other individuals. Therefore, they are less likely to commit the resistance against the innovation in companies. (Wanberg & Banas 2000, 135-136.)

4.5 Data analysis

In overall, there were four kinds of analysis utilized in this study, which are mentioned in the table 5 below.

Table 5. Data analysis type summary

Type of analysis	Chapter
Reliability	4.4.1, 4.4.2
Factor analysis (Exploratory factor analysis)	(Results showed in table 4)
Factor analysis (Harma's single-factor)	5.1
Correlation	5.1 (Result showed in table 6)
Multiple regression (Collinearity diagnostics included)	5.2, 5.3 (Results showed from table 7 to table 30)

As can be seen from the table 5, there were four types of analysis in this study: reliability test, factor analysis, correlation and multiple regression. The reliability aimed to

examine whether measurements provided reliable data or not. The exploratory factor analysis consisted of several steps and decision points, such as extraction and rotation. Additionally, after building the data, to eliminate the possibility of the common method variance in the data set, this study used the Harman's single-factor test (a part of factor analysis). The research also ran the correlation analysis between variables to examine the multicollinearity between independent factors. Finally, the multiple regression analysis was applied to test and confirm the hypotheses of this research (collinearity diagnostics was also included while running the model to evaluate the potential of regression coefficient instability in this study).

4.6 Trustworthiness of the study

The trustworthiness evaluation of this study is based on two main criteria for quantitative research: reliability and validity. Reliability refers to the consistency or the level to which a specific research scale measures a provided variable consistently. In the quantitative study, the reliability aims to apply to data instead of the measurement instruments. (Kaya 2013, 317.) Thus, reliability is considered as the desired outcome of the "obtained scores from measure instruments (Salkind 2012, 2). Based on that, the researchers could assess the level, in which the selected measurement provides reliable data by utilizing various methods or approaches (Kaya 2013, 317).

Though it is impossible to calculate the reliability exactly, there are certain methods, which could help the researchers to achieve the estimated reliability (Heale & Twycross 2015, 66). First, internal consistency reliability refers to the condition in which the items of measuring instrument are highly correlated with each other (Henson 2001, 180). This kind of reliability could calculate by utilizing Spearman-Brown formula, Kuder–Richardson coefficient, or Cronbach α (alpha) (Salkind 2012, 3-4). It can be said that Cronbach alpha is most commonly used to check the internal consistency reliability coefficient. The value of Cronbach alpha is between 0 and 1 and the minimum level to ensure the internal reliability is 0.7. (Heale & Twycross 2015, 67.) Second, stability reliability comprises test-retest and parallel testing. Test-retest is applied when an instrument is measured by the same participants more than once under the same circumstance. Parallel form reliability is similar to test-retest, but there is a different form of measured items compared to original version. The examined concepts are consistent in two cases while the wordings of instruments in both versions are different. (Heale & Twycross 2015, 67.) In stability reliability, the sets of scores should be highly correlated to ensure the consistency (Kaya

2013, 318). Finally, inter-observer reliability refers to the situation in which the researchers ask the raters to give their opinions about a set of objects or pictures, etc. After gathering the data, researchers will quantify the consistency degree through the answers of the observers. (Kaya 2013, 318.) In this study, the reliability perspective was clearly reflected through the internal consistency method, which was calculated through Cronbach α (alpha). As can be seen from the table 4, Cronbach alpha of every instrument of the study is much higher than 0.7 reinforcing the study's data reliability.

Validity is the term which refers to the data accuracy. The data of a study is assumed to be valid if the outcomes of the measurements are accurate. (Kaya 2013, 318.) Or in another way, the concepts of the research are measured accurately (Heale & Twycross 2015, 66). Thus measurement instruments are valid with the condition that they measure the things that they are considered to measure. There are major kinds of validity, which are internal validity, external validity, construct validity, and conclusion validity. (Kaya 2013, 318.)

Internal validity aims to identify the causal effect between variables (Kaya 2013, 318). Prior researches have been trying to show the strength of the conclusion through the significant test (Fisher 2010, 273). External or population validity refers to the extent to which other researchers could apply equally well whether generalization or interpretation found by a scholar in a specific context to other settings, populations or contexts (Kaya 2013, 318; Fisher 2010, 273). Construct or measurement validity refers to the extent to which the outcomes of the study can be made based on the theoretical measurements, which are supposed to measure (Kaya 2013, 318). Construct validity is utilized in the researches using questionnaire to discover a person, group of people or the entire organization's attributes, which could be anything, for instance, leadership style, resistance to change, etc. (Fisher 2010, 272). Finally, the conclusion validity refers to the situation that the independent and dependent variables are correlated (Kaya 2013, 318).

In this study, the validity aspect is confirmed through four kinds of validity mentioned above. The research outcomes in chapter 5 and 6 identified the causal effect between employee's commitment, strength toward the existing habits, self-esteem, knowledge management and resistance to process innovation as the outcome. The interpretation of this study could be applied in different context, such as different industries. Moreover, the measurement for each variable is adapted from the existing literatures measuring the same concept. Last but not least, the conclusion validity is confirmed because most of the hypotheses of the study are supported. Four independent variables of

the study are positively and negatively (depends on the variable) correlated with three dimensions of resistance to change: cognition, emotion and behavior.

5   FINDINGS

In this chapter, the analysis results of the study will be demonstrated. Sub-chapter 5.1 shows the outcomes to confirm the quality of the data set. Subsequently, chapter 5.2 will show the outputs of data analysis for three individual barriers of resistance to process innovation: employee commitment, strength toward existing habits, and self-esteem. Chapter 5.3 illustrates correlation outcomes between four constructs of knowledge management and three dimensions of resistance to change followed by the discussion section in sub-chapter 5.4 where the research outcomes are compared to theoretical background.

5.1   Quality of the data set

Table 6 demonstrates the correlation between variables in this study. According to García-Cabrera & Hernández (2014, 455), one of the general rules of thumb to ensure the multicollinearity between independent variables would not affect the analysis results is that two independent components should not be correlated at the level over 0.75. As can be seen from the table 6, except the correlation between strengths toward two mentioned habits and correlation between knowledge utilization and organizational memory, at 0.803 and 0.776 respectively, the rest correlations between the other independent variables of this study met the required level. Even there are two correlations between independent variables over 0.75 as mentioned above, every variance inflation factor (VIF) value in regression models of this study was lower than the recommended cutoff level, at 10 (Hair, Anderson, Tatham, & Black 1992). In addition, the highest condition indexes were found in the models 5.1C, 5.1E and 5.1B, at 17.675, which were lower than the recommended level of 20 (García-Cabrera & Hernández 2014, 455). Those evidences reinforce that multicollinearity is not a problem in the data set of this study.

Table 6. Correlations matrix between variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Cognition	1													
2. Emotion	0.857**	1												
3. Behavior	0.844**	0.847**	1											
4. Loyalty to supervisor	-0.369**	-0.412**	-0.372**	1										
5. Loyalty to organization	-0.434**	-0.468**	-0.419**	0.607**	1									
6. Strength toward habit 1	0.502**	0.489**	0.501**	-0.318**	-0.316**	1								
7. Strength toward habit 2	0.470**	0.504**	0.445**	-0.212*	-0.276**	0.803**	1							
8. Self-esteem	-0.554**	-0.605**	-0.531**	0.519**	0.714**	-0.472**	-0.402**	1						
9. Knowledge acquisition	-0.243*	-0.251*	-0.305**	0.432**	0.441**	-0.060	-0.002	0.378**	1					
10. Knowledge distribution	-0.206*	-0.285**	-0.137	0.283**	0.281**	-0.037	-0.128	0.237*	0.343**	1				
11. Knowledge utilization	-0.236*	-0.341**	-0.229*	0.357**	0.381**	-0.006	-0.040	0.319**	0.521**	0.681**	1			
12. Organizational memory	-0.314**	-0.352**	-0.308**	0.393**	0.382**	0.041	-0.054	0.335**	0.533**	0.547**	0.776**	1		
13. Age	0.036	0.047	0.090	-0.117	-0.261*	0.151	0.163	-0.325**	-0.171	-0.086	-0.149	-0.079	1	
14. Managerial re-sponsibility	-0.216*	-0.196	-0.195	0.223*	0.140	-0.119	-0.043	0.288**	0.207*	-0.005	0.207*	0.269**	0.095	1

**p < 0.001

*p < 0.05

In terms of three dimensions of resistance, the outputs in table 6 show high correlation level among them. These results are aligned with many prior researches. For example, Piderit (2000), Oreg (2006), and García-Cabrera and Hernández (2014) emphasized that these three aspects of resistance are dependent on each other. Because the emotions of employees about the proposed changes often correspond with their thoughts and their behaviors. Also, from the cognitive dissonance approach, high correlation between these three dimensions can be explained by the fact that individuals would feel psychologically uncomfortable in the context of dissonance of their thoughts, feelings, and behaviors. (García-Cabrera & Hernández 2014, 455.)

Additionally, the results in table 6 also show that there are several significant correlations between independent variables and the consequences with **$p < 0.001$ and *$p < 0.05$, which reinforces for the regression analysis process. Finally, the Harman's single-factor test was conducted to check the possibility of the common method variance. The results showed that there were three factors with eigenvalues higher than 1.000, whether the principal component analysis with varimax rotation (total variance explained = 71.44%) or principal axis factoring method with varimax rotation (total variance explained = 63.73%) was applied. The first factor explained 28.61% and 25.39% of the total variance, respectively. These two numbers were much lower than the commonly accepted threshold of 50% (Eichhorn 2014, 7). Therefore, the common method variance or common variance bias was not the problem of this study. From the evidences mentioned above, the quality of this data set meet the demand for regression analysis.

5.2 Hypothesis confirmation for individual barriers

In this chapter, the outcomes of regression models between independents variables: employee commitment, strength toward the existing habits, self-esteem and each dimension of resistance to process innovation will be demonstrated from table 7 to table 24. In these tables, the symbols (**) and (*) appearing right after the number means that $p < 0.001$ and $p < 0.05$ respectively. Based on the regression analysis, the implications will be interpreted before confirming the hypotheses about employee's commitment, strength toward the existing habits, and self-esteem in sub-chapters 5.2.1, 5.2.2 and 5.2.3 respectively.

5.2.1 Hypothesis 1 – Employee commitment

In each perspective of resistance to innovation, the loyalty to supervisor and the loyalty to organization are examined in the first and the second model separately. The third one includes these two factors in the same model to reconfirm the statistical coefficient between them and each angle of resistance to process innovation. The outcomes of regression analysis between employee commitment and resistance to innovation are showed in 6 tables below (table 7 to table 12). A pair of tables are demonstrated in each dimension of resistance to change. One aims for showing the correlations between variables included in regression models while the other one provides the results of each model.

Table 7. Correlation matrix for models 1C, 2C, and 3C

	Cognition	Loyalty to supervisor	Loyalty to organization	Age	Managerial
Cognition	1				
Loyalty to supervisor	-0.369**	1			
Loyalty to organization	-0.434**	0.607**	1		
Age	0.036	-0.117	-0.261*	1	
Managerial	-0.216*	0.223*	0.14	0.095	1

Table 8. Regression models between employee commitment and cognitive resistance

Variables	Model 1C			Model 2C			Model 3C		
	β	Std[1]	VIF	β	Std	VIF	β	Std	VIF
Age	0.02	0.194	1.03	-0.123	0.192	1.094	-0.116	0.192	1.095
Managerial Responsibility	-0.458	0.320	1.069	-0.484	0.304	1.04	-0.424	0.308	1.071
Loyal to supervisor	-0.508*	0.150	1.074				-0.205	0.178	1.634
Loyal to organization				-0.642**	0.145	1.106	-0.521*	0.179	1.682
R^2	15.50%			21.60%			22.70%		
Adjusted R^2	12.80%			19.10%			19.30%		
F (df1, df2)	5.637 (3, 92)*			8.455 (3, 92)**			6.695 (4, 91)**		
Condition index	11.667			14.49			17.151		

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[1] Coefficient Standard Error

Regarding the cognitive dimension, it can be seen from the table 7, the correlations between loyalty to both supervisor and organization and cognitive resistance are significant, at -0.369** and -0.434** respectively. Model 1C is statistically significant, $F_{(3, 92)} = 5.637$, $p < 0.05$, and accounts for 15% of the variance of cognitive resistance ($R^2 = 15.5\%$ and Adjusted $R^2 = 12.80\%$). In this model, the loyalty to direct manager is negatively correlated with opposed thoughts, which is reflected through the β value $= -0.508*$. Model 2C is also statistically significant with $F_{(3, 92)} = 8.455$, $p < 0.001$, and it can explain around 20% of variance of the dependent factor ($R^2 = 21.60\%$ and Adjusted $R^2 = 19.10\%$). The coefficient β value of loyalty to organization in model 2C is -0.642**, which means this factor would negatively influence on cognitive resistance to process innovation. However, when it comes to the model 3C, which is statistically significant with $F_{(4, 91)} = 6.695$, $p < 0.001$, $R^2 = 22.70\%$ and Adjusted $R^2 = 19.30\%$, only the coefficient of loyalty to organization is significant with $\beta = -0.521*$. Therefore, if identification and internalization of both supervisor and organization are considered simultaneously, only organization-related elements negatively influence on cognitive resistance to process innovation. Thus the hypothesis 1a is partially supported.

Table 9. Correlation matrix for models 1E, 2E, and 3E

	Emotion	Loyalty to supervisor	Loyalty to organization	Age	Managerial
Emotion	1				
Loyalty to supervisor	-0.412**	1			
Loyalty to organization	-0.468**	0.607**	1		
Age	0.047	-0.117	-0.261*	1	
Managerial	-0.196	0.223*	0.14	0.095	1

Table 10. Regression models between employee commitment and emotional re-sistance

Variables	Model 1E			Model 2E			Model 3E		
	β	Std	VIF	β	Std	VIF	β	Std	VIF
Age	0.025	0.202	1.03	-0.134	0.2	1.094	-0.124	0.199	1.095
Managerial Responsibility	-0.378	0.333	1.069	-0.424	0.317	1.04	-0.34	0.319	1.071
Loyal to supervisor	-0.618 **	0.156	1.074				-0.285	0.184	1.634
Loyal to organization				-0.740 **	0.152	1.106	-0.573*	0.186	1.682
R^2	18.10%			24.00%			25.90%		
Adjusted R^2	15.50%			21.50%			22.60%		
F (df1, df2)	6.799 (3, 92)**			9.663 (3, 92)**			7.952 (4, 91)**		
Condition index	11.667			14.49			17.151		

In terms of emotional perspective, according to the correlation matrix in table 9, the correlations between two constructs of employee's commitment and emotional resistance are -0.412** and -0.468**. Three regression models were run with the same formula as cognitive dimension. Model 1E is statistically significant, F (3, 92) = 6.799, p < 0.001, R^2 = 18.10%, and Adjusted R^2 = 15.50%. The coefficient of loyalty to supervisor in this model is also significant with β = -0.618**. In the similar pattern, model 2E is significant with F (3, 92) = 9.663, p < 0.001 and it accounts for nearly 25% of the variance of emotional resistance with R^2 = 24.00% and Adjusted R^2 = 21.50%. Loyalty to organization of employee in this model negatively correlates with emotional perspective of resistance, which is reflected through significant β value, at -0.740**. However, the outcomes from model 3E, which is statistically significant with F (4, 91) = 7.952, p < 0.001, R^2 = 25.90%, and Adjusted R^2 = 22.60%, show that only commitment to organization is significantly coefficient with β = -0.573*. Therefore, the hypothesis 1b is supported partially.

Table 11. Correlation matrix for models 1B, 2B, and 3B

	Behavior	Loyalty to supervisor	Loyalty to organization	Age	Managerial
Behavior	1				
Loyalty to supervisor	-0.372**	1			
Loyalty to organization	-0.419**	0.607**	1		
Age	0.09	-0.117	-0.261*	1	
Managerial	-0.195	0.223*	0.14	0.095	1

Table 12. Regression models between employee commitment and behavioral re-sistance

Variables	Model 1B			Model 2B			Model 3B		
	β	Std	VIF	β	Std	VIF	β	Std	VIF
Age	0.119	0.186	1.03	-0.003	0.187	1.094	0.004	0.187	1.095
Managerial Responsibility	-0.391	0.307	1.069	-0.431	0.296	1.04	-0.362	0.299	1.071
Loyal to supervisor	-0.489*	0.144	1.074				-0.234	0.173	1.634
Loyal to organization				-0.576**	0.142	1.106	-0.438*	0.174	1.682
R^2	15.50%			19.50%			21.10%		
Adjust R^2	12.80%			16.80%			17.60%		
F (df1, df2)	5.646 (3, 92)*			7.410 (3, 92)**			6.067 (4, 91)**		
Condition index	11.667			14.49			17.151		

When it comes to behavioral perspective of resistance to innovation, according to table 11, the correlations between independent and dependent variables are significant. Three models 1B, 2B and 3B share the same formula and similar pattern of output as models relating to other two dimensions. By that way, the coefficient β values of loyalty to supervisor and loyalty to organization are statistically significant, at -0.489* and -0.576** in model 1B and 2B respectively. Both model 1B and 2B are significant. Model 1B explains around 15% of variance of behavioral resistance (R^2 = 15.50%, Adjusted R^2 = 12.80%), F (3, 92) = 5.646, p < 0.05) while model 2B accounts for nearly 20% of variance of resistance to change in behavioral perspective (R^2 = 19.5%, Adjusted R^2 = 16.80%), F (3, 92) = 7.410, p < 0.001). However, like models 3C and 3E, when two constructs of employee commitment are examined in model 3B, which is significant with F (4, 91) = 6.067, p < 0.001, R^2 = 21.10%, Adjusted R^2 = 17.60%, only the coefficient of loyalty to organization is statistically significant, at β = -0.438*. From the outcomes of three behavior-related models, loyalty to organization would affect negatively to the behavioral reactions of employees in response to innovation within the firm. Thus, hypothesis 1c is partially confirmed.

5.2.2   Hypothesis 2 – Strength toward existing habits

In this section, habit 1 refers to practices of using the old input portfolio of material, habit 2 refers to using familiar equipment and technology in manufacturing process. There are two models examining the linear regression between each habit and each dimension of resistance to innovation. The outcomes of these models are demonstrated in 6 tables below (from table 13 to table 18).

Table 13. Correlation matrix for models 4C and 5C

	Cognition	Strength toward habit 1	Strength toward habit 2	Age	Managerial
Cognition	1				
Strength toward habit 1	0.502**	1			
Strength toward habit 2	0.470**	0.803**	1		
Age	0.036	0.151	0.163	1	
Managerial	-0.216*	-0.119	-0.043	0.095	1

Table 14. Regression models between strength toward existing habits and cognitive resistance

Variables	Model 4C			Model 5C		
	β	Std	VIF	β	Std	VIF
Age	-0.45	0.18	1.037	-0.042	0.182	1.038
Managerial Responsibility	-0.504	0.29	1.028	-0.626*	0.291	1.013
Strength toward habit 1	0.592**	0.11	1.042			
Strength toward habit 2				0.515**	0.101	1.031
R^2	27.70%			26%		
Adjusted R^2	25.40%			23.60%		
F (df1, df2)	11.77 (3, 92)**			10.775 (3, 92)**		
Condition index	9.295			9.003		

As can be seen from table 13, there are correlations between independent and dependent variables. Those are essential for proceeding the next two models 4C and 5C. These two prediction models are statistically significant, F (3, 92) = 11.77, p < 0.001 for model 4C, and F (3, 92) = 10.775; p < 0.001 for model 5C. R^2 and Adjusted R^2 indexes of both models are excellent with nearly 30% of variance of cognitive resistance (R^2 =

27.70% and Adjusted R^2 = 25.40% for model 4C, R^2 = 26% and Adjusted R^2 = 23.60% for model 5C). More importantly, the coefficient β values of strength toward input material and technology are significant in model 4C and 5C, at 0.592** and 0.515** respectively. Those mean the strength toward two existing habits in manufacturing process positively influence on cognitive perspective of resistance to change. Thus hypotheses 2-1a and 2-2a are confirmed.

Table 15. Correlation matrix for models 4E and 5E

	Emotion	Strength toward habit 1	Strength toward habit 2	Age	Managerial
Emotion	1				
Strength toward habit 1	0.489**	1			
Strength toward habit 2	0.504**	0.803**	1		
Age	0.047	0.151	0.163	1	
Managerial	-0.196	-0.119	-0.043	0.095	1

Table 16. Regression models between strength toward existing habits and emotional resistance

Variables	Model 4E			Model 5E		
	β	Std	VIF	β	Std	VIF
Age	-0.25	0.193	1.037	-0.039	0.189	1.038
Managerial Responsibility	-0.472	0.311	1.028	-0.589	0.303	1.013
Strength toward habit 1	0.611**	0.118	1.042			
Strength toward habit 2				0.586**	0.105	1.031
R^2	25.90%			28.50%		
Adjusted R^2	23.40%			26.20%		
F (df1, df2)	10.696 (3, 92)**			12.23 (3, 92)**		
Condition index	9.295			9.003		

According to table 15, the correlations between two mentioned habits and emotion aspect of resistance to innovation are significant at 0.489** and 0.504**, $p < 0.001$. Two regression models 4E and 5E are statistically significant with F (3, 92) = 10.696 and F (3, 92) = 12.23 respectively. Model 4E accounts for approximately 25% of variance of emotional resistance reflected through R^2 = 25.90% and Adjusted R^2 = 23.40%. Model 5E could explain at nearly 30% of variance of emotion perspective of resistance to change

($R^2 = 28.5\%$ and Adjusted $R^2 = 26.20\%$). The β values of strength toward existing practices of using portfolio of input material and technology in production are significant statistically, at 0.611** and 0.586** in model 4E and 5E respectively. Those outcomes mean that the stronger habit of employees in using familiar input material and equipment, the higher level of opposed emotion in response to proposed change in production process. Thus the hypothesize 2-1b and 2-2b are supported.

Table 17. Correlation matrix for models 4B and 5B

	Behavior	Strength toward habit 1	Strength toward habit 2	Age	Managerial
Behavior	1				
Strength toward habit 1	0.501**	1			
Strength toward habit 2	0.445**	0.803**	1		
Age	0.09	0.151	0.163	1	
Managerial	-0.195	-0.119	-0.043	0.095	1

Table 18. Regression models between strength toward existing habits and behavioral resistance

Variables	Model 4B			Model 5B		
	β	Std	VIF	β	Std	VIF
Age	0.059	0.174	1.037	0.07	0.178	1.038
Managerial Responsibility	-0.438	0.280	1.028	-0.559	0.286	1.013
Strength toward habit 1	0.560**	0.106	1.042			
Strength toward habit 2				0.459**	0.099	1.031
R^2	27.00%			23.00%		
Adjust R^2	24.70%			20.50%		
F (df1, df2)	11.364 (3, 92)**			9.175 (3, 92)**		
Condition index	9.295			9.003		

The correlation matrix demonstrated in table 17 shows that the correlations between independent and dependent variables are significant, at 0.501** and 0.445**, $p < 0.001$ which support for the regression analysis in table 18. Model 4B, which is statistically significant with F (3, 92) = 11.364, $p < 0.001$, accounts for about 27% of variance of behavioral resistance ($R^2 = 27.00\%$ and Adjusted $R^2 = 24.70\%$). The coefficient of strength toward the habit of using old portfolio of input material in model 4B is significant with β = 0.560**. In the similar vein, coefficient of the other habit is also significant in

model 5B with $\beta = 0.459**$, F (3, 92) = 9,175, p < 0.001, $R^2 = 23.00\%$ and Adjusted R^2 = 20.50%. From those results, it could be considered that the strength toward two mentioned habits would positively influence on the behavioral resistance to innovation. Thus hypothesize 2-1c and 2-2c are confirmed.

5.2.3   Hypothesis 3 – Self-esteem

In the similar formula with previous models mentioned above, self-esteem is alternately put in the same model with each dimension of resistance to change with aim of confirming the linear relation between them. The outcomes of regression analysis of this hypothesis are showed from table 19 to table 24 below.

Table 19. Correlation matrix for model 6C

	Cognition	Self-esteem	Age	Managerial
Cognition	1			
Self-esteem	-0.554**	1		
Age	0.036	-0.325**	1	
Managerial	-0.216*	0.288**	0.095	1

Table 20. Regression model between self-esteem and cognitive resistance

Variables	Model 6C		
	β	Std	VIF
Age	-0.308	0.184	1.168
Managerial Responsibility	-0.096	0.294	1.140
Self-esteem	-0.717**	0.115	1.263
R^2	33.10%		
Adjusted R^2	30.90%		
F (df1, df2)	15.154 (3, 92)**		
Condition index	13.828		

Table 21. Correlation matrix of model 6E

	Emotion	Self-esteem	Age	Managerial
Emotion	1			
Self-esteem	-0.605**	1		
Age	0.047	-0.325**	1	
Managerial	-0.196	0.288**	0.095	1

Table 22. Regression model between self-esteem and emotional resistance

Variables	Model 6E		
	β	Std	VIF
Age	-0.359	0.185	1.168
Managerial Responsibility	-0.040	0.297	1.140
Self-esteem	-0.847**	0.117	1.263
R^2	39.20%		
Adjusted R^2	37.20%		
F (df1, df2)	19.742 (3, 92)**		
Condition index	13.828		

Table 23. Correlation matrix for model 6B

	Behavior	Self-esteem	Age	Managerial
Behavior	1			
Self-esteem	-0.531**	1		
Age	0.09	-0.325**	1	
Managerial	-0.195	0.288**	0.095	1

Table 24. Regression model between self-esteem and behavioral resistance

Variables	Model 6B		
	β	Std	VIF
Age	-0.166	0.182	1.168
Managerial Responsibility	-0.088	0.291	1.140
Self-esteem	-0.638**	0.114	1.263
R^2	29.00%		
Adjust R^2	26.70%		
F (df1, df2)	12.532 (3, 92)**		
Condition index	13.828		

From three correlation matrix showed in table 19, 21, 23, self-esteem is correlated with cognition, emotion and behavior dimensions, at -0.554**, -0.605**, and -0.531** respectively. According to the results in table 20 and 24, both models 6C and 6B are statistically significant with F (3, 92) = 15.154, p < 0.001 and F (3, 92) = 12.532, p < 0.001 respectively. These two models account for almost 30% of variance of behavioral perspective of resistance to innovation (R^2 = 33.10%, Adjusted R^2 = 30.90% for model 6C and R^2 = 29.00%, Adjusted R^2 = 26.70% for model 6B). Model 6E shares the same pattern as model 6C and 6B with F (3, 92) = 19.742, P < 0.001, but it explains for nearly 40% of variance of behavioral resistance (R^2 = 39.20% and Adjusted R^2 = 37.20%). More importantly, coefficient of self-esteem in models 6C, 6E and 6B are significant with β = -0.717**, -0.847**, and -0.638** respectively. From those, hypotheses 3a, 3b, and 3c are supported.

5.3 Hypothesis confirmation for knowledge management

In this section, each factor of knowledge management is run in the same model with each dimension of resistance to change (models 1.1 to 4.1). Subsequently, four constructs of knowledge management would be examined simultaneously in cognition-related, emotion-related and behavior-related models. However, due to high correlation between two independents constructs: information utilization and organizational memory, at 0.776** (mentioned in table 25, 27, and 29), which is higher than the recommended cut off level at 0.75 (García-Cabrera & Hernández 2014, 455). Therefore, these two factors would not be put in the same model. Instead of that, two more models: 5.1 and 6.1 are created in each dimension of resistance. The regression analysis of this section is demonstrated from table 25 to table 30 below. In these models, symbols (*) and (†) appearing after the number indicate p value < 0.05 and 0.1 respectively.

Table 25. Correlation matrix for models 1.1C, 2.1C, 3.1C, 4.1C, 5.1C, and 6.1C

	Cognition	Knowledge acquisition	Knowledge diffusion	Information utilization	Organizational memory	Age	Managerial
Cognition	1						
Knowledge acquisition	-0.243*	1					
Knowledge diffusion	-0.206*	0.343**	1				
Information utilization	-0.236*	0.521**	0.681**	1			
Organizational memory	-0.314**	0.533**	0.547**	0.776 **	1		
Age	0.036	-0.171	-0.086	-0.149	-0.079	1	
Managerial	-.0216*	0.207*	-0.005	0.207*	0.269**	0.095	1

Table 26. Multiple regression models between knowledge management constructs and cognitive resistance

Variables	Model 1.1C			Model 2.1C			Model 3.1C			Model 4.1C			Model 5.1C			Model 6.1C		
	β	Std	VIF	β	Std	VIF	β	Std	VIF	β	Std	VIF	β	Std	VIF	β	Std	VIF
Age	0.035	0.203	1.049	0.079	0.199	1.017	0.047	0.202	1.04	0.056	0.197	1.021						
Managerial responsibility	-0.566†	0.331	1.064	-0.712*	0.322	1.009	-0.574†	0.332	1.063	-0.469	0.33	1.094						
Knowledge acquisition	-0.249†	0.127	1.086										-0.204	0.143	1.373	-0.125	0.14	1.405
Knowledge diffusion				-0.241*	0.118	1.007							-0.105	0.162	1.866	-0.049	0.14	1.435
Information utilization							-0.28†	0.148	1.077				-0.127	0.216	2.26			
Organizational memory										-0.355*	0.133	1.091				-0.308†	0.17	1.769
R^2	8.80%			9.10%			8.50%			11.80%			8%			10.80%		
Adjusted R^2	5.80%			6.20%			5.50%			8.90%			5%			7.90%		
F (df1, df2)	2.964 (3, 92)*			3.076 (3, 92)*			2.860 (3, 92)*			4.112 (3, 92)*			2.656 (3, 92)			3.712 (3, 92)*		
Condition index	11.276			10.675			14.027			13.136			17.675			14.606		

*p < 0.05

†p < 0.1

When it comes to cognition perspective, according to the table 25, the correlation between knowledge acquisition, knowledge diffusion, information utilization, organizational memory and cognition are -0.243*, -0.206*, -0.236*, -0.314** respectively. The outcomes from model 1.1C, 2.1C, 3.1C and 4.1C in table 26 showed that every factor of knowledge management negatively influences on cognitive resistance, which is demonstrated through β = -0.249†, -0.241*, -0.28†, -0.355* respectively. These four models are statistically significant, $F_{(3, 92)}$ = 2.964, $p < 0.05$, R^2 = 8.80%, Adjusted R^2 = 5.80% for model 1.1C; $F_{(3, 92)}$ = 3.076, $p < 0.05$, R^2 = 9.10%, Adjusted R^2 = 6.20% for model 2.1C; $F_{(3, 92)}$ = 2.860, $p < 0.05$, R^2 = 8.50%, Adjusted R^2 = 5.50% for model 3.1C; and $F_{(3, 92)}$ = 4.112, $p < 0.05$, R^2 = 11.80% and Adjusted R^2 = 8.90% for model 4.1C. However, the prediction model 5.1C, which includes cognition, knowledge acquisition, knowledge diffusion, and information utilization, is not significant while model 6.1C provides opposite outcome with $F_{(3, 92)}$ = 3.712, $p < 0.05$ and accounts for around 10% of variance of cognitive resistance (R^2 = 10.80% and Adjusted R^2 = 7.90%). More importantly, in model 6.1C, only organizational memory has significant coefficient with β = -0.308†. That means among 4 main factors of knowledge management, only organizational memory which refers to the advanced information and technology or system helping employees keep updated what is going on about the changes in the production process would reduce the possibility of opposed thoughts in response to the innovation. Thus, the hypothesis 4a is partially supported.

Table 27. Correlation matrix for models 1.1E, 2.1E, 3.1E, 4.1E, 5.1E, and 6.1E

	Emotion	Knowledge acquisition	Knowledge diffusion	Information utilization	Organizational memory	Age	Managerial
Emotion	1						
Knowledge acquisition	-0.251*	1					
Knowledge diffusion	-0.285**	0.343**	1				
Information utilization	-0.341**	0.521**	0.681**	1			
Organizational memory	-0.352**	0.533**	0.547**	0.776**	1		
Age	0.047	-0.171	-0.086	-0.149	-0.079	1	
Managerial	-0.196	0.207*	-0.005	0.207*	0.269**	0.095	1

Table 28. Multiple regression models between knowledge management constructs and emotional resistance

Variables	Model 1.1E			Model 2.1E			Model 3.1E			Model 4.1E			Model 5.1E			Model 6.1E		
	β	Std	VIF	β	Std	VIF	β	Std	VIF	β	Std	VIF	β	Std	VIF	β	Std	VIF
Age	0.052	0.215	1.049	0.088	0.208	1.017	0.027	0.209	1.04	0.068	0.207	1.021						
Managerial re-sponsibility	-0.524	0.352	1.064	-0.687	0.336	1.009	-0.452	0.342	1.063	-0.385	0.347	1.094						
Knowledge acquisition	-0.278*	0.134	1.086										-0.133	0.147	1.373	-0.103	0.148	1.405
Knowledge diffusion				-0.353*	0.123	1.007							-0.126	0.167	1.866	-0.157	0.145	1.435
Information utilization							-0.473*	0.153	1.077				-0.333	0.222	2.26			
Organizational memory										-0.44*	0.14	1.091				-0.333†	0.177	1.769
R^2	8.50%			12.10%			13.20%			13.60%			12.90%			14.10%		
Adjusted R^2	5.50%			9.30%			10.40%			10.80%			10.00%			11.20%		
F (df1, df2)	2.852 (3, 92)*			4.238 (3, 92)*			4.682 (3, 92)*			4.826 (3, 92)*			4.534 (3, 92)*			5.014 (3, 92)*		
Condition in-dex	11.276			10.675			14.027			13.136			17.675			14.606		

*$p < 0.05$

†$p < 0.1$

The results in the regression analysis between factors of knowledge management and emotional resistance shared the similar pattern with cognitive resistance. All four factors show the correlation with emotion dimension in table 27, at 0.251*, -0.285**, -0.341**, -0.352**. Although the β values of knowledge acquisition, knowledge diffusion, information utilization, and organizational memory were statistically significant in model 1.1E with $F_{(3, 92)} = 2.852$, $p < 0.05$, $R^2 = 8.50\%$, Adjusted $R^2 = 5.50\%$; model 2.1E with $F_{(3, 92)} = 4.238$, $p < 0.05$, $R^2 = 12.10\%$, Adjusted $R^2 = 9.30\%$; model 3.1E with $F_{(3, 92)} = 4.682$, $p < 0.05$, $R^2 = 13.20\%$, Adjusted $R^2 = 10.40\%$; and model 4.1E with $F_{(3, 92)} = 4.826$, $p < 0.05$, $R^2 = 13.60\%$, Adjusted $R^2 = 10.80\%$ respectively, significant coefficient confirmation is only found in the β value of organizational memory, at 0.333† in model 6.1E with $F_{(3, 92)} = 5.014$, $p < 0.05$, $R^2 = 14.10\%$, Adjusted $R^2 = 11.20\%$. Therefore, this study just supports the hypothesis 4b partially.

Table 29. Correlation matrix for models 1.1B, 2.1B, 3.1B, 4.1B, 5.1B and 6.1B

	Behavior	Knowledge acquisition	Knowledge diffusion	Information utilization	Organizational memory	Age	Managerial
Behavior	1						
Knowledge acquisition	-0.305 **	1					
Knowledge diffusion	-0.137	0.343**	1				
Information utilization	-0.229*	0.521**	0.681**	1			
Organizational memory	-0.308**	0.533**	0.547**	0.776**	1		
Age	0.09	-0.171	-0.086	-0.149	-0.079	1	
Managerial	-0.195	0.207*	-0.005	0.207*	0.269**	0.095	1

Table 30. Multiple regression models between knowledge management constructs and behavioral resistance

Variables	Model 1.1B			Model 2.1B			Model 3.1B			Model 4.1B			Model 5.1B			Model 6.1B		
	β	Std	VIF	β	Std	VIF	β	Std	VIF	β	Std	VIF	β	Std	VIF	β	Std	VIF
Age	0.111	0.192	1.049	0.187	0.194	1.017	0.149	0.195	1.04	0.155	0.19	1.021						
Managerial responsibility	-0.452	0.314	1.064	-0.636	0.314	1.009	-0.51	0.32	1.063	-0.407	0.318	1.094						
Knowledge acquisition	-0.311*	0.12	1.086										-0.298*	0.136	1.373	-0.236†	0.136	1.405
Knowledge diffusion				-0.148	0.115	1.007							0.034	0.154	1.866	0.068	0.133	1.435
Information utilization							-0.253†	0.143	1.077				-0.162	0.205	2.26			
Organizational memory										-0.334*	0.128	1.091				-0.292†	0.162	1.769
R^2	11.40%			6.70%			8.10%			11.50%			10.00%			12.50%		
Adjusted R^2	8.60%			3.60%			5.10%			8.60%			7.10%			9.70%		
F (df1, df2)	3.962 (3, 92)*			2.198 (3, 92)'			2.709 (3, 92)†			3.984 (3, 92)*			3.419 (3, 92)*			4.384 (3, 92)†		
Condition index	11.276			10.675			14.027			13.136			17.675			14.606		

*$p < 0.05$

†$p < 0.1$

Regarding the behavioral resistance, the regression analysis shows that knowledge acquisition, information utilization, and organizational memory negatively correlate with opposed behavior, which are reflected through statistically significant model 1.1B with $F_{(3, 92)} = 3.962$, $p < 0.05$, $R^2 = 11.40\%$, Adjusted $R^2 = 8.60\%$, $\beta = -0.311*$; model 3.1B with $F_{(3, 92)} = 2.709$, $p < 0.1$, $R^2 = 8.1\%$, Adjusted $R^2 = 5.10\%$, $\beta = -0.253\dagger$; and model 4.1B with $F_{(3, 92)} = 3.984$, $p < 0.05$, $R^2 = 11.5\%$, Adjusted $R^2 = 8.60\%$, $\beta = -0.334*$. Once again, knowledge acquisition factor reconfirms to be a factor affecting to the process innovation adoption of employees, at $\beta = -0.298*$ (model 5.1B, $R^2 = 10\%$, Adjusted $R^2 = 7.10\%$) and $\beta = -0.236\dagger$ (model 6.1B, $R^2 = 12.5\%$, Adjusted $R^2 = 9.70\%$). In the similar vein, organizational memory also acquire a significant $\beta = -0.292\dagger$ through model 6.1B, $F_{(3, 92)} = 4.384$, $p < 0.1$, $R^2 = 12.50\%$ and Adjusted $R^2 = 9.70\%$. Based on those results, this study confirms that if the company is capable of acquiring both internal and external information into the firm and utilizing platforms to help employees to access to new knowledge, the opposed behavior toward innovation can be alleviated. Thus, the hypothesis 4c is partially supported.

5.4   Discussion

This section will begin with the discussion about two control variables, which are age and managerial responsibility after the regression models are available. According to the analysis demonstrated from table 7 to table 30, in every model, the β value of employee's age factor is not statistically significant. That means in this study, age is not confirmed as a stumbling-block of innovation adoption of employees, which is not in line with assumption mentioned in prior researches (e.g. Wanberg & Banas 2000; García-Cabrera & Hernández 2014). Additionally, managerial responsibility just shows its impact on cognitive resistance only in a few regression models (5C, 1.1C, 2.1C, and 3.1C). This does not totally support the outcomes of historical studies (e.g. Wanberg & Banas 2000; García-Cabrera & Hernández 2014).

In this study, the relations between three aspects of resistance to change of employees and key variables associated with them, which are employee commitment, strength toward existing habits, self-esteem, and knowledge management, have been analyzed. The table 31 below provides the panoramic view about the results of this study through the quantitative analysis. Based on that, insightful discussions are mentioned by comparing these outcomes with theoretical background.

Table 31. Study's results summary

Barrier	Block	Hypothesis	Hypothesis confirmation
Individual	**Employee commitment**	1a, 1b, 1c	Partially (Only loyalty to organization is confirmed)
	Loyalty to supervisor		
	Loyalty to organization		
	Strength toward existing habits	2-1a, 2-1b, 2-1c	
	Input material		Supported
	Equipment/ technology	2-2a, 2-2b, 2-2c	Supported
	Self-esteem	3a, 3b, 3c	Supported
Organizational	**Knowledge management**	4a, 4b, 4c	- 4a, 4b: partially (only organizational memory is confirmed) - 4c: Partially (knowledge acquisition and organizational memory are confirmed)
	Knowledge acquisition		
	Knowledge distribution		
	Information utilization		
	Organizational memory		

Firstly, according to Peccei et al. (2011), organizational commitment is the mechanism affecting to resistance to innovation of employees due to their psychological desire to attach to the identification and internalization of the firm. In fact, the results from the regression models consisting of this factor and resistance to change are in line with the theoretical background when they show that the loyalty of employees to their organizations is negatively correlated with the resistance to process innovation in all three dimensions. Additionally, the outcomes from the regression models including variables: loyalty to direct manager and three dimensions of resistance imply that employees who have higher loyal level to their supervisor are more likely to show the willingness to involve in the change initiatives within the firm. When putting these two kinds of commitment in the same model, the study expects the negative correlations between each of them and three dimensions of resistance (Strebel 2009). However, the results demonstrated that only the commitment to the firm is the main mechanism affecting to the resistance of employees to change. Once again, this outcome is aligned with assumption of Peccei et al. (2011).

Secondly, the strength toward the habit of using the old portfolio of input material and equipment and technology is positively correlated with resistance to change. This result is in line with the assumption of Sheth (1981, 276). The stronger habit toward a particular practice, the higher level of resistance to innovations related to that practice (Sheth 1981, 276). From the multidimensional approach of resistance to change, the regression analysis results of this factor is statistically significant. That means strength toward the two mentioned habits of the study is positively correlated with three facets of resistance to innovation, which aligns with the assumption that three dimensions of resistance to innovation: cognition, emotions and behaviors are connected to each other (Chung et al. 2012).

Subsequently, the results of this study showed that when employees perceive themselves as competent and valuable individuals for their own organization, they are more likely to feel motivated to cope with the changes within the firm and they will try to keep their cognitions, emotions and behaviors in response to the change persistent with their perceptions. Thus, their resistance level would be lower. This outcome is aligned with previous literatures about the correlation between self-esteem and resistance to change within the firm (e.g. García-Cabrera & Hernández 2014; García-Cabrera et al. 2011).

Regarding knowledge management, the results of this study showed that two out of four elements of this term: organizational memory and knowledge acquisition are negatively correlated with the resistance to process innovation within the firm. In other words, the outcome of this study emphasizes: (1) if the companies provide the environment for the employees to acquire and absorb the information from external and internal sources relating to the changes through regular reports, meetings, particular system or processes, employees are less likely to commit resistance to changes; (2) information and technology, which is fundamental to create databases and communication system for employees to keep updated what is going on, could reduce the possibility to commit the negative attitudes in response to change events within the firm. These outcomes are partially not aligned with the assumptions in previous studies. Traditionally, knowledge sharing mainly refers to the ability to utilize information and technology to diffuse the innovative ideas within the firm, but it can be seen an increase in the capability of diffusion between employees, or groups of employees (Ipe 2003). While in this study, the statistic coefficient of capability to transfer the knowledge between employees are not significant.

Last but not least, the three facets of resistance to change are often misaligned generating the ambivalence (Piderit 2000). According to the outcomes of this study, except

the knowledge acquisition construct, which is only negatively correlated with the behavior dimension, the remaining independent variables of this research are positively or negatively (depends on variable) correlated with three dimensions of resistance to change. That means employees have tendency to commit ambivalent attitudes when the company deploys innovations in production process. Therefore, it can be said that the results of this study are in line with the theoretical background. In the other hand, this study also expects that it would be difficult for employees to show their unpleasant emotions rather than negative thoughts about the change, even some employees might have capability to express their feelings compared to the other individuals (Piderit 2000, 789). However, the results of this study are not in line with previous assumption of Piderit (2000), because as can be seen from the analysis sections, the coefficient β values of independent variables in regression models relating to emotional resistance are higher than those relating to cognitive resistance. That should be understood that the employees could express their emotional resistance stronger than cognitive resistance in response to change in process.

6 CONCLUSION AND FORMATION OF FINAL FRAMEWORK

This chapter will start with the sub-chapter 6.1. It will mention the contribution of this study to existing literature about process innovation and resistance to innovation of employees within the firm followed by the final framework of the study. While chapter 6.1 focuses on the theoretical implications of the research, chapter 6.2 will discuss the managerial implications. Finally, chapter 6.3 will mention the limitations of this research and propose the suggestions for future studies.

6.1 Theoretical implications of the study

Regarding the process innovation, previous researches underlined the role of this term in improving the productivity and creating the changes in the industries (Reichstein & Salter 2006, 677). In spite of the importance of process innovation, there are relatively few studies focusing on this phenomenon (Frishammar, Kurkkio, Abrahamsson, & Lichtenthaler 2012, 519). In fact, there is not too much contribution to existing literature about innovation from this study. Because this study focuses on figuring out the antecedents causing resistance to innovation whose implications are mentioned in later part of this chapter. Process innovation in this research is treated as the environment where the companies introduce the changes in production process and resistance to these proposed changes happens. This study inherits the findings from prior researches (e.g. Papinniemi 1999; Cunliffe 2008; Scannell, Vickery & Droge 2000; Schniederjans 2018), thus the input material and technology developments in production process are focused on. From the outcomes of the empirical data analysing, the final framework which demonstrates the relations between four key concepts of this study: employee conmitment, habit toward existing habits, self-esteem and knowledgement and three dimensions of resistance to changes: cognition, emotion and behavior, is suggested in the figure 2 below.
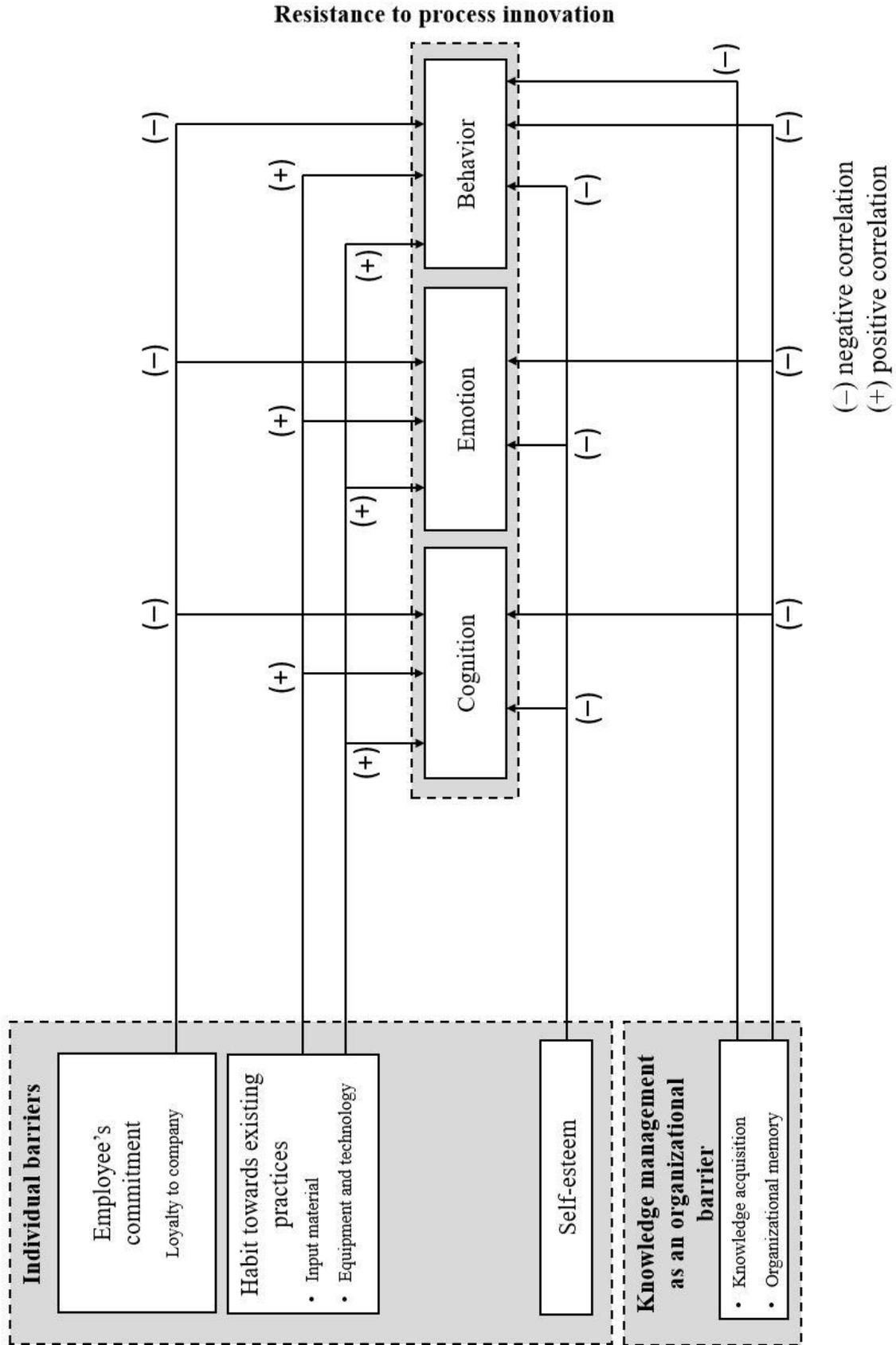
Figure 2: Final framework of the study

Through the figure 2, there are three major points this study contributes to the existing literatures. Firstly, historical researches approached this phenomenon from unidimensional perspective. Thus employees could commit one of three perspectives of resistance to change: cognition, emotion and behavior (García-Cabrera & Hernández 2014, 463). However, it is perceived that there will be ambivalence between these three dimensions of resistance when employees undergo the change events within the firm (Piderit 2000). Ambivalent attitudes are understood as the extent to which the internal reactions of employees: their thoughts and emotions about the changes overlap their external expression as behavior. Thus, employees could have positive thinking about the benefits of the improvement in the production process, but they might simultaneously commit the anxiety and stress because they feel that the change initiatives could make their job harder due to higher requirements. To reconfirm the multidimensional argument, this study once again has examined and analyzed the correlations between antecedents and three facets of resistance to change: cognitive, emotional and behavioral. Based on quantitative analysis, this study confirms the existence of ambivalence of employees in response to innovation. However, an additional finding is contributed to the existing theory. The ambivalent attitudes of employees do not always happen when employees commit resistance to change. It depends on the origin of antecedents causing the negative attitudes toward the change. According to the quantifiable results of the study, these factors: employee commitment, strength toward the existing habit, self-esteem, and organizational memory are correlated with all three dimensions of resistance to change while knowledge acquisition is only correlated with behavioral resistance.

Secondly, when it comes to employee commitment, previous studies concluded that employee being loyal to their organization are less likely to commit to resistance to change (Peccei, Giangreco, & Sebastiano 2011, 190). In this study, loyalty to the organization is examined again, but in the context with the factor of loyalty to the direct manager, which is thrived from the organizational commitment (Chen, Tsui, & Farh 2002, 340). According to the data analysis, this study not only reconfirms the correlation between loyalty to organization and resistance to innovation, but also makes the contribution to the existing researches that: (1) the loyalty to direct manager is negatively correlated to all three dimensions of resistance to innovation; and (2) the loyalty to the organization outweighs the loyalty to the direct manager in influencing the resistance to innovation of employees. Previous researches confirmed the positive correlation between strength toward existing habits and resistance to innovation (e.g. Sheth 1981), as well as

the negative correlation between self-esteem and resistance to change (e.g. García-Cabrera & Hernández 2014). This study, once again, reinforces these conclusions mentioned in exiting literature. Thus, (1) among the context of this study, the stronger habit toward using familiar input material and technology in the production, the higher level of resistance to innovation of employees in manufacturing process; and (2) employees who assume themselves to be competent for the job and valuable for their organization will put effort to support for the change program of the firm, because they want to keep their images consistent with their levels within the firm.

The third addition is about the relation between knowledge management and resistance to change within the firm. Much of previous research work about knowledge management focused on how the term is created, absorbed and diffused within the firm (Rahe & Morales 2005, 49). This study brings a new angle in approaching the term of knowledge managament in the context that the company deploys the process innovations, in which the correlation between knowledge management and resistance to innovation is examined. The outcomes of the data analysis underline the role of technology and ability of knowledge acquisition of the firm in reducing the resistance to change. Thus, if the organizations are competent in utilizing the information and technology to build the systems, such as communication for employees to keep pace with what is happening within the firm or platforms for spreading the innovative ideas, the possibility of resistance to change programs of employees would be lower. Last but not least, the ability of the firm in providing environment for employees to acquire and absorb information from inside and outside the firm could reduce the resistance to change of employees when the firm introduce the innovation in production process.

6.2   Managerial implications of the study

Besides the theoretical implications mentioned in previous section, the practical implications in this sections might benefit several stakeholders within the firm. Regarding Innovation Project Managers, the outcomes of this study should be taken into account before they make the decision of implementing the innovation within the firm. For instance, the strength toward the existing habits of employees is the strong predictor of their future behaviors. Therefore, Project Managers could prepare the strategies or action plans to help their own employees reduce the resistance in response to the proposed change. Furthermore, Project Managers should offer more opportunities for their employees to enhance their self-esteem at work making them competent for their job performance and valuable for the organization. Additionally, the outcomes of the study might imply for managers of innovation projects in terms of delegating the responsibilities for the members of the project team wisely. Employees who are loyal to their organization and managers show higher willingness to support the change program. Therefore, project managers should give them the opportunities to hold important tasks or positions in the project. By that way, the change program could be possibly successful. Last but not least, Project Managers who hold the perception of different antecedents of resistance to innovation would consider the generated resistance from employees as possible stumbling-blocks, warning or alert rather than as a negative factor (Giangreco & Peccei 2005).

Human Resource Manager might apply the practical implications of this study in recruitment process and employee management in their organization. In terms of recruitment process, the study emphasizes the importance of employee's commitment to organization in terms of reducing the resistance to change. Organization commitment consists of identification and internalization (Becker et al. 1996). The key point of these two elements is to make employees adapt to company's values and goals due to the feeling of pride to work for their own organization. The values or personal characters of candidates should be considered to match with the internal values of the company before the employment contract decision. When it comes to employee management, the loyal employees appreciate psychological attachment between them and their organization (Becker et al. 1996). To enhance the organizational commitment in employees, management should attach their employees' efforts to the success of the company to increase their sense of togetherness.

Additionally, the change events cannot be deployed successfully if the information about the change is not well absorbed and diffused throughout the organization (Abdul Rashid et al. 2004, 176). The outcomes of this study underline the role of information and technology in terms of designing communication platform, in which employees could easily acquire, receive, and convey the information from the external and internal sources related to the changes. This platform could be considered as the communication channel between management and employees helping the information and benefits of the innovation be effectively distributed.

6.3 Limitations of the study and suggestions for future researches

This study has some limitations. First, the number of respondents in this study is limited, which includes 72 responses from two companies in the Textile and Garment industry of Vietnam and 24 answered questionnaires collected through social media page of employees working in the same industry. This might limit the possibility to generalize the outcomes of the study for the whole industry. Moreover, due to the method of collecting these 24 questionnaires, the study concerns to ensure whether these respondents are sufficiently qualified for this study. Based on those, future studies should be conducted across industries to keep the generalization of the research outcomes guaranteed.

Second, as mentioned in chapter 3.1, this research focuses on the negative side of resistance to change only. Therefore, 11 items measuring three dimensions of resistance are not in favor of the changes within the organizations. That might influence on the honesty of respondents when they indicated their opinions because people are less likely to recognize that they get anxiety because of the change initiative or try to find the way to avoid it (García-Cabrera & Hernández 2014, 454). The future researches should take this matter into consideration and even develop the new methods to measure the resistance to change. Last but not least, even though this research has studied different variables, it is not sufficient to generalize because there are many other antecedents explaining for the concept of resistance to change, for example, individual's traits: general predisposition to change, cognitive rigidity (García-Cabrera et al. 2011, 244). Therefore, future studies should take these mentioned antecedents into researching.

7 SUMMARY

Innovation in production process plays important role to enhance the quality of product and company's competitive advantages. However, whenever the management deploys the innovative program, the resistance to change initiative of employees is the number one stumbling-block. It is also commonly found as the root cause leading to the failure in innovation implementation within the firm. The aim of the study is to identify the barriers preventing employees from adopting process innovations within the organization. To achieve the research's aim, two different sub-research questions were applied: one revealed the individual-related antecedents, one revealed the organization-based barrier. The hypotheses of the study were suggested based on the literature background. Each hypothesis reflected the relation between specific antecedent and three different dimensions of resistance to innovation. Based on that, the initial framework was built. Overall, this study was conducted by quantitative approach. The data was collected through the online survey by utilizing the pre-coded questionnaire. The respondents of this study are employees working in the Textile and Garment of Vietnam. Subsequently, data was analyzed through SPSS by applying four different types of analysis: reliability, factor analysis, correlation and multiple regression.

In terms of individual antecedents, the results revealed that the strength toward habits is positively correlated with resistance to change while self-esteem and loyalty to organization are negatively related to the mentioned phenomenon. Among four constructs of the knowledge management, knowledge acquisition and organizational memory are confirmed to be in negative correlation with resistance to change. Overall, except knowledge acquisition, all of the other antecedents are correlated with three dimensions of the resistance: cognition, emotion and behavior. Interestingly, the outcome of this study also revealed that among these three dimensions, employees are more likely to express their attitudes toward the change events through their emotions, such as anxiety, fear, or upset, etc. Besides theoretical contributions, this study provided practical implications helping management of the company manipulate the resistance to innovation from their own employees.

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APPENDICES

Appendix 1. Identification and internalization of supervisor/ organization

Author	Items
Becker, Billings, Eveleth, & Gilbert (1996, 469)	When someone criticize my supervisor/ organization, it feel like a personal insult
	When I talk about my supervisor/ organization, I usually say 'we' rather than "he or she"/ "they"
	My supervisor's/ organization's success is my success
	When someone praises my supervisor/ organization, it feels like a personal compliment
	I feel a sense of belonging for my supervisor/ organization
	If the values of my supervisor/ organization were different, I would not be as attached to my supervisor
	My attachment to my supervisor/ organization is primarily based on similarity of my values and those represented by my supervisor/ organization
	Since starting this job, my personal values and those of my supervisor/ organization have become more and more similar
	The reason I prefer my supervisor/ organization to others is his or her/ its values

Appendix 2. Self-report scale

Author	Scale (Behavior X is something)
Verplanken & Orbell (2003)	1. I do frequently.
	2. I do automatically.
	3. I do without having to consciously remember.
	4. That makes me feel weird if I do not do it.
	5. I do without thinking.
	6. That would require effort not to do it.
	7. That belongs to my (daily, weekly, monthly) routine.
	8. I start doing before I realize I'm doing it.
	9. I would find hard not to do.
	10. I have no need to think about doing.
	11. That is typically "me."
	12. I have been doing for a long time.

Appendix 3. Self-esteem scale

Author	*Items*
Pierce, Gardner, Cummings & Dunham (1989)	I count around here
	I am taken seriously
	I am important
	I am trusted
	There is a faith in me
	I can make difference
	I am valuable
	I am helpful
	I am efficient
	I am cooperative

Appendix 4. Knowledge management scale

Author	Construct	Items
Hughes, Morgan, & Kouropalatis (2008)	Knowledge acquisition	It is part of the work of all staff to collect, bring back, and report information about what's going on outside the company
		All meetings in the company regularly include a review of what's going on in our business environment
		I meet regularly with representative groups of customers, suppliers, community members and so on to find out what's important to them
		I receive regular intelligence reports on the economy, markets, technological developments, socio-political events and general trends
		Based on the reports above, I examine how economy, markets, technological developments, socio-political events and general trends may affect my business
		There are systems and procedures for receiving, collating, and sharing information from outside the firm
	Information distribution	Information flows freely and openly
		Departments speak freely and candidly with each other, both to challenge and to give help
		People make time to question their own practice, to analyze, discuss, and learn from what happens
	Information utilization	Errors and incidents are analyzed, widely reported, and acted upon
		Information is used for understanding, not reward or punishment
		We really understand the nature and significance of variation in a system and interpret data accordingly
		Managers facilitate communication, negotiation, and contracting, rather than exerting top-down control
	Organizational memory	Information technology is used to create databases and communication systems that help everyone understand what is going on
		You can get feedback on how your section or department is doing at any time by pressing a button
		Information technology is used to create databases,
		Information, and communication systems that help everyone to understand what is going on and to make sound decisions

Appendix 5. Resistance to change scale

Author	Dimension	Items
Oreg (2006)	**Thought**	I believed that the change would harm the way things are done in the organization
		I thought that it is a negative thing that we were going through this change
		I believed that the change would make my job harder
	Feeling	I was afraid of the change
		I had a bad feeling about the change
		The change made me upset
		I was stressed by the change
	Behavior	I looked for ways to prevent the change from taking place
		I protested against the change
		I complained about the change to my colleagues
		I presented my objections regarding the change to management

Appendix 6. Questionnaire

A. INDEPENDENT VARIABLES

1. Employee commitment

Question 1.1: Read the following statement below and indicate your opinion about the extent to which you agree

(1 - Strongly disagree; 2 – Disagree; 3 – Somewhat disagree; 4 – Neutral; 5 – Somewhat agree; 6 – agree; 7 – Strongly agree)

Statement	1	2	3	4	5	6	7
When someone criticize my boss, it feel like a personal insult							
When I talk about my boss, I usually say 'we' rather than "he or she"							
My boss's success is my success							
When someone praises my boss, it feels like a personal compliment							
I feel a sense of belonging for my boss							
If the values of my boss were different, I would not be as attached to my boss							
My attachment to my boss is primarily based on similarity of my values and those represented by my boss							
Since starting this job, my personal values and those of my boss have become more and more similar							
The reason I prefer my boss to others is his or her values							

Question 1.2: Read the following statement below and indicate your opinion about the extent to which you agree

(1 - Strongly disagree; 2 – Disagree; 3 – Somewhat disagree; 4 – Neutral; 5 – Somewhat agree; 6 – agree; 7 – Strongly agree)

Statement	1	2	3	4	5	6	7
When someone criticize my organization, it feel like a personal insult							
When I talk about my organization, I usually say 'we' rather than 'they'							
My organization's success is my success							
When someone praises my organization, it feels like a personal compliment							
I feel a sense of ownership for my organization							
If the values of my organization were different, I would not be as attached to my organization							
My attachment to my organization is primarily based on similarity of my values and those represented by my organization							
Since starting this job, my personal values and those of my organization have become more and more similar							
The reason I prefer my organization to others is its values							

2. Strength toward existing practice

Question 2.1: "Using the old portfolio of input material (yarns, fibers, accessories, chemical, etc.) for production" is something… Indicate your opinion about the extent to which you agree.

(1 - Strongly disagree; 2 – Disagree; 3 – Somewhat disagree; 4 – Neutral; 5 – Somewhat agree; 6 – agree; 7 – Strongly agree)

Statement	1	2	3	4	5	6	7
I do frequently							
I do automatically							
I do without having to consciously remember							
that makes me feel weird If I do not do it							
I do without thinking							
that would require effort not to do it							
that belongs to my (daily, weekly, monthly) routine							
I start doing before I realize I'm doing it							
I would find hard not to do							
I have no need to think about doing							
It is typically "me."							
I have been doing for a long time							

Question 2.2: "Using familiar machines for production (spinning, weaving, dyeing, knitting, printing, etc.)" is something … Indicate your opinion about the extent to which you agree.

(1 - Strongly disagree; 2 – Disagree; 3 – Somewhat disagree; 4 – Neutral; 5 – Somewhat agree; 6 – agree; 7 – Strongly agree)

Statement	1	2	3	4	5	6	7
I do frequently							
I do automatically							
I do without having to consciously remember							
that makes me feel weird If I do not do it							
I do without thinking							
that would require effort not to do it							
that belongs to my (daily, weekly, monthly) routine							
I start doing before I realize I'm doing it							
I would find hard not to do							
I have no need to think about doing							
It is typically "me."							
I have been doing for a long time							

3. Self-esteem

Question 3: These statements are your assumptions about how managers and boss think about you. Indicate your opinion about the extent to which you agree.

(1 - Strongly disagree; 2 – Disagree; 3 – Somewhat disagree; 4 – Neutral; 5 – Somewhat agree; 6 – agree; 7 – Strongly agree)

Statement	1	2	3	4	5	6	7
I count around here							
I am taken seriously							
I am important							
I am trusted							
There is a faith in me							
I can make difference							
I am valuable							
I am helpful							
I am efficient							
I am cooperative							

4. Knowledge Management

Question 4: Read the statements below and indicate your opinion about the extent to which you agree.

(1 - Strongly disagree; 2 – Disagree; 3 – Somewhat disagree; 4 – Neutral; 5 – Somewhat agree; 6 – agree; 7 – Strongly agree)

Construct	Statement	1	2	3	4	5	6	7
Knowledge acquisition	It is part of the work of all staff to collect, bring back, and report information about what's going on outside the company							
	All meetings in the company regularly include a review of what's going on in our business environment							
	I meet regularly with representative groups of customers, suppliers, community members and so on to find out what's important to them							
	I receive regular intelligence reports on the economy, markets, technological developments, socio-political events and general trends							
	Based on the reports above, I examine how economy, markets, technological developments, socio-political events and general trends may affect our business							
	There are systems and procedures for receiving, collating, and sharing information from outside the firm							
Information distribution	Information flows freely and openly							
	Departments speak freely and candidly with each other, both to challenge and to give help							
	People make time to question their own practice, to analyze, discuss, and learn from what happens							
Information utilization	Errors and incidents are analyzed, widely reported, and acted upon							
	Information is used for understanding, not reward or punishment							
	We really understand the nature and significance of variation in a system and interpret data accordingly							
	Managers facilitate communication, negotiation, and contracting, rather than exerting top-down control							
Organizational memory	Information technology is used to create databases and communication systems that help everyone understand what is going on							
	You can get feedback on how your section or department is doing at any time by pressing a button							
	Information technology is used to create databases, information, and communication systems that help everyone to understand what is going on and to make sound decisions							

B. DEPENDENT VARIABLES

Question 5: The management of the company decided to apply the new input material and new machines into the manufacturing process". Read the statements below and indicate your opinion about the extent to which you agree.

(1 - Strongly disagree; 2 – Disagree; 3 – Somewhat disagree; 4 – Neutral; 5 – Somewhat agree; 6 – agree; 7 – Strongly agree)

Dimension	Statement	1	2	3	4	5	6	7
Thought	I believed that the change would harm the way things are done in the organization							
	I thought that it's a negative thing that we were going through this change							
	I believed that the change would make my job harder							
Feeling	I was afraid of the change							
	I had a bad feeling about the change							
	The change made me upset							
	I was stressed by the change							
Behavior	I looked for ways to prevent the change from taking place							
	I protested against the change							
	I complained about the change to my colleagues							
	I presented my objections regarding the change to management							

C. CONTROL VARIABLES

Question 6: Which age group do you belong to?

(1) 30 or under

(2) Between 31 and 40

(3) Between 41 and 50

(4) 51 or over

Question 7: Do you have managerial responsibility in your job?

(0) No

(1) Yes