Studying the effect of Intellectual Capital on Performance of Optimizing Fuel Consumption Firm Mediated by Knowledge Management (KM)

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ABSTRACT

In today's world, the main economic resources aren't capital, natural resources and labor, but it is knowledge. After the twentieth century which was the industrial economy century, the twenty-first century is the century of information & knowledge. In the industrial economy, the factors of creating economic wealth have been physical and tangible assets such as land, labor, and money and wealth is created by combining these economic factors. In this economy, using knowledge has had little role as a factor of production. The purpose of the current research is Studying the effect of intellectual capital on performance of optimizing fuel consumption firm mediated by knowledge management (KM) in optimizing fuel consumption firm in Tehran. This research is of applicable researches in terms of way of doing and in terms of gathering data is Survey (cross) type. The library and questionnaire method will be used to gather data. Statistical community of this research is consisting of all managers, executives, staffs and administrative professionals. To determine sample size, kokran method is used. To study research hypotheses & data analysis, SPSS & LISREL software are used. So, to study the status of variables, normal test and mean of a community are used. To assess the validity of research, Confirmatory factor analysis is used and for testing research hypotheses, path analysis is used. Finally we saw that all research hypotheses were confirmed. So, we can say that intellectual capital on performance of optimizing fuel consumption firm impacts on mediating knowledge management (KM).

INTRODUCTION

An organization's intellectual capital is assets and intellectual & intangible resources that organization create value by changing them into new processes of goods and services. The term "intellectual capital" was proposed by John Kent gal bright in 1969 for the first time; Peter Drucker had used the term “knowledge workers” before that. Due to being intangible and the dynamic nature of this term, its translation is very difficult. Intellectual capital is often equal to intangible or knowledge assets. Intellectual property and experiences are used for creating wealth. Knowledge assets such as technical information, customer information, trademarks and organizational culture that are not measured in terms of competitive power of firms, define intellectual capital [6].

Environmental challenges have forced organizations use knowledge management and intellectual capital. It seems that knowledge is very essential for organizations. When companies move from an industrial economy to a knowledge economy, they face major challenges such as dynamism and uncertainty and complexity. So in this situation the need for more information about intellectual capital and its immediate control is increased.

In this research, we intend to Study the effect of intellectual capital on performance of optimizing fuel consumption firm mediated by knowledge management (KM).

1. Research literature:

In today's world, the main economic resources aren't capital, natural resources and labor, but it is knowledge. After the twentieth century which was the industrial economy century, the twenty-first century is the century of information & knowledge. In the industrial economy, the factors of creating economic wealth.
have been physical and tangible assets such as land, labor, and money and wealth is created by combining these economic factors. In this economy, using knowledge has had little role as a factor of production but in the knowledge economy, knowledge or intellectual capital is more preferred as a factor of producing wealth compared to other tangible & physical assets.

No research has been done related to studying the effect of intellectual capital on performance of optimizing fuel consumption firm mediated by knowledge management (KM) so far. We have tried to state the researches which relate to research issue directly or indirectly:

Sinkaee et al [8] did a research about studying the role of knowledge management in manufacturing organizations to reach global class. The purpose of this study is studying the role of knowledge management in manufacturing organizations to reach global class so, correlation test has been used. Statistical community of this research is rahantavan co of zanjan province. Tools of gathering data consist of studying research literature and questionnaire. Confirming the hypotheses testing prove significant relationship of knowledge management with reducing costs, improving product quality, innovation and continuous improvement to achieve world-class in manufacturing organizations.

Sadeqi rad, mohammadi, jasemi [7] studied the effect of the processes of knowledge management on intellectual capital (Case Study: Ilam Province). The results showed that Component of KM (knowledge creation, knowledge organization, storage, dissemination and application of knowledge) had a significant and positive effect on intellectual capital and only one component of KM (creating knowledge) had no significant relationship with the intellectual capital.

Helena rodez&tanjamihalik studied the impact of intellectual capital components on financial performance in the hotel industry in Slovenia. The results of this research showed that firstly there is a significant & positive relationship between the components of intellectual capital and financial performance in this industry; secondly, high impact coefficient of communications capital is compared to other components of Intellectual capital on financial performance of companies.

Boss and Thomas studied the relationship between intellectual capital and performance Using the Balanced Scorecard approach and concluded that the Balanced Scorecard is a valuable evaluation method about intellectual capital.

Tavestiga and taloogorova studied the relationship between intellectual capital and performance in Russia. The findings of research showed that Intellectual capital, especially human & structure capital are primary criterion for determining performance.

2. Research methodology:
In this research, intellectual capital as an independent variable consists of dimensions (human, structural, relational) and knowledge management as a mediator with dimensions (knowledge creation, knowledge sustaining, knowledge conversion, and application of knowledge) and performance as the dependent variable are recognized by dimensions (aspect of personnel, internal processes, environmental and social sustainability).

Conceptual model of this research is resulted from combining intellectual capital model of bonnis, pike et al and knowledge management model of gold et al & to measure the performance of optimizing fuel consumption firm(aspect of personnel, internal processes, environmental and social sustainability) indicators have been used.

<table>
<thead>
<tr>
<th>Intellectual capital</th>
<th>knowledge management</th>
<th>firm performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human</td>
<td>creating knowledge</td>
<td>aspect of personnel</td>
</tr>
<tr>
<td>Structural</td>
<td>sustaining knowledge</td>
<td>internal processes</td>
</tr>
<tr>
<td>Relational</td>
<td>converting knowledge</td>
<td>environmental and social sustainability</td>
</tr>
<tr>
<td></td>
<td>Applying knowledge</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 1: conceptual model of research.

This research is descriptive in terms of way of doing because it studies the current situation and existing situation of intellectual capital and knowledge management of optimizing fuel consumption firm and also studies the impact of intellectual capital on performance of optimizing fuel consumption firm mediated by KM, in terms of purpose is applicable type and it is survey (cross) in terms of gathering data. Since this research is about a real, objective and living (dynamic) issue and its results can be used practically, it is an applicable research [4]

The main objective of this research is to obtain a scientific understanding about the impact of intellectual capital on firm performance to optimize fuel consumption is mediated by knowledge management.

Secondary objectives of the study are as follows:
- To Review and determine the impact of intellectual capital on performance of optimizing fuel consumption firm
• To Review and determine the impact of knowledge management on performance of optimizing fuel consumption firm
• To Review and determine the impact of mediating knowledge management on the relationship between intellectual capital and performance of optimizing fuel consumption firm

In this research the main question which researcher faces, is that:
What effect does intellectual capital on performance of optimizing fuel consumption firm have mediating knowledge management? To answer this, we put it in the form of main and 3 secondary hypotheses. Hypothesis that appears to explain the trajectory of research and its process and assist researcher in achieving the expected results, are as below:
Main hypothesis: intellectual capital impacts on performance of optimizing fuel consumption firm mediating knowledge management.

Secondary hypotheses:
• intellectual capital impacts on performance of optimizing fuel consumption firm
• knowledge management impacts on performance of optimizing fuel consumption firm
• knowledge management has mediation impact on the relationship between intellectual capital and performance of optimizing fuel consumption firm

The local scope of research is in the field of organizational resources and specialized field of knowledge management and intellectual capital. The spatial scope of it is optimizing fuel consumption firm in Tehran and its time scope is between July 2014 and Jan 2015.

In this research, to gather data library and questionnaire methods have been used.

Given the purpose and subject of the research, statistical community of this research consist of all directors, executives, staff and administrative professionals that work in optimizing fuel consumption firm, they are 390 persons & Stratified random sampling method will be used. In this research, due to the lack of access to all staffs of this community, kokran method is used to determine sample volume. Given above formula, 190 persons are considered.

To study the research hypotheses and analyzing data, descriptive and inferential statistics using spss and lisrel are applied. Normality test and the mean of a community will be used to consider the status of variables. To study the validity of research Confirmatory factor analysis is used and path analysis is used to test hypotheses of research.

To determine the validity, the questionnaire was made by 10 experts. They were asked to reply 53 items: item is necessary, item is useful not necessary and the item is not necessary. Answers were calculated based on CVR formula.

So the score of 72 items was 0.62 larger than lavshe table and showed that related items are essential with an acceptable statistical significant (p<0.05).

In this research Cronbach's alpha is used to measure the reliability.

To calculate Cronbach's alpha coefficient, first standard deviation (SD) of scores for each subset of questions of questionnaire and standard deviation (SD) of all questions must be computed then obtain alpha coefficient of each subset of questions using below formula:

Table 1: variables, number of questions and reliability coefficient.

<table>
<thead>
<tr>
<th>Cronbach alpha coefficient</th>
<th>Accepted level</th>
<th>N of questions</th>
<th>variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.81</td>
<td>0.7</td>
<td>6</td>
<td>Human capital</td>
</tr>
<tr>
<td>0.75</td>
<td>0.7</td>
<td>6</td>
<td>Structural capital</td>
</tr>
<tr>
<td>0.80</td>
<td>0.7</td>
<td>7</td>
<td>Relational capital</td>
</tr>
<tr>
<td>0.83</td>
<td>0.7</td>
<td>5</td>
<td>Creating knowledge</td>
</tr>
<tr>
<td>0.79</td>
<td>0.7</td>
<td>7</td>
<td>Sustaining knowledge</td>
</tr>
<tr>
<td>0.86</td>
<td>0.7</td>
<td>6</td>
<td>Converting knowledge</td>
</tr>
<tr>
<td>0.82</td>
<td>0.7</td>
<td>5</td>
<td>Applying knowledge</td>
</tr>
<tr>
<td>0.77</td>
<td>0.7</td>
<td>4</td>
<td>Staffs aspects</td>
</tr>
<tr>
<td>0.81</td>
<td>0.7</td>
<td>3</td>
<td>Internal processes</td>
</tr>
<tr>
<td>0.89</td>
<td>0.7</td>
<td>4</td>
<td>environmental and social sustainability performance</td>
</tr>
<tr>
<td>0.90</td>
<td></td>
<td></td>
<td>Cronbach’s alpha coefficient of the whole questionnaire</td>
</tr>
</tbody>
</table>

As it is clear in above table, the results obtained from reliability of questionnaire showed that the total calculated alpha coefficient equals to 0.90 and given that it is larger than 0.7 and it is a remarkable value, we can conclude that the applied questionnaire has enough reliability.

It is observed from the above tables that H0 isn’t confirmed based on that the mean of intellectual capital variable equals 3. The total result is explained in this way that intellectual capital status is high given community mean of 3.591 in statistical community. H0 is not confirmed based on that the mean of knowledge management
variable equals 3. 2 figures shown in the column related to confidence distance 95% of mean difference doesn’t consist zero; so, this factor confirms rejecting H0. H0 is not confirmed based on that the mean of firm performance variable equals 3. 2 figures shown in the column related to confidence distance 95% of mean difference doesn’t consist zero; so, this factor confirms rejecting H0.

Confirmatory factor analysis first time of intellectual capital variable

3. Findings:

Table 2: one-sample statistics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>numbers</th>
<th>mean</th>
<th>SD</th>
<th>SD of mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual capital</td>
<td>190</td>
<td>3.591</td>
<td>0.495</td>
<td>0.036</td>
</tr>
<tr>
<td>Knowledge management</td>
<td>190</td>
<td>3.668</td>
<td>0.513</td>
<td>0.037</td>
</tr>
<tr>
<td>Firm performance</td>
<td>190</td>
<td>3.526</td>
<td>0.552</td>
<td>0.040</td>
</tr>
</tbody>
</table>

Table 3: one-sample test.

<table>
<thead>
<tr>
<th>Test value = 3</th>
<th>T</th>
<th>Freedom degree</th>
<th>Significant coefficient</th>
<th>Mean difference</th>
<th>Degree of confidence 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intellectual capital</td>
<td>16.443</td>
<td>189</td>
<td>0.000</td>
<td>0.591</td>
<td>0.520-0.662</td>
</tr>
<tr>
<td>Knowledge management</td>
<td>17.965</td>
<td>189</td>
<td>0.000</td>
<td>0.668</td>
<td>0.595-0.742</td>
</tr>
<tr>
<td>Firm performance</td>
<td>13.124</td>
<td>189</td>
<td>0.000</td>
<td>0.526</td>
<td>0.447-0.605</td>
</tr>
</tbody>
</table>

Fig. 1: The correlation model between the dimensions and indicators of intellectual capital in significant mode.

Given the above figures factor load is not significant and should be removed from the model.

Fig. 2: The correcting correlation model between the dimensions and indicators of intellectual capital in significant mode.

The result of Factor analysis shows that all indicators of intellectual capital have values more than 1.96 and acceptable factor load. Fit indices of model show that model is in good condition in terms of fit indices.
Confirmatory factor of second time of intellectual capital

Fig. 3: The correlation model between variable & sizes of intellectual capital and in significant mode.

Fit indices of model show that model is in good condition in terms of fit indices. All shows that we can rely on the results of confirmatory factor analysis to intellectual capital structure and put the structure as our working base.

Confirmatory factor analysis first time of knowledge management variable

Fig. 4: The correlation model between the dimensions and indicators of knowledge management in significance mode.

The result of Factor analysis shows that all indicators of knowledge management have acceptable factor load. Fit indices of model show that model is in good condition in terms of fit indices.

Confirmatory factor analysis second time of knowledge management variable

Fit indices of model show that model is in good condition in terms of fit indices. All shows that we can rely on the results of confirmatory factor analysis to knowledge management structure and put the structure as our working base.

Confirmatory factor analysis first time of firm performance variable

The result of Factor analysis shows that all indicators of firm performance have acceptable factor load. Fit indices of model show that model is in good condition in terms of fit indices.

Confirmatory factor analysis second time of firm performance variable

Fit indices of model show that model is in good condition in terms of fit indices. All shows that we can rely on the results of confirmatory factor analysis to firm performance structure and put the structure as our working base.

Structural equations modeling:

Fit indices of model in main hypotheses mode indicate that model is in good condition in terms of fit indices.
Fig. 5: The correlation model between the dimensions and indicators of knowledge management in significance mode.

Table 4: fit model level.

<table>
<thead>
<tr>
<th>Indicator name</th>
<th>Obtained value</th>
<th>Allowed value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square with degrees of freedom</td>
<td>2.00</td>
<td>less than 3</td>
</tr>
<tr>
<td>CFI</td>
<td>0.99</td>
<td>higher than 0.9</td>
</tr>
<tr>
<td>RMSEA (The root of error of estimate squares mean)</td>
<td>0.078</td>
<td>less than 0.08</td>
</tr>
<tr>
<td>NFI (soften fitness)</td>
<td>0.98</td>
<td>higher than 0.9</td>
</tr>
<tr>
<td>NNFI (so softened fitness)</td>
<td>0.99</td>
<td>higher than 0.9</td>
</tr>
</tbody>
</table>

Research hypothesis test:

Table 5: Path coefficients, t-statistics & coefficient of determination.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>T statistic</th>
<th>Path coefficient β</th>
<th>Predictive variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>performance</td>
<td>10.43**</td>
<td>0.84</td>
<td>Intellectual capital</td>
</tr>
<tr>
<td>Knowledge management</td>
<td>12.02**</td>
<td>0.97</td>
<td>Intellectual capital</td>
</tr>
<tr>
<td>performance</td>
<td>10.25**</td>
<td>0.86</td>
<td>Knowledge management</td>
</tr>
</tbody>
</table>

**p < 0.01  * p < 0.05

The main hypothesis of this research tests the impact of intellectual capital on performance of optimizing of fuel consumption firm mediating knowledge management. Given 0.84 path coefficient and t statistic with 10.43 we can say that: intellectual capital in 99% confidence level has positive & significant effect on performance of optimizing of fuel consumption firm mediating knowledge management. So, the main hypothesis of this research is significant and it is confirmed.

The first Secondary hypothesis of this research tests the impact of intellectual capital on knowledge management. Given 0.97 path coefficient and t statistic with 12.02 we can say that: intellectual capital in 99% confidence level has positive & significant effect on knowledge management. So, the first secondary hypothesis of this research is significant and it is confirmed.

The 2nd Secondary hypothesis of this research tests the impact of knowledge management on performance of optimizing of fuel consumption firm. Given 0.86 path coefficient and t statistic with 10.25 we can say that: knowledge management in 99% confidence level has positive & significant effect on performance of optimizing of fuel consumption firm. So, the 2nd secondary hypothesis of this research is significant and it is confirmed.

4. Discussion and conclusion:

The results of the research showed that the most percent of respondents are between 36-45 years which are 206 persons and the least percent of frequency related to less than 25 years with 14 persons. High percentage of respondents, 162 persons, have diploma and the low percentage, 39 persons, have M.A.

96 of the respondents are men and 58 of them are women. High percentage of respondents, 160 persons, have reference history of 1 year and the low percentage, 42 persons have reference history of more than 2 years.

Given obtained results we saw that the main hypothesis of this research was confirmed, so we can say that intellectual capital impacts on performance of optimizing fuel consumption firm mediated by knowledge management (KM).
The first secondary hypothesis based on impact of intellectual capital on knowledge management was also confirmed.

The results of this hypothesis is consistent with the results of some studies such as seyednaghavi et al research with the subject of studying intellectual capitals and knowledge management in knowledge-based organizations, sadeghi rad et al [7] related to studying the impact of the processes of knowledge management on intellectual capital, ameri et al with the subject of The relationship of social & intellectual capital with knowledge management in the general Offices of Youth and Sports in East and West Azerbaijan Province and also by bontis research in a study about intellectual capital in organizations and its role in KM of organization.

The second secondary hypothesis tests knowledge management impact on performance of optimizing fuel consumption firm and it is also confirmed.

The results of this hypothesis is consistent with the results of the researches of ghaffarimoghaddam “studying the relationship between KM and improving staffs performance in hospitals of zanjan, sinkae et al “studying the relationship between KM in manufacturing organizations to reach global class and mohammadnia et al research in KM and innovation with productivity of education ministry staffs of lamard.

The second secondary hypothesis is also confirmed with title of KM on the relationship between intellectual capital and performance of optimizing fuel consumption firm and has mediating impact.

The results of this hypothesis is consistent with the results of researches of zabihmanesh “studying the impact of KM and intellectual capital on commercial performance of engineering and consulting firms, ganjavi et al “studying the impact of KM and its role on organizational effectiveness in sports saloons of Iran.

6. Suggestions for future researches:
1. It is suggested this research is done in other organizations.
2. Longitudinal Study or continuous research in alternating periods, in studying the effect of intellectual capital on performance by mediating presented knowledge management
3. Studying the subject of this research in national level with the purpose of Comparative analysis between different regions and cities.
4. It is suggested this research is studied via other methods such as the method of the least partial squares PLS and qualitative methods (Geravand theory) and obtained results are compared with these results.
5. it is suggested to managers of optimizing fuel consumption firm create Seminars and conferences in the field of knowledge management, intellectual capital and optimizing fuel consumption in the domestic and international level with a focus on composition (knowledge management, intellectual capital and optimizing fuel consumption)

6. Suggestions rose from research:
1. Cooperation with other employees in the organization is strengthened.
2. Fuel consumption optimization companies put a large volume of comments and new ideas into practice and action.
3. The databases of optimizing fuel consumption firm should make it possible to access required data.
4. Structural context of optimizing fuel consumption firm should be bureaucracy
5. organizational structure of optimizing fuel consumption firm shouldn’t cause people be far from each other.
6. There should be suitable space to perform new ideas and comments in organization.
7. There should be clear mechanism for conversion of staff’s tacit knowledge into explicit knowledge.
8. There should be Idea management systems such as the suggestions, the think tank, the Advisory Council in organization.
9. There should be required facilities to share knowledge in organization.
10. Documentation and maintenance of project-related information should be in order of organization works.
11. Team work is expanded.
12. The regular meetings for the exchange of information between authorities and staff should be run.
13. Organization uses the obtained information regarding organizational purposes.
14. Provide conditions for strengthening the spirit of risk-taking
15. Managers should have sufficient attention to delegate authority and strengthen the spirit of civic responsibility in corporate environments to provide a suitable context to strengthen staff’s individual creativity

8. Research limitations:
1. Some staffs and administrative professionals aren’t familiar with concepts and variables of intellectual capital and knowledge management
2. being sectional of research referred that it limit the ability to generalize results
3. Lack of required Persian resources in studying the effect of intellectual capital on performance of optimizing fuel consumption firm mediated by knowledge management (KM)
REFERENCES


