

# Adoption of Intangibles for Industrial Products as a Method of Measurement in Knowledge Management

**Manal Abdul Jabbar Al-Sammak<sup>a</sup>, Siham Kamel Mohamed<sup>b</sup>, Alaa Hassib Abdul Hadi Jalili<sup>c</sup>**, <sup>a,b,c</sup>College of Tourism Sciences / Mosul University = Book University College of Administration and Economics, Mosul University, Email: <sup>a</sup>[alaa\\_haseb@uomosul.edu.iq](mailto:alaa_haseb@uomosul.edu.iq), <sup>b</sup>[manal-abdulgabar@uomosul.edu.iq](mailto:manal-abdulgabar@uomosul.edu.iq), <sup>c</sup>[sihamkamel2006@yahoo.com](mailto:sihamkamel2006@yahoo.com)

From the review it can be concluded that IC standards of intangibles in the industrial organisation in general and the researched organisation, in particular, are still not reliable, this does not mean diminishing the importance of financial assessment of knowledge but proposing that it should be directed towards internal management to avoid previously known problems, and to ensure a high degree of objectivity and transparency in diagnosis and reporting of the value of cognitive assets. The second trade-off is between the possibility of generalisation and adaptation, as standard frameworks are designed to be general and allow to reference comparison but have been criticised for not being adopted in particular circumstances in specific industries, markets or industrial organisations. On the other side, some models provide internal methods that cannot be segregated to a particular organisational nature, industry or strategy; it criticises to losing the generalisation possibility because comparisons by companies become impossible or at least inaccurate. Knowledge is not valued of price in specific surroundings but maybe unrelated to significance in another surround. It is therefore suggested that knowledge measurement frameworks should include control processes as part of them and control towards the regulatory environment and strategy. There need to measurement models including dynamic knowledge flow metrics, and settings processes as a part of it and setting toward the regulatory environment and its strategic.

**Key words:** *Adoption - industry - product - management.*

## Introduction

The concept of intangibles is one of the concepts in the book with a very different meaning in reality, as the intangible found it difficult to confine or sense it, unlike the tangible assets that are characterised by the possibility of sense and identification. *Delfmann, 2012* defines the concept of intangibles as intangible assets are the non-material things of value that an organisation possesses. These assets do not determine the monetary value and are not a material measure. Moreover, these assets cannot be seen or touched. However, they are crucial to the success of the organisation.

## Research Questions

1. Is there a clear perception of the researched persons about the concept of intangibles and the importance of the researched organisation?
2. Are there clear scientific methods can measure the tangible knowledge in the researched organisation which can manage its knowledge?

## Aim of the Study

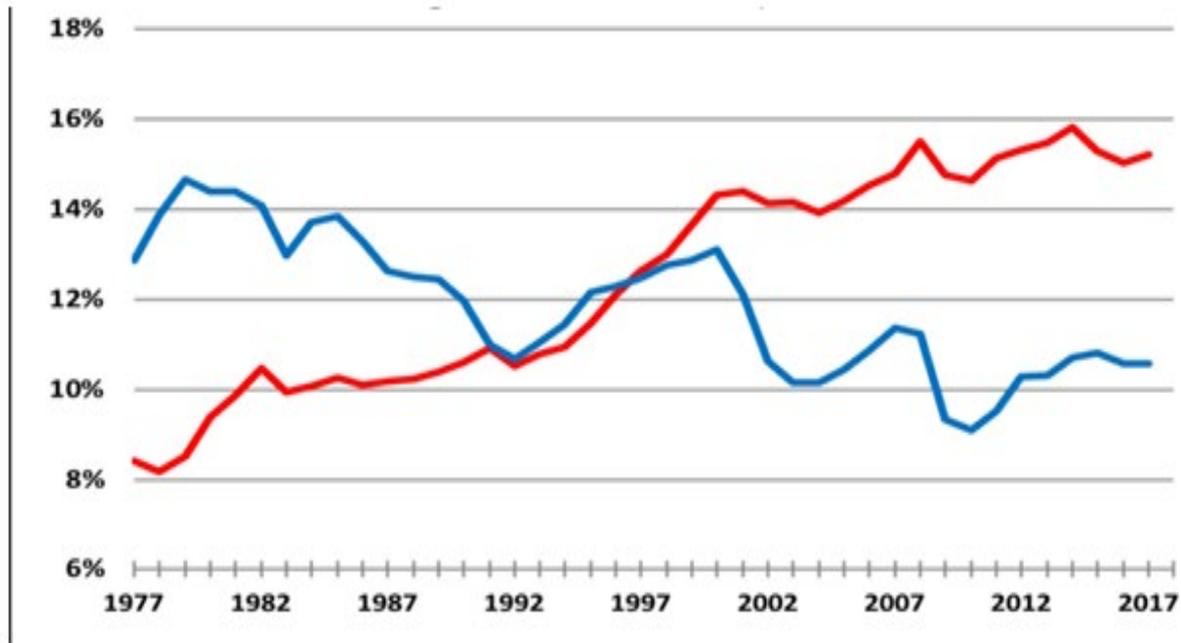
- Identify the theoretical frameworks of both intangibles and ramified assets such as intellectual capital, and measure the knowledge as one of the most important activities of knowledge management.
- Determine the level of intangibles adoption in measuring the knowledge of the researched organisation.

## Literature review

### ❖ *First, the concept of tangibility*

(*Ferreira, 2018*) see that they are non-monetary resources and without material, content combined on achieving the future benefits to the organisation. *Riley, 2018* defines it as resources that are not easily verifiable, not always visible, uncompetitive in consumption (thus show the public interest elements) and (as with research and development) not always easy to allocate the revenues that are produced. According to *Carol, 2017*, the concept of intangible assets has accompanied us all along human history, but a combination of innovations is needed to identify the intellectual property as a particular form of intangible.

**Figure 1.** Investment rate of tangible and intangible assets in the United States



**Source:** Unpublished update to *Corrado and Hulten (2010)* using methods and sources developed in *Corrado and Hao (2013)* and in *Corrado et al (2016)* and *Corrado et al (2017)* for INTAN-Invest© and the SPINTAN project, respectively.

❖ *Second: Characteristics of Intangible Assets*

*Andrews, 2012* identifies a set of points that he considers to be characteristic of assets to be tangible: 1- Lack of clarity: 2. Non-competition. 3. Partial exception 4. It cannot be traded. 5. Cannot be separated. 6 - Transfer of knowledge. 7 - Uncertainty and risk perceptions.

**Table 1:** Different the characteristics between the intangible assets

<i>Intangible</i>	<i>Competition</i>	<i>Negotiable (transaction of Market)</i>	<i>exception</i>	<i>Section</i>	<i>knowledge transfer</i>
<i>Computer Information</i>					
<i>Computer Software</i>	<i>Not complete the competition</i>	<i>Not in software accounts</i>	<i>only partial (protected access tokens)</i>	<i>Separated</i>	<i>High (rated)</i>
<i>Computer databases</i>	<i>Not-Complete the</i>	<i>internally generated data</i>	<i>Only partial</i>	<i>Separated</i>	<i>High (rated)</i>

	<i>competition</i>				
<b><i>Innovation</i></b>					
<b><i>Scientific research and development</i></b>	<b><i>Not-Complete the competition</i></b>	<b><i>external sources For research, development and grant of patents</i></b>	<b><i>Only partial</i></b>	<b><i>Separated</i></b>	<b><i>High of patents / Low of Secrets</i></b>
<b><i>Creative Property</i></b>	<b><i>Not-Complete the competition</i></b>	<b><i>external sources for research, development and copyright</i></b>	<b><i>Only partial</i></b>	<b><i>Separated</i></b>	<b><i>High (Regulated)</i></b>
<b><i>Designs</i></b>	<b><i>Not-Complete the competition</i></b>	<b><i>external sources of Intellectual Property Rights</i></b>	<b><i>Low for goods High for business</i></b>	<b><i>Separated</i></b>	<b><i>High (Regulated)</i></b>
<b><i>Economic capabilities</i></b>					
<b><i>Brands</i></b>	<b><i>Heavily competitor</i></b>	<b><i>external sources for marking service</i></b>	<b><i>High to company characteristics</i></b>	<b><i>Partial separation</i></b>	<b><i>through converting property</i></b>
<b><i>the organisation Characteristics - human resources</i></b>	<b><i>Heavily competitor</i></b>	<b><i>external sources for tanning</i></b>	<b><i>High to organisation characteristics</i></b>	<b><i>Not Separated</i></b>	<b><i>By human resource movement</i></b>
<b><i>the organisation Structure</i></b>	<b><i>Not Heavily competitor</i></b>	<b><i>external sources for discussing</i></b>	<b><i>Partial separation</i></b>	<b><i>Not Separated</i></b>	<b><i>Moderate / difficult attributes for encryption</i></b>

**Source:** Andrews, Dan & Serres, Alain de ,2012, Intangible Assets, Resource Allocation and Growth, OECD Economics Department Working Papers No. 989,p.8

❖ ***Third: Intangibles Types***

Different criteria have been used to classify the intangibles in the literature on intangibles. **Córcoles, 2010** has classified intangibles according to several criteria: 1. Identification. 2. The second criterion of classification depends on the organisation 3. Different intangible elements can be combined according to the nature and content of the corresponding investments. **Fădur, 2013** Whereas **Gervis, 2013**, see that intangible assets are divided into: (related to marketing, related to customers, related to technical, based on contract-, based on technology).

❖ ***Fourth: Problems of Identifying the Intangible Assets***

1. Uncertainty syndrome. 2. Partial Exceptions. 3. Non- Separable.

❖ ***Fifth: Evaluation of Intangible***

1. Division. 2. Setting priorities. 3. Collecting. 4- Sensitivity analysis. (**Abbaszadeh, 2013**)

❖ ***Sixth: Intangibility in Contemporary Industrial Companies***

The importance of intangibles in industrial organisations cannot be overlooked because they have a large impact on their course and work effectively and efficiently. **Konnur, 2013** found in their study that resources can be classified into tangible and intangible resources, and tangible resources refer to physical assets owned by organisations. While (**Ng & Kee, 2013**) identified a set of intangible factors that contribute to the success of the company, namely: 1. Leadership style. 2- Company image and reputation. 3 - organisational creativity. 4. Entrepreneurial capabilities.

❖ ***Seventh: Measuring Knowledge***

(**Hubbard, 2007**) defines metrics as "a set of observations that reduce uncertainty when the result is expressed as a quantity." (**Bolisan, 2017**) identifies it in general, in knowledge strategies. • Financial methods • Tobin's q method • EVA Economic Added Value Method • Methods (intellectual capital) IC. • Human capital methods • Methods of measuring performance **Alsammak, 2019**. In light of the classification of **Huang, 2007** (**Mohamed, 2018**), performance measurement methods are represented in the following classification: 1. Quantity ways: 2. Quality ways: (**Zack, 1999**) surveyed 88 Executive Director and found a relationship between knowledge management, organisational and financial performance from the results. More recently, **Mills, 2011**, surveyed the manager and used the same

technique to assess the links between particular knowledge management resources and performance.

**Balanced scorecard:** The BSC balanced scorecard is offered in a special category by itself because of its multidimensional nature in providing quality, financial and non-financial measures. It is based on research (*Kaplan, 1995*).

## Methodology

**Firstly: The study population:** it consists of Mosaic company for the furniture and furnishings / Dohuk branch, the primary data were analysed by using a statistical package (SPSS) and the following statistical methods were used: arithmetic mean and standard deviation. Test (T) for the average of one sample to test hypotheses

**Table 2:** Arithmetic Media and Standard Deviations of Intangibles

<i>S</i>	<i>Details</i>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Std. Error</b>	<b>Variance</b>
<i>1</i>	<i>our organisation's management cares about its intangible assets</i>	<b>2.3500</b>	<b>0.17741</b>	<b>1.12204</b>	<b>1.259</b>
<i>2</i>	<i>our organisation's management encourages new innovations</i>	<b>2.1500</b>	<b>0.17741</b>	<b>1.12204</b>	<b>1.259</b>
<i>3</i>	<i>Our organisation's management carefully examines data and information to diagnose its opportunities</i>	<b>2.4000</b>	<b>0.15933</b>	<b>1.00766</b>	<b>1.015</b>
<i>4</i>	<i>The management of our organisation respects intellectual property rights</i>	<b>2.3250</b>	<b>0.18393</b>	<b>1.16327</b>	<b>1.353</b>
<i>5</i>	<i>Intangible assets are depreciated on their production</i>	<b>2.4250</b>	<b>0.15968</b>	<b>1.00989</b>	<b>1.020</b>
<i>6</i>	<i>Our organisation is seeking to contract with outsource to get intangible services</i>	<b>2.4500</b>	<b>0.17885</b>	<b>1.13114</b>	<b>1.279</b>
<i>7</i>	<i>The management of our organisation seeks to work tangible management department</i>	<b>2.4500</b>	<b>0.16775</b>	<b>1.06096</b>	<b>1.126</b>
<i>8</i>	<i>Our organisation's management seeks to attract talent to develop its tangible assets</i>	<b>2.3000</b>	<b>0.16093</b>	<b>1.01779</b>	<b>1.036</b>
<i>9</i>	<i>The management of our company seeks to make a distinct brand in the market</i>	<b>2.3750</b>	<b>0.16286</b>	<b>1.03000</b>	<b>1.061</b>

<b>10</b>	<b><i>The management of our organisation seeks to increase investment in intangible assets</i></b>	<b>2.3750</b>	<b>0.16675</b>	<b>1.05460</b>	<b>1.112</b>
-----------	--	---------------	----------------	----------------	--------------

The source is prepared by the researchers based on spss results

The two researchers note that in Table (2) the results of most questions are directed to the non-agreed side in terms of the arithmetic mean value which reached the highest value (2.4500), and it is less than the hypothesis value of the measurement of (4). Through the standard deviation values, we note that the values were the maximum value (0.18393), which indicates that the answers of the respondents were mostly consistent and similar and have few deviations. We can note from the variance values and error squares that distribution of researched answers is consistent and suits with each other.

**Table 3:** Arithmetic means and standard deviations of variable measurement questions

<b>S</b>	<b>Details</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Std. Error</b>	<b>Variance</b>
<b>1</b>	<b>Our organisation determined a set of metrics to measure knowledge</b>	<b>2.5750</b>	<b>0.17500</b>	<b>1.10680</b>	<b>1.225</b>
<b>2</b>	<b>our organisation's management is formulating its strategy based on data and information</b>	<b>2.4500</b>	<b>0.18240</b>	<b>1.15359</b>	<b>1.331</b>
<b>3</b>	<b>our organisation's management continuously control on its activities</b>	<b>2.5000</b>	<b>0.16408</b>	<b>1.03775</b>	<b>1.077</b>
<b>4</b>	<b>our organisation's management use of feedback</b>	<b>2.5250</b>	<b>0.18942</b>	<b>1.19802</b>	<b>1.435</b>
<b>5</b>	<b>our organisation's management Evaluate by tangible and intangible asset</b>	<b>2.5000</b>	<b>0.17903</b>	<b>1.13228</b>	<b>1.282</b>
<b>6</b>	<b>our organisation management studies its competitors through information gathered from the market</b>	<b>2.4500</b>	<b>0.18245</b>	<b>1.2071</b>	<b>1.381</b>
<b>7</b>	<b>Our company's management encourages attracting competencies.</b>	<b>2.5750</b>	<b>0.19245</b>	<b>1.21713</b>	<b>1.481</b>
<b>8</b>	<b>Our organisation uses financial indicators to measure its activities</b>	<b>2.4000</b>	<b>0.18536</b>	<b>1.17233</b>	<b>1.374</b>
<b>9</b>	<b>our organisation's management conducts interviews and customer</b>	<b>2.4750</b>	<b>0.16403</b>	<b>1.03744</b>	<b>1.076</b>

	surveys				
10	Our company develops its relationship with customers	2.5750	0.19900	1.25856	1.584

The source prepared by the two researchers depending on the spss results

The researchers note that in Table (3), the most results of the questions are directed to the non-agreed side in terms of the value of the arithmetic mean, which reached the highest value of (2.5750), which is less than the hypothesis value of the measure of (4). Through the standard deviation values, we notice that their values were the maximum value (0.19245), which indicates that the researched answers were mostly consistent, similar and have a few deviations. We note through the values of variance and error squares that the distribution of respondents' answers is consistent and suits with each other.

**Table 4:** The (t) test results of the third hypothesis

	<i>Arithmetic mean</i>	<i>standard deviation</i>	<i>tabled T value</i>	<i>Calculated T value</i>	<i>Significance level Sig</i>	<i>decision</i>
<i>Hypothesis test</i>	2.4300	0.93732	1.68	16.396	0.14820	<i>Accept the alternative hypothesis</i>

Source: depending on SPSS

Note that the calculated (T) value was (16.396), which is greater than the tabular value, which is a positive signal, and the level of significance (0.000), which is less than (0.005) so reject the null hypothesis (H0) and accept the alternative hypothesis (H1), This means that the knowledge measurement level is weak despite the actual commitment to adopt tangibles in measuring the knowledge in the researched organisation.

***We Reached to the Following Results Which Prove the Hypothesis Test***

- The industrial organisation does not diagnose its internal knowledge of skills and competencies, so it does not know its knowledge needs with a intent to measuring it.
- It is rarely held in the researched industrial organisation to invent new ideas, while it occurs only at the senior management level. This impedes the measuring knowledge process.
- Although the organisation has internal records that provide explicit knowledge in the organisation, there is no implicit knowledge on the offices so that employees can access them and therefore difficult to measure.

## Conclusion

1. From the review it can be concluded that IC standards of intangibles in the industrial organisation in general and the researched organisation, in particular, are still not reliable, this does not mean diminishing the importance of financial assessment of knowledge but proposing that it should be directed towards internal management to avoid previously known problems, and to ensure a high degree of objectivity and transparency in diagnosis and reporting of the value of cognitive assets
2. The second trade-off is between the possibility of generalisation and adaptation, as standard frameworks are designed to be general and allow to reference comparison but have been criticised for not being adopted in particular circumstances in specific industries, markets or industrial organisations. On the other side, some models provide internal methods that cannot be segregated to a particular organisational nature, industry or strategy; it criticises to losing the generalisation possibility *because comparisons by companies become impossible or at least inaccurate.*
3. Knowledge is not valued of price in specific surroundings but maybe unrelated to significance in another surround. It is therefore suggested that knowledge measurement frameworks should include control processes as part of them and control towards the regulatory environment and strategy. There need to measurement models, including dynamic knowledge flow metrics, and settings processes as a part of it and setting toward the regulatory environment and its strategic.

## REFERENCES

- Abbaszadeh, Mohammad Reza, Mahdi Moradi, and Seyedeh Tahereh Mehrabankhou. "Application of analytic hierarchy process in analyzing and ranking of non-financial measures that affect investor decisions." *International Journal of Business Management and Administration* 2 (2013).
- Alsammak, Manal, and Alaa Aljalely. "Cognitive Transformation Reflections Based on the Supply Chain Management and 5s Requirements (An Analytical Descriptive Study of a Sample of Workers in Zaki/Iraq Factory in the Province of Dohuk)." *Int. J Sup. Chain. Mgt Vol* 8.3 (2019): 426.
- Andrews, Dan, and Alain De Serres. "Intangible assets, resource allocation and growth." (2012).
- Andries, Petra, and Annelies Wastyn. "Disentangling value-enhancing and cost-increasing effects of knowledge management." *Journal of Knowledge Management* 16.3 (2012): 387-399.
- Bolisani, Ettore, and Constantin Bratianu. "Knowledge strategy planning: an integrated approach to manage uncertainty, turbulence, and dynamics." *Journal of Knowledge Management* 21.2 (2017): 233-253.
- Carol, Corrado, et al. "Advancements in measuring intangibles for European economies." (2017): 89-106.
- Córcoles, Yolanda Ramírez. "Towards the convergence of accounting treatment for intangible assets." *Intangible Capital* 6.2 (2010): 185-201.
- Corrado, Carol A., and Charles R. Hulten. "Internationalization of intangibles." *Globalization and US* (2013).
- Corrado, Carol, and Janet Xiaohui Hao. *Brands as productive assets: concepts, measurement, and global trends*. Geneva: WIPO, 2014.
- Corrado, Carol, et al. *Intangible investment in the EU and US before and since the Great Recession and its contribution to productivity growth*. No. 2016/08. EIB Working Papers, 2016.
- Daft, Jost, and Sascha Albers. "A conceptual framework for measuring airline business model convergence." *Journal of Air Transport Management* 28 (2013): 47-54.



- El Talla, Suliman A., et al. "The Availability of the Resource Standard and Partnership as One of the Possibilities of Excellence in Palestinian Universities According to the European Model." (2018).
- Fădur, C., Daniela Ciotină, and Marilena Mironiuc. "„Do the Romanian and Spanish Accounting Environments Meet the Challenges Concerning the Acknowledgement of Intangible Elements?"". *Journal of Accounting and Auditing: Research & Practice* 2013 (2013): 1-19.
- Feng, Kuoching, Edward T. Chen, and Wenching Liou. "Implementation of knowledge management systems and firm performance: an empirical investigation." *Journal of Computer Information Systems* 45.2 (2005): 92-104.
- Ferreira, Catarina Filipa Pitau. *The impact of intangibles on the performance of the major technological companies in the world*. Diss. 2018.
- Gervais, Daniel, et al. "Is Profiting from the Online Use of Another Property Unjust-The Use of Brand Names as Paid Search Keywords." *IDEA* 53 (2013): 131.
- Huang, Mu-Jung, Mu-Yen Chen, and Kaili Yieh. "Comparing with your main competitor: the single most important task of knowledge management performance measurement." *Journal of Information Science* 33.4 (2007): 416-434.
- Jaafar, Hartini. "Accounting Choice, Firm Life-Cycle and the Value-Relevance of Intangible Assets." *Global Review of Accounting and Finance* 1.01 (2010): 18-40.
- Kaplan, Robert S., and David P. Norton. "Putting the Balanced Scorecard." *Performance measurement, management, and appraisal sourcebook* 66 (1995).
- Konnur, Basavaraj A., and Aditya L. Hundekar. "Restructuring strategy for construction companies through RBV theory." *Journal of Mechanical and Civil Engineering* 6 (2008): 24-29.
- Lee, Kun Chang, Sangjae Lee, and In Won Kang. "KMPI: measuring knowledge management performance." *Information & management* 42.3 (2005): 469-482.
- Matos, Florinda, et al. "Biplot Methodology Applied to an Intellectual Capital Model." *Electronic Journal of Knowledge Management* 11.1 (2013): 81.
- Mills, Annette M., and Trevor A. Smith. "Knowledge management and organisational performance: a decomposed view." *Journal of knowledge management* 15.1 (2011): 156-171.



- Montemari, Marco, and Christian Nielsen. "The role of causal maps in intellectual capital measurement and management." *Journal of Intellectual Capital* 14.4 (2013): 522-546.
- Naidenova, Iuliia, and Petr Parshakov. "Intellectual capital investments: evidence from panel VAR analysis." *Journal of Intellectual Capital* 14.4 (2013): 634-660.
- Ng, Hee Song, and Daisy Mui Hung Kee. "Intangible factors affecting the success of small and medium enterprises (SMEs)." *International Journal of Management & Organisational Studies* 1.2 (2013).
- Nonaka, Ikujiro, and Hirotaka Takeuchi. *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford university press, 1995.
- Oliveira, Lídia, Lúcia Lima Rodrigues, and Russell Craig. "Stakeholder Theory and the Voluntary Disclosure of Intellectual Capital Information." *Caspian Journal of Applied Sciences Research* 2.3 (2013).
- Romer, Paul M. "Increasing returns and long-run growth." *Journal of political economy* 94.5 (1986): 1002-1037.
- Stewart, Thomas, and Clare Ruckdeschel. "Intellectual capital: The new wealth of organisations." *Performance Improvement* 37.7 (1998): 56-59.
- Werner, Jon M. "The Human Value of the Enterprise: Valuing People as Assets--Monitoring, Measuring, Managing." *Personnel Psychology* 55.4 (2002): 1053.
- Zack, Michael H. "Managing codified knowledge." *Sloan management review* 40.4 (1999): 45-58.
- Zamzeer, Mannam, et al. "Determinants of cloud ERP adoption in Jordan: an exploratory study."