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The Effect of Psychological Capital on Innovation in Information Technology

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Abstract

In today's competitive world, innovation is considered as a key factor to success and survival for organizations. So far, the literature has recognized various items that affect innovation in organizations. This paper seeks to investigate the effect of psychological capital on innovation in Information Technology (IT) among branches of Agriculture bank in Tehran, Iran. In terms of objective, this study is considered as an empirical one, and the research methodology is descriptive-correlative type. The population includes 132 managers and employees working in Agriculture bank branches in Tehran. Among those people, 100 individuals were selected to be studied based on using Cochran formula and through random sampling method. Structural Equation Modeling (SEM) was used for data analysis. The Results of study showed a significant effect of psychological capital on innovation in IT. In addition, more specific analysis on each of the psychological capital dimensions (self-efficacy, hope, optimism, resilience) revealed that except resilience, none of them enhanced innovation in IT. Finally, this study proposes insights for managers how to enhance their employees' capabilities and psychological capital through constant measurement as well as using improvement plans in order to provide higher innovation in IT. The current research also provides more suggestion for future studies that could consider consequences of innovation in IT.

Keywords: Psychological capital; Self-efficacy; Hope; Optimism; Resilience; Innovation

Background

Today, firms need innovation to grow and have been encouraged to develop their innovative activities by the behavioral patterns (Sweetman et al. 2010). According to Ortt and Duin (2008), innovation reduces the competitiveness in a dynamic business environment. Lumpkin and Dess (1996) also defined innovation as supporting and getting involved in new ideas through creative approaches in order to solve problems and meet market needs. Innovation could also be defined as a new product or service, a new technology or manufacturing process, a new structure or administrative system, or a new plan regarding the members of an organization (Liao and Wu, 2010).

Creation and establishment of innovation depend on the capital changes in an organization (Mohanty, 2009). Capital has been modified from its traditional form of economic capital to first human capital, second social capital, and finally psychological capital form (Jafri, 2012). Psychological capital, which fosters innovation inside the organizations through creating a good context, has attracted the attention of many

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papers in the literature (e.g. Jafri, 2012; Rego et al. 2012;Abbas and Raja, 2011;Luthans and Avey 2011).

According to Luthans et al. (2007), psychological capital includes self-efficacy, hope, optimism, and resilience and it enables the individuals to be more creative to act more innovatively in their activities. In another study Luthans and Avey (2011) also pointed out that the resilience or optimism needed for having creativity and innovation could be obtained through psychological capital. Therefore, identifying psychological capital of individuals is considered as an important tool for fostering innovation (Jafri, 2012).

So far, few studies have been conducted on the relationship between dimensions of psychological capital (i.e., self-efficacy, hope, optimism, and resilience) and innovation in IT.

The aim of this paper is to investigate the effect of psychological capital dimensions on innovation in it in agriculture bank of Iran as a bank in Iran. It is important for service sector and particularly bank industry to consider the psychological issues that can lead innovation in their structure. In this line, psychological capitals make up the innovation in IT as one of the most obvious waves visualizing of this "new IT paradigm" (Liao and Wu 2010).

Literature review
Psychological capital

Psychological capital has lately been entered into the literature of organizational behavior (Luthans and Youssef, 2004). Positive psychology, as "a science of positive subjective experience, positive individual traits, and positive institutions, promises to improve quality of life and prevent the pathologies that arise when life is barren and meaningless" (Seligman and Csikszentmihalyi, 2000). Positive organizational behavior focuses on paying attention to the employee's strengths rather than their weaknesses (Nelson and Cooper, 2007). In fact, through positive psychology dimensions such as hope, optimism, and resilience, psychological capital lead to promotion of human capital value (e.g. Individuals' knowledge and skills) and social capital (e.g. social network among individuals) in organizations (Luthans, 2001). Psychological capital, the same as human capital and social capital, could be managed and invested; and unlike traditional capitals and tangible assets, is achieved even by little investment (Luthans et al. 2007).

Four dimensions of self-efficacy, hope, optimism, and resilience have been recognized through the literature for psychological capital (Jafri 2012; Luthans and Avey, 2011;Luthans et al., 2007) which are respectively are define. Self-efficacy refers to humans' beliefs on themselves that they have the ability of successfully doing a range of activities for obtaining favorite outcomes (Bandura, 1997). Belief on the progress and achieving success lead to the self-efficacy in an individual (Larson and Luthans, 2006). Self-efficacy refers to one's believes about the perceived competence for achieving success as well as accomplishing goals (Luthans and Avey, 2011). Hope also refers to a positive energy which promotes individuals' motivation, progressing in goals, and compatibility (Piazza et al., 1991). In other words, people with high hope experience a sense that they are able to develop some ways to obtain the things they want, which provides them with the ability to generate alternative pathways towards accomplishing their goals in case the initiative ways get blocked (Luthans and Youssef, 2004; Snyder, 2002).

In addition, optimism refers to an emotional as well as cognitive preparation to the fact that good things are more important than bad ones in life (Seligman et al., 2005). Optimism relies on how a person evaluates and predicts the outcomes of daily life events (Mohanty, 2009). Optimists attribute unpleasant events to external (It isn't my fault), inconstant (It just happened once) and specific (just for this case) factors; while pessimists interpret similar events as internal, constant, and global (Peterson, 2000).

Researchers also have identified resilience as a process or energy which increases the one's patience for difficult circumstances and anxieties (e.g., Choi and Kim, 2010;Richardson and Waite, 2002; Waller, 2001;). Resilience is a kind of growing state which enables individuals to keep on trying and doing their best when they face failures, calamities, life paradoxes, and even positive events, progresses or more responsibility (Larson and Luthans, 2006).

Innovation in information technology

Due to globalization of economics and technological changes, competition has been increased among countries in Macro level; and businesses in Micro level (Sebastian and Moyano, 2007). In such competition, only those firms can survive which are able to obtain a competitive advantage over their rivals (Amado et al. 2010). Technological innovation is considered as a pre-requisite for gaining competitive advantage (Bergek et al. 2007). Innovation in IT refers to newness in products, services, processes, and other IT dimensions (e.g. different systems of IT which have emerged since the beginning of IT) (Wang and Ramiller, 2009). IT can also help to create innovation in organizations (Lopez-Nicolas and Soto-Acosta 2010).

According to Amado et al. (2010), IT plays a key role in improving a firm's performance and capabilities. The relationship between IT and innovation has been studied in recent years (i.e. Wang and Ramiller, 2009; Lee et al., 2008), which based on these studies, IT is considered as a driving force for innovation in organizations such as products, services, and process innovation (Tarafdar and Gordon, 2007). Amado et al. (2010) studied the effect of IT on enhancement of firms' capabilities, emphasizing the mediating role of innovation. It was concluded that innovation contributes to development of firms' capabilities; and the development of IT resources effects on innovating environment growth.

Based on the literature, one of the key factors for creating innovation in IT seems to be "psychological characteristics of the employees" (Lee et al., 2008). In addition, innovative employees and managers could be a promoting factor for IT in the firm (Sebastian and Moyano, 2007). Previous research demonstrates that the psychological characteristics of the employees and managers in an organization are one of the important factors of creating, developing, and also accepting innovation in IT.

The Effect of psychological capital on innovation in information technology

Psychological capital has been proven to have a significant effect on enhancing innovation in an organization (e.g.,Jafri, 2012;Luthans and Avey, 2011; Abbas and Raja, 2011; Rego et al., 2012). Jafri (2012) believes that psychological capital and its dimensions (i.e. self-efficacy, hope, resilience, and optimism) affects employees' innovative behavior to a large extent and could even predict their innovative behavior; therefore, innovative behavior seems to be an essential factor for all the organizational levels in

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order for fostering innovation; besides, innovation is crucial for an effective and efficient performance of the organization (Abbas and Raja, 2011). In a study on two Pakistani banks, it was found out that individual with high self-efficacy, hope, resilience, and optimism show more creative and innovative behaviors in using IT. In fact, these people were more tended to design, develop, and achieve innovative ideas in their IT implementation processes (Hmieleski and Carr, 2007). In another study by Luthans and Avey (2011) with a purpose of investigating the effect of psychological capital on innovative performance, it was revealed that innovative performance could be predicted and developed through psychological capital and its dimensions (i.e. self-efficacy, hope, resilience, and optimism). Due to the undeniable effect of psychological capital on innovation, this study seeks to investigate this effect in IT area field among Agriculture bank branches in Tehran.

Conceptual framework

The previous research findings demonstrate that the integration of all four dimensions of psychological capital (i.e. self-efficacy, hope, resilience, and optimism) provides a better prediction for the rational results (Luthans et al., 2007). Focusing on previous studies, Avey et al. (2010) argued that psychological capital has a significantly greater added value for favorite organizational outputs than self-evaluation and personality dimensions of an individual. Psychological capital such as psychological characteristics of the employees could pave the way for emergence of innovation in organizations. According to Luthans and Youssef (2004), creation and also establishment of innovation depends on a capital change within the organization. Individuals with positive psychological capital have a high capability to propose and implement innovative ideas for achieving the planned goals (Avey et al., 2008). These people accept the organizational changes and are able to develop new ways for obtaining their goals (hope); have the required self-confidence to use new ways for reaching their goals (self-efficacy); benefit from a positive vision for the future (optimism); and adapt themselves to any new change or difficulty (resilience); which all of these characteristics are effective in implementing the new ideas within an organization (Avey et al., 2008; Luthans et al., 2007). Although the demand for creativity and innovation may stimulate stress or frustration among employees, a positive psychological capital as a potential to meet the stressful demands, development and implementation of innovative ideas seems to be essential (Sweetman et al., 2010). Therefore, according to Luthans et al. (2007), psychological capital includes four dimensions of self-efficacy, hope, optimism and resilience. Therefore, based on these four dimensions, the present research hypotheses are discussed below:

The effect of self-efficacy on innovation in information technology

Individuals with high self-efficacy, motivation, and perseverance are able to suggest and implement new ideas to achieve their goals. Bandura (1997) demonstrated that self-efficacy is the generator of exploiting the innovative ideas (Tierney and Farmer, 2004). In addition, many studies (e.g. Hmieleski and Corbett 2008;Baum and Locke, 2004) have identified the positive relationship between the self-efficacy of innovative managers and firms' growth (Hmieleski and Carr 2007). Jafri (2012) also found out a positive relationship between self-efficacy and employees' innovative behavior. Therefore, the first research hypothesis was formed:

H1: Self-efficacy has a significant effect on innovation in IT.

The effect of hope on innovation in information technology

Hopeful people are more tended to take risks and always seek for new ways to reach their goals (Snyder, 2002). These people usually are looking for new ideas to solve their problems (Zhou and George, 2003). In fact, hopeful employees, despite different problems in their work place, are very enthusiastic about innovation (Luthans et al. 2007). Jafri (2012) also demonstrated a positive relationship between hope and innovative behavior. Based on this, second research hypothesis was formed:

H2: hope has a significant effect on innovation in IT.

The effect of optimism on innovation in information technology

Optimists create more positive viewpoints, and hope that good things will happen in the future; they also believe that they are able to control events in their lives (Hmieleski and Carr, 2007). Therefore, these individuals rarely lose their hopes on following innovative ideas, and look for positive as well as better visions in stressful circumstances. Moreover, optimists show more endurance when facing problems to find new ways and exploit new opportunities (e.g.,Luthans and Youssef, 2007;Fredrickson, 2001). Optimism directly affects employees' creativity and innovation (Rego et al. 2012). Optimist leaders also are looking for innovative ideas to solve their organizational problems. Jafri (2012) also found out a positive relationship between optimism and employees innovative behavior.

H3: hope has a significant effect on innovation in IT.

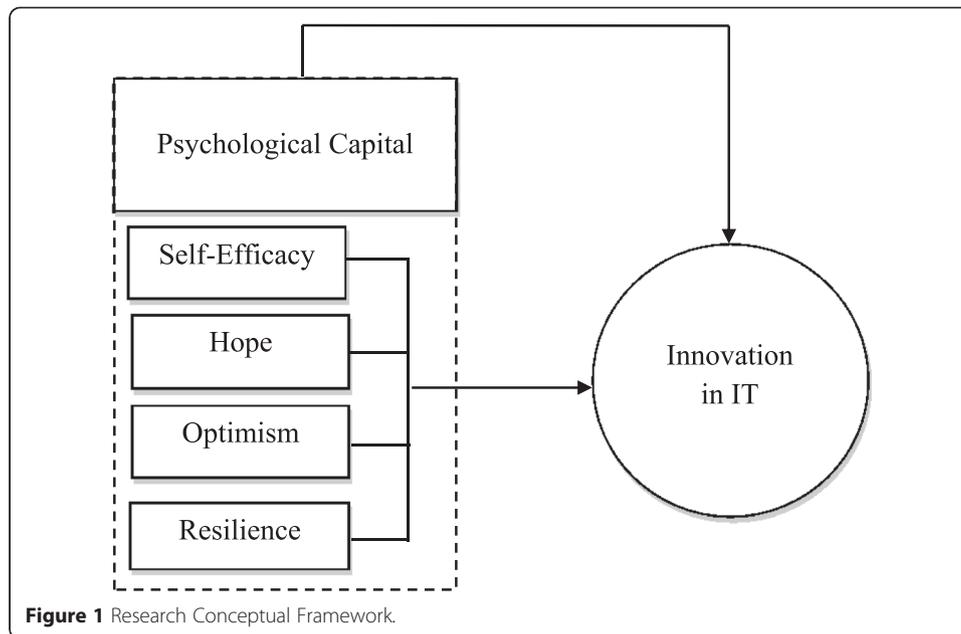## The effect of resilience on innovation in information technology

Previous studies confirmed that resiliency in the workplace can be a good predictor for performance, job attitudes, and other work outcomes (Harland et al. 2005). People with high resilience can adapt themselves to changes, and always seek for recognition and exploitation of new idea because of their higher capacity to take risks (Luthans et al., 2007). These people mainly are looking for new experiences in terms of change and uncertainty (Luthans and Youssef, 2007); thus, flexible employees when faced with difficulties, failures and opportunities look for developing new ways (Fredrickson, 2001). Resilient leaders encourage their subordinates to risk-taking and innovative behavior (Peterson et al. 2008). Jafri (2012) found out a positive relationship between resilience and employees innovative behavior.

H4: resilience has a significant effect on innovation in IT.

Considering the above-mentioned hypotheses, shows the conceptual framework of the study to investigate the effect of psychological capital on innovation in IT Figure 1.

Method

Since this study seeks to investigate the causal relationships between psychological capital variables and innovation in IT, the purpose of this study is considered as an empirical one in terms of objective, and its research methodology is descriptive-correlative type. More specifically, structural equation modeling (SEM) was used for data analysis. The population includes 132 managers and employees working in Agriculture bank

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Figure 1 Research Conceptual Framework.

branches in Tehran (as an important pilot in developing innovation in IT). Among those people, 100 individuals were selected based on using Cochran formula and through random sampling method. Independent and dependent variables in this study respectively include psychological capital and innovation in IT. Two standardized questionnaires (i.e. Luthans et al., 2007) questionnaire on psychological capital, and Damanpour et al. (2009) questionnaire on innovation in IT were used to collect data for this research. 16 questions were asked to measure psychological capital variables (4 questions for each indicator) and 5 questions were asked to measure innovation in IT through 5 Likert type scale.

Results and discussion

A total of 100 individuals responded to the survey. The results in descriptive statistics part of the study show that 72 percent of the participants are male and 28% are female. In terms of age, the mean age of the respondents was 35. Regarding education, 69% of the respondents had a Bachelor, 30% had a Master, and 1% had a PhD degree. The profile of the respondents in participating in this study is presented in Table 1.

Table 2 also shows the descriptive statistics (including mean and standard deviation) for the variables of the study.

Based on Table 2, the criterion of minimum and maximum score of the indicators is according to the individuals' scores in that indicator. For example, for self-efficacy, the minimum score of the individuals is 6.5, whereas the maximum score of the individuals is 16.25. Based on the difference between minimum and maximum scores, the standard deviation has been measured 1.7 for self-efficacy.

Analysis and results

The Structural Equation Modeling (SEM) approach by PLS methodology with Smart PLS 2.0 software were used. PLS was selected to assess the relationships between the endogenous and exogenous variables and to determine the predictive power of the

Table 1 Sample profile of the respondents

	Characteristics	Number	Percent
Gender	Male	72	72
	Female	28	28
Age	30 and below	22	22
	31-40	28	28
	41-50	35	35
	50 and above	15	15
Educational Level	Bachelor Degree	69	69
	Master Degree	30	30
	PhD	1	1
Years in present designation	Less than Three Years	27	27
	Three to Ten Years	35	35
	Over Ten Years	38	38

research model. The partial least squares (PLS) approach to SEM offers an alternative to covariance based SEM, which is especially suited for situations when data is not normally distributed.

Structural equation modeling is a very general, chiefly linear, chiefly cross-sectional statistical modeling technique. Factor analysis, path analysis and regression all represent special cases of SEM (Hair et al., 1999).

PLS path modelling is referred to as soft–modeling–technique with minimum demands regarding measurement scales, sample sizes and residual distributions (Hair et al., 1999). In the current study, reliability was measured through two criteria of Cronbach's Alpha and Composite reliability (CR). Validity was also measured by Convergent and Divergent Validity. While convergent validity controls if the correlation between a construct and the questions of that construct is adequate (Hair et al., 1999), Divergent validity compares the correlation between a construct and the questions of that construct with the correlation of that construct with other constructs (Hulland, 1999). Table 3 shows these amounts.

Table 4 also shows the correlation coefficients for the relationship between two variables of psychological capital and innovation in IT among Agriculture bank branches in west of Tehran:

As it can be seen from the above table, for the relationship between psychological capital and innovation in IT, $r = 0.455$. For the relationship between self-efficacy and innovation in IT, $r = 0.363$. For the relationship between hope and innovation in IT, $r = 0.414$. For the relationship between optimism and innovation in IT, $r = 0.386$. For the relationship between resilience and innovation in IT, $r = 0.432$. Therefore, all of the relations are significant at the

Table 2 Descriptive statistics based on the variables of the study

Indicators	Frequency	Lower limit	Upper limit	Mean	Standard deviation
Self-efficacy	100	6.50	16.25	13.9	1.7
Hope	100	6.50	16.25	13.2	2.1
Optimism	100	6.50	16.25	12.5	2.01
Resilience	100	5.50	16.25	12.8	2.3
Innovation in IT	100	9.20	20.80	16.9	2.3

Table 3 Amount of convergent validity, divergent validity, composite reliability, Cronbach's alpha and indicators

Measure	Alpha's cronbach	Composite reliability	Convergent validity	Divergent validity	Number of items	Scale
Criterion	Above 0.7	Above 0.7	Above 0.4	-	-	-
Self-efficacy	0.72	0.835	0.63	0.794	4	Interval
Hope	0.78	0.865	0.62	0.788	4	Interval
Optimism	0.71	0.787	0.56	0750	4	Interval
Resilience	0.85	0.901	0.69	0.834	4	Interval
Innovation in IT	0.78	0.879	0.63	0.799	5	Interval

Alpha level of 0.05. All the relationships are positive, implying that as psychological capital and its dimensions increase, innovation level in IT would increase too.

Hypotheses testing

The significance level in PLS software is equal or more than 1.96, which shows that the hypotheses are significant. Research hypotheses would be supported if the score becomes above 1.96. In addition, according to Chin (1998), the coefficient must become equal or above 0.30 which is the ideal score for the indicator. Based on standards, the hypotheses test results and PLS hypothesized models are presented below (Table 5, Figure 2 and 3):

Even though psychological capital in general is a predictor of innovation in IT, with respect to the observed significance score at the alpha level of (.05), except for resiliency, other dimensions of psychological capital cannot solely predict innovation in IT.

Assessing the structural model

To validate the relationships between variables and to investigate the overall fitness of the proposed model, multi-variable analysis and particularly path analysis were used. Table 6 shows the common model-fit indices, recommended values and results of the test of structural model fitness. In this study, all of the indices are better than recommended value and represent the goodness-of-fit for the proposed model.

Discussion

In the current study, analysis of the results demonstrates a positive and significant relationship between the dimensions of psychological capital (i.e., self-efficacy, hope, optimism, and resilience) altogether and innovation in IT. This finding is in line with previous studies (e.g. Jafri, 2012; Rego et al., 2012; Abbas and Raja, 2011). The results also show that 45 percent of changes and variances of scores related to innovation in

Table 4 The correlation coefficients

Source	Frequency	Pearson coefficient	Significance level
Psychological capital and innovation in IT	100	0.455	0.00
Self-efficacy and innovation in IT	100	0.363	0.00
Hope and innovation in IT	100	0.414	0.00
Optimism and innovation in IT	100	0.386	0.00
Resilience and innovation in IT	100	0.432	0.00

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Table 5 The hypotheses test results

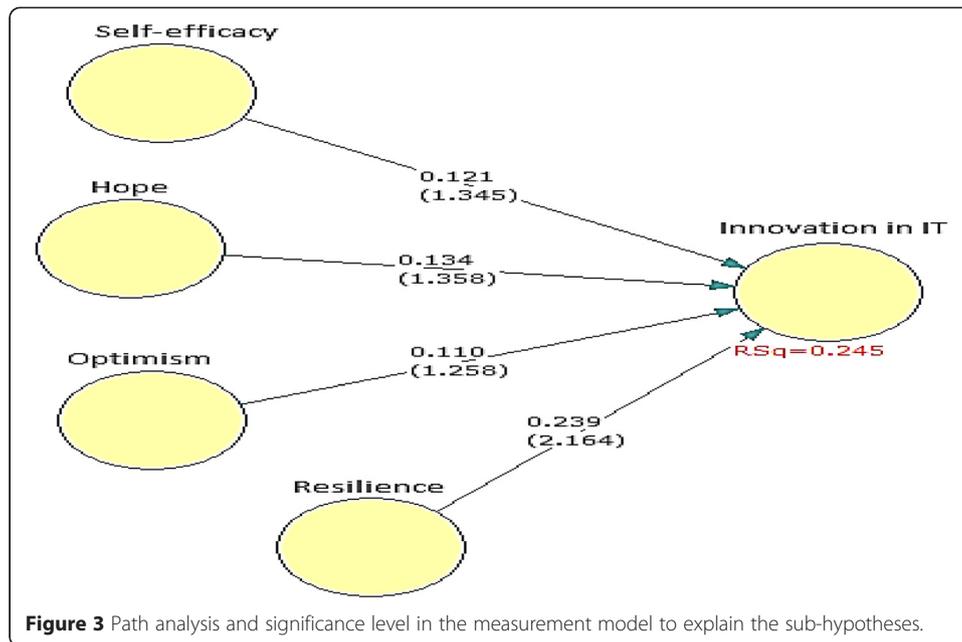| Hypotheses	The relationship	Sig level (t)	Coefficient (B)	Results
Main hypothesis	The effect of psychological capital on innovation in IT	3.63	0.455	Positive and significant effect
Sub-hypothesis 1	The effect of self-efficacy on innovation in IT	1.34	0.121	No effect
Sub-hypothesis 2	The effect of hope on innovation in IT	1.35	0.134	No effect
Sub-hypothesis 3	The effect of optimism on innovation in IT	1.25	0.110	No effect
Sub-hypothesis 4	The effect of resilience on innovation in IT	2.16	0.339	Positive and significant effect

IT can be explained through a combination of all predicting elements of self-efficacy, hope, optimism, and resilience. However, none of the dimensions of psychological capital except resilience couldn't predict innovation solely. Resilience solely explains 33% of changes of the variable of innovation. Findings of this study confirm the previous theories of Luthans et al. (2007) and Sweetman et al. (2010), regarding the fact that psychological capital elements have synergy. In other words, the overall psychological capital is bigger than the combination of its elements.

Conclusion

Today, organizations seek for innovation in order to survive in the competition scene. Due to the necessity of innovation in any organization, this study investigated the effect of psychological capital on innovation in IT among Agriculture bank branches in Tehran.

The results of this study also provide worthwhile insights for understanding the dimensions of psychological capital (i.e., self-efficacy, hope, optimism, and resilience) altogether and innovation in IT. Managers are suggested to enhance their employees' capabilities and psychological capital through constant measurement as well as using

Figure 2 Path analysis and significance level in the measurement model to explain the main hypothesis.

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Figure 3 Path analysis and significance level in the measurement model to explain the sub-hypotheses.
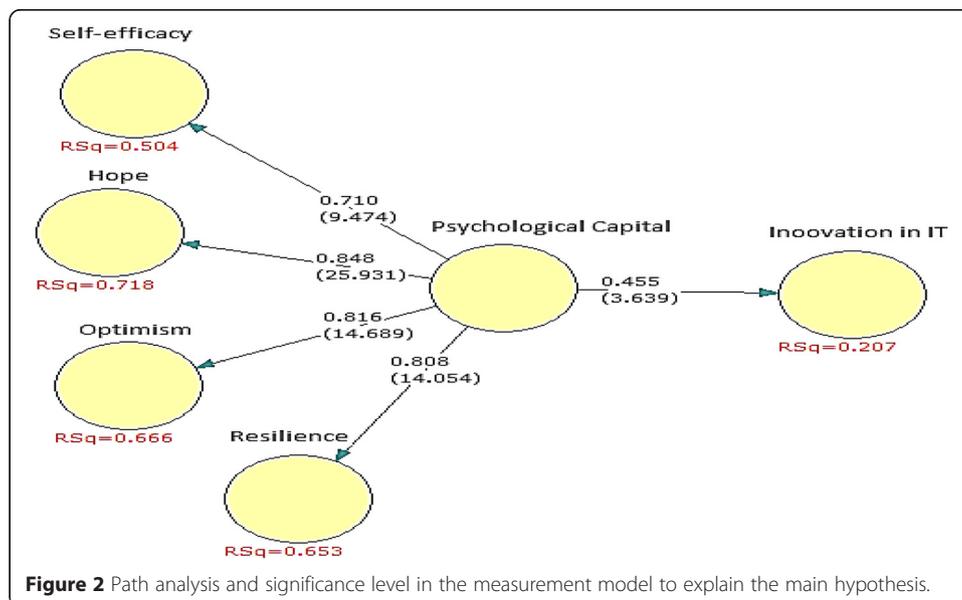
improvement plans in order to provide higher productivity. In addition, due to the key role of innovation, managers of bank branches are proposed to support banking new ideas to obtain competitive advantage through applying and promoting innovative culture particularly in service delivery and understanding customers' needs. Furthermore, with respect to intra-correlations between the dimensions of psychological capital, managers can increase each of the dimensions through creating and reinforcing a productive environment in order to enhance the psychological and then innovation in their organizations. The combination of all psychological capital dimensions suggests this fact to the policy makers to pay attention to all elements as a whole and not one by one. Therefore, a systematic approach is preferred to enhance the employees' psychological capital in bank branches.

The current study also provides more valuable insights for the future studies which should examine the performance outcomes of innovation in IT and the variables that can moderate the relationship between the psychological capital and innovation in IT. It is also recommended that future research may need to make efforts on the comparative studies to identify and test systematically variables that could effect on innovation in IT.

Table 6 The fit indices and analysis results of the structural model of the overall model

Fit indices	Recommended value	Result
x^2/df	<3.00	2.11
GFI (goodness of fit index)	>0.90	0.91
RMSEA (root mean square error of approximation)	<0.08	0.05
RMR (root mean square residual)	<0.08	0.05
NFI (normed fit index)	>0.90	0.92
NNFI (non-normed fit index)	>0.90	0.95
CFI (comparative fit index)	>0.90	0.94

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