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COMPREHENSIVE APPROACH TO INTELLECTUAL CAPITAL MANAGEMENT[1]

In the reality of global competition intellectual capital gives opportunity to enterprises to create valuables and to provide competitiveness of either separate firms or economy at a whole. The main function of the intellectual capital is to fasten income growth in some degree owing to formation and realization of necessary knowledge system for the company. Knowledge system in its turn provides highly efficient economic activity. Besides, intellectual capital determines quality of its management system. It dictates rate and character of the production technologies renewing, which soon will be competitive advantages.

Transition to new stage of civilization development has facilitated the research of intellectual capital phenomenon. Ukrainian and foreign scientists paid much attention to this matter. The research of knowledge as the source of development was performed by such foreign scientists as W. Petty, G. Becker, M. Blaug, K. Griffin, E. F. Denison, R. Crawford, F. Machlup, T. Stewart, W. Hudson, T.W. Schultz, A. Smith, D. Ricardo, J. S. Mill, K. H. Marx and others. Famous domestic scholar S.M. Illyashenko analyzed the approaches to determining the structure and methodology for assessing intellectual capital in his paper. K. Wiig investigated integration of intellectual capital and knowledge management.

The intangible asset leader does the following: studies the history of strategy, understands, and can articulate the differences between industrial/manufacturing era strategies and intangible intellectual capital asset strategies; thinks strategically about the central problems of the enterprise; advances and defends strategically sound strategies that use intellectual assets when they offer a superior solution; gets involved in strategic planning and

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joins the strategic conversations within the company; grows out of functional discipline management into executive leadership [Moore 2008, p. 16].

Particularly, Karl Sveiby confirmed that people create profit, that's why investments into personnel are not to be concerned as expenses; workers' competence is resource to create prosperity.

In 1998 Annie Brooking investigated model "The Technology Broker's Audit" to determine value of the intellectual capital in the firm in money terms and presented structure in the following way: market assets, human assets, infrastructure assets, and intellectual property. This model was investigated for managers in order to diagnose and to develop weak places in the intellectual capital. It is based on the method of directing questions in knowledge management, estimation of research and investigations number, brand value existing. The more positive answers are, the more developed intellectual capital is [Brooking 2001].

Johann and Goran Russ worked out the Index of intellectual capital. They divided intellectual capital into three groups: human capital, organizational capital and customer capital. The aim of IC-Index model investigation was to prognosticate profit from development of new projects and service, through investing money into various intellectual capitals. However it was not been achieved.

To measure intellectual capital assets monetary (financial, cost) and non-cash methods are used.

Thus, depending on how intellectual capital and its elements are estimated, there are the following approaches [Chuprina, 2012, p. 22-34]:

1. Structural approach, based on using of various units for each element in the intellectual capital; it doesn't foresee general cost estimation; it is used in non-financial models.

2. Cost approach is used to determine total value of the company intellectual capital, therefore cost of its separate components is not calculated.

Under modern conditions if there is no universal methodic to estimate intellectual capital it is necessary to imply both mentioned approaches.

While determining of the intellectual capital cost at the enterprise one uses cost indicators. Therefore depending on peculiarities of the concrete situation expenses, profitable and market capitals are used [Evseev 2012, p. 336-345].

According to the profitable approach intellectual capital value is equal to the discount incomes flow, which is expected to be received during the whole period to use this capital.

An expense approach supposes that some assets cost is equal to either expenses, spent

earlier for its creation, or purchase, or expenses, which are necessary to buy analogical asset under modern conditions. But this method is bloodedly used while estimating intellectual capital, because expenses results in scientific and research sphere are not prognosticated and have no direct connection with capital investment amount: sometimes great expenses are vain, and sometimes one needs little efforts to conduct great discovery, which allows to improve positions in market organization and to increase profit amounts.

Market approach foresees estimation of some asset cost according to analogical assets, purchased and sold at the market (considering possible differences). This approach gives precise results, but it is bound used. It may be used only for those elements of intellectual capital, which have analogues. Sometimes one can use combinations of these approaches in practice [Evseev 2012, p. 336-345].

Sveiby's approach arouses special interest. It distinguishes 25 methods, subdivided into 4 categories [Sveiby 1996].

The first methods group includes all methods, based on identification and estimation in monetary equivalent of separate assets or elements of the intellectual capital. As they are estimated, there is integral estimation of the intellectual capital in the company. Therefore it is not necessary that all assets evaluations are concluded. More complicated formula may be used.

Owing to methods from the second group difference between market capitalization of the company and own capital of its stockholders is calculated. The received value is observed as its intellectual capital value, or non-material assets.

Methods to calculate return from assets are based on calculation of difference in ratio between economy subject's profit for some period in time (considering taxes) and its material assets cost and analogical factor in branch at a whole. Product of the received difference and estimated economy subject's material assets is average profit from intellectual capital. Then, one determines cost of the intellectual capital through direct capitalization or discounting of the received monetary flow.

Methods from the forth group help to identify different components of the non-material assets or intellectual capital, to investigate and to give indicators and indexes through marks counting. Using of methods by point system doesn't foresee to get monetary estimation of the intellectual capital. These methods are similar to methods of the diagnostic informational system [Sveiby 1996; Chuprina, 2012, p. 22-34].

Methods to measure intellectual capital are developed for more clear understanding of all non-material assets types, and also with purpose to create logic theory, which explains how

such assets have to be revealed and measured, in order to estimate organization value. It is foreseen that confirmation of the market cost estimations will lead to capital flows optimization, and as a result, will increase market economy efficiency. Thus, we can conclude that nowadays Sveiby's investigations have consistent character and can be partially used in practice to measure intellectual capital at the enterprises.

Q-Tobin coefficient, suggested by laureate of Nobel Prize in Economy in 1981 J. Tobin, is used to estimate intellectual capital. It is calculated as ratio between market value of the firm and its assets proper value. If q-Tobin coefficient is more than 1, it describes high level of the intellectual capital, practical use of which gives ability to get superprofits. Today coefficient value for efficient companies is 5-10 units. It is higher in knowledge-intensive branches, and for firms, occupied in computer technologies and software sphere, it can be several hundreds. The main factor in production is intellectual capital at such companies, and material assets do not practically create valuables, functioning as infrastructural provision [Chuprina, 2013, p. 22-34].

Besides mentioned above methods, there is also one interesting approach to determine the most perspective assets of the intellectual capital, called Economic Real Assets Value Enhancer (ECRAVE), method to measure economic added value which is created by the intellectual capital components. The suggested way to calculate index EcRAVE is based on assumptions of researchers about fact that economic profit is formed by company during increasing of its profitability at the middle-branch level [Oskolkova 2012, p. 348-358]. Assumptions about that fact that intra-sectoral differences in company profitability is explained by unique non-material assets of each company, were used in studies of the foreign capital markets [Aboody 2001; Freeman 1997].

The described method includes three approaches: Custonomics, Workonomics, Supplynomics [Oskolkova 2012, p. 348-358]. The first approach is based on the idea, that relations with purchasers earn profit for company, when the company realizes production in great amounts, than in average in the branch, or with higher price. Therefore the following factors are corrected:

– expenses for clients' involving: high price or realization amount may be explained by high expenses to involve customers. Thus, in order to compare results of the company activity with industry average, it is necessary to correct profit;

– company size, to balance its impact on factors, one has to compare not absolute results in company and branch activity, but relative ones, i.e. calculated per unit of the investment capital.

Formula to calculate economic added value, created owing to relations with purchasers is:

$$EVA_c = (TR - ComExp) - TR_{ind.adj} = (\frac{TR - ComExp}{IC} - \frac{TR_{ind} - ComExp_{ind}}{IC_{ind}}) \times IC, \quad (1)$$

where EVA_c – economic added value, created owing to relations with purchasers;

TR – profit of the company;

TR_{ind} – industry average profit;

$TR_{ind.adj}$ – industry average profit, corrected for expenses to involve purchasers витрати на залучення покупців;

$ComExp$ – commercial expenses of the company (trade and marketing);

$ComExp_{ind}$ – industry average commercial expenses;

IC – investment capital of the company, determined as sum of the percent duties and own capital;

IC_{ind} – industry average investment capital.

According to approach Workonomics, key resource is human capital. The whole added value of the company is created by its workers. Therefore it is also necessary to consider indirect expenses to involve capital and correct factor on the company size, expressed by workers' quantity. In spite of the approach Custonomics, another factor of rating is used, because added value per one worker is observed as result of intellectual capital use.

Formula of the economic added value calculation, created by workers from the company, is:

$$EVA_w = VA - VA_{ind.adj} = (\frac{VA}{P} - \frac{VA_{ind}}{P_{ind}}) \times P, \quad (2)$$

where EVA_w – economic added value, created by workers from the company;

VA – added value of the company, defined as difference between profit and material expenses;

VA_{ind} – industry average added value;

$VA_{ind.adj}$ – industry average added value, corrected on the company size;

P – number of workers in the company;

P_{ind} – industry average number of workers.

Within the next approach Supplynomics one calculates economic added value, created by relations with suppliers. The example of such capital is stable business relations with suppliers, and as a result, giving discounts by them. These discounts are shown in the factor of material expenses. The material expenses are corrected on the level of profit in the

company and capital productivity.

According to the mentioned above, one suggests formula to calculate economic added value, created by relations with suppliers:

$$EVA_s = (\frac{Costs_{ind}}{TR_{ind}} \times \frac{1}{C_{ind}} \quad \frac{Costs}{TR} \times \frac{1}{C}) \times TR, \tag{3}$$

where EVA_s – economic added value, created by relations with suppliers;

$Costs$ – material expenses of the company;

$Costs_{ind}$ – industry average material expenses;

TR – profit of the company;

TR_{ind} – industry average profit;

C – capital productivity of company;

C_{ind} – industry average capital productivity.

We can conclude that suggested factors consider direct and indirect costs and may be calculated using data from open sources. Depending on which resource is intellectual capital core for the company, one can choose proper factor. However this approach has disadvantage: it doesn't give ability to compare companies which work at the international markets, in case if one compares industry average factors.

Besides described methods to estimate intellectual capital, there are separate factors [Evseev 2012, p. 336-345], which describe possibilities to generate and accept ideas and plans of innovations and bringing them to the level of technologies, goods, organizational managerial decisions; are used mostly at the micro-level.

1. Index of the inventing activity ($I_{i.a.}$).

$$I_{i.a.} = \frac{N_i}{N_w}, \tag{4}$$

where $N_{i.}$ – number of inventions; $N_{w.}$ – number of engineering and technical and scientific workers.

2. Index of the engineering and technical and scientific software ($I_{i.s.}$).

$$I_{i.a.} = \frac{N_{t.s.e.}}{N_e}, \tag{5}$$

where $N_{t.s.e.}$ – number of technical and scientific employees; $N_{e.}$ – total number of employees.

3. Index of the personnel educational level ($I_{e.d.}$) at the enterprise.

$$I_{e.d.} = \frac{N_{h.s.}}{N_e}, \tag{6}$$

where N_{hs} – number of people with higher or secondary special education, which corresponds enterprise activity specialization.

4. Index of the highly qualified workers turnover (I_t).

$$I_{t.} = \frac{N_{rhqw}}{N_{hq}}, \tag{7}$$

Where N_{rhqw} – number of workers with high qualification, resigned during the year; N_{hq} – total number of workers with high qualification.

5. Index knowledge renewing ($I_{k.r}$).

$$I_{k.r.} = \frac{N_{wat.}}{N_e}, \tag{8}$$

Where N_{wat} – number of workers, who had advanced training or additional training during the last 3–5 years.

The intellectual capital structure is presented on fig. 1 according to Skandia's intellectual capital model. Skandia, the Swedish insurance company, has developed this model. It and shows the relationships between the different areas, which comprise intellectual capital.

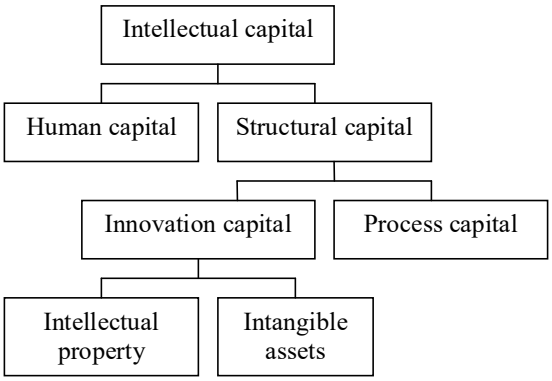


Figure 1. Intellectual capital structure [Skandia 1996]

In Skandia's model intellectual capital consists of several entities facets which may be defined as follows [Wiig 1997, p. 401]:

- Human capital consists of competence and capabilities of the employees. When an enterprise educates its employees, it increases its human capital.

- Structural capital consists of the results of intellectual activities in data and knowledge bases, documents, etc. Skandia suggests, "Structural capital is what is left after the employees have gone for the night."
- Customer capital consists of the value of the enterprise's relationships with its customers.
- Organizational capital consists of embedded knowledge assets in the process and innovation areas.
- Process capital consists of the enterprise's value creating processes such as its organizational structure, management practices, systems and procedures, infrastructure computer systems and the like.
- Innovation capital consists of both explicit knowledge and hard-to-identify intellectual assets such as a positive culture.
- Intellectual property consists of documented and captured knowledge such as innovations, operational practices, patents, technology, educational programs, corporate knowledge bases, and designs and specifications of products and services.
- Intangible assets consist of the value of positive culture, community image, etc.

Now let consider the process of intellectual capital management (ICM) strategy selection (fig. 2).

K. Wiig highlighted five basic knowledge-centered strategies [Wiig 1997, p. 400]:

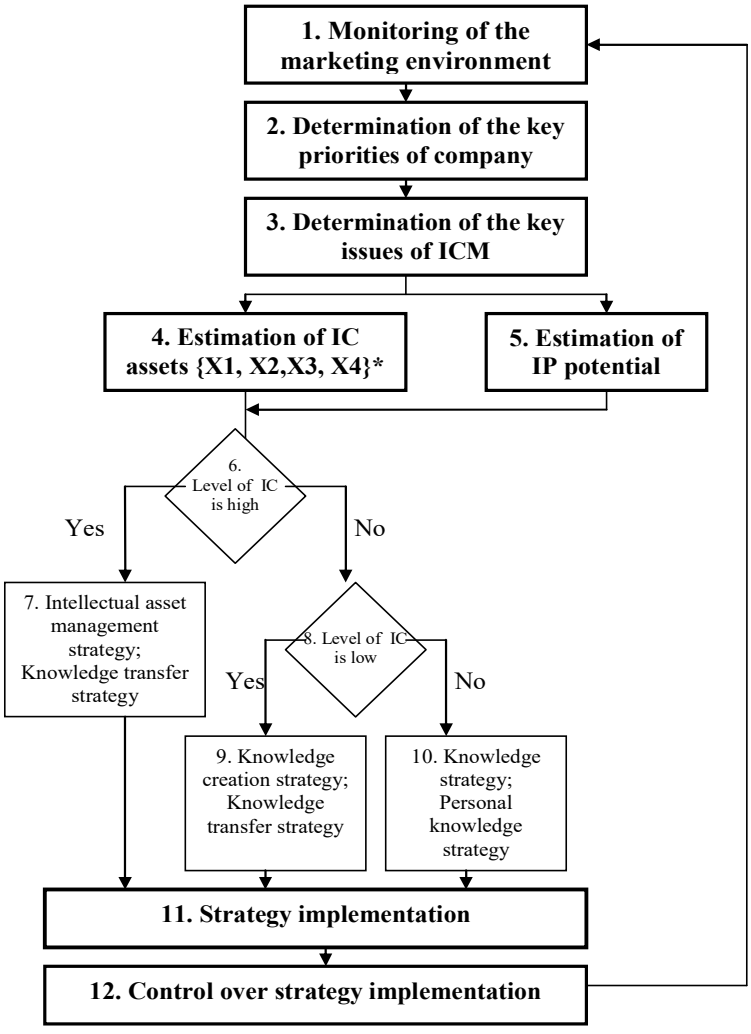
1. Knowledge strategy as business strategy emphasizes knowledge creation, capture, organization, renewal, sharing, and use in all plans, operations, and detailed activities to provide the best possible knowledge available at each point of action.

2. Intellectual asset management strategy emphasizes enterprise-level management of specific intellectual assets such as patents, technologies, operational and management practices, customer relations, organizational arrangements, and other structural knowledge assets. Management's task is to renew, organize, evaluate, protect and increase the availability and marketing of these assets.

3. Personal knowledge strategy emphasizes personal responsibility for knowledge-related investments, innovations and competitiveness, renewal, effective use and availability to others of knowledge assets within each employee's area of accountability. The objectives are continually to build knowledge and to apply the most competitive knowledge to the enterprise's work.

4. Knowledge creation strategy emphasizes organizational learning, basic and applied research and development, and motivation of employees to innovate and capture lessons learned to obtain new and better knowledge, which will provide improved competitiveness.

5. Knowledge transfer strategy emphasizes systematic approaches to transfer (i.e. obtain, organize, restructure, warehouse or memorize, repackage for deployment and distribute) knowledge to points of action where it will be used to perform work. This strategy includes knowledge sharing and adopting best practices.



* X1 – human capital; X2 – process capital; X3 – intellectual property; X4 – intangible assets

Figure 2. The algorithm of selection of intellectual capital management strategy [created by author]

Strategy implementation is phased process. It is necessary to adopt the system used for the intellectual capital management of the organization on this stage. This system defines: what departments will be responsible for what, and what information systems are needed to

monitor the implementation of the strategy, what retraining of employees will be required, etc.

And the last one, but not the least, is the control and strategy revision. The main objectives of ICM control as follows: definition of what parameters and how to check; assessment of the state of the controlled object in accordance with accepted standards, regulations or other benchmarks; elucidation of the causes of deviations, if any are be opened as a result of the assessment; implementing adjustments, if it is necessary and possible.

To pursue these strategies, organizations undertake specific programs and activities, provide supporting infrastructure capabilities, and sometimes create incentives to motivate individual employees, teams, and even departments and business units to cooperate with the new objectives. In order to estimate efficiency to use intellectual capital at micro-level, one can use factors of its separate constituents in dynamics or comparing with enterprises-competitors' factors.

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