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# Operationalising a safety culture in the management of a business entity (case study)

## Introduction

The topic of developing a safety culture is of great interest to businesses. This is evidenced by the ever-increasing number of organisations implementing CE or B (construction) certification. Safety culture – in addition to quality and environmental culture – determines a positive image, competitive advantage and financial benefits. Safety culture can be considered from the point of view of philosophy, sociology, anthropology, economics and management, as evidenced by Andrzej Chodyński's rich compilation of terms, definitions and points of reference.<sup>1</sup> The purpose of this article, however, is to look at safety culture as an object of economic accounting and to answer the questions: can safety culture be an object of operationalisation based on the principle of dualism dominating in accounting? Can safety culture, therefore, be a measurable category using the profitability index developed on the basis of the scientific theory of capital?

Conducting empirical research into safety culture requires the adoption of a specific path of inquiry. The path of cognition in this case can be made the so-called scientific approach. The same one that applies to the category of capital. It is characterised

<sup>1</sup> A. Chodyński, *Dynamika przedsiębiorczości i zarządzania innowacjami w firmach. Odpowiedzialność – prospołeczność – ekologia – bezpieczeństwo*, Kraków: Oficyna Wydawnicza KAAFM, 2021, pp. 141–143.

in detail in the study by Agnieszka Giszterowicz.<sup>2</sup> It is an approach grounded in accounting theory. It appears that safety culture is a category that can be described by the characteristics with which intellectual capital is also described and defined, and then the operationalisation tools developed on the basis of accounting theory can be applied to it. In this study, a generalised profitability indicator, the ROAH model, is used to identify and value safety culture.

The first part of the article pursues theoretical and cognitive objectives related to intellectual capital, operationalisation and safety culture, while the second part is devoted to empirical research. Answers to the research problems posed are provided by literature analysis, financial document analysis and a case study.

## Safety culture and intellectual capital

The category of safety culture is included in the broader category of culture, i.e. the totality of the spiritual and material achievements of society.<sup>3</sup> Safety culture as a domain of culture has accompanied humanity since the beginning of time. Ensuring safety has always been the basis of humanisation and, as Stanisław Jarmoszko writes, “it constituted *conditio sine qua non* not only for the survival of the human species, but also for the development of other planes of human culture.”<sup>4</sup> The author defines it as follows: a collection of tangible and intangible elements (and thus capable of being considered in mental, rational and physical dimensions) developed to enhance or restore the security of various entities. A recognised researcher of safety culture in Poland is Professor Marian Cieślarczyk,<sup>5</sup> who pointed out that security is closely related to defence with the latter also having a non-military character. The researcher calls it the potential to counter, prevent and resist danger (threat). Cieślarczyk’s definition of safety culture is: a set of basic principles, a canon adopted by a given entity, which influences its perception of opportunities and threats coming from the environment. Safety culture is also a specific feeling, thinking, behaviour and (worked out and learned) action serving the development and achievement of objectives in the broadly understood security useful

<sup>2</sup> A. Giszterowicz, “Kapitał jako zdolność do wykonywania pracy i antecedensy teorii”, *Przegląd Nauk Stosowanych*, no. 23(2), 2019, pp. 23–35.

<sup>3</sup> This framing already suggests that safety culture is an abstract category and can be considered in relation to the theory of capital developed in accounting, for which the principle of dualism is central.

<sup>4</sup> S. Jarmoszko, Nowe wzory kultury bezpieczeństwa a procesy deterioracji więzi społecznej, [in:] *Jedność i różnorodność: kultura vs. kultury*, eds. E. Reklajtis, R. Wiśniewski, J. Zdanowski, Warszawa, Oficyna Wydawnicza Aspra-JR, 2010, p. 110.

<sup>5</sup> J. Piwowarski, “Słowo wstępne”, *Kultura Bezpieczeństwa. Nauka – Praktyka – Refleksje*, no. 9, 2012, p. 4.

for the implementing entity as well as the environment.<sup>6</sup> The author also defines it as a body of knowledge and skills, as well as a certain technology of the intellect, which functions within the system (entity, organisation) and which makes it possible to feel security and react to its absence.<sup>7</sup> In summary: safety culture is the result of subjective characteristics, attitudes, perceptions, competences and behavioural patterns.<sup>8</sup> According to Cieślarczyk, safety culture has three pillars. These are: knowledge together with a certain idea, value and spirituality of man; the social impact of organisations and legal systems; and the material aspects of human existence. The presented approaches to safety culture and, above all, its key terms such as: tangible, intangible, knowledge and potential, create the possibility to consider this category in the context of accounting theory, scientific theory of capital and, finally, intellectual capital.

As is well known, intellectual capital is not uniformly defined. “A terminological jungle” – as Lesław Niemczyk writes<sup>9</sup> – has arisen as a result of the “rash” of definitions, classifications and concepts of management and memento of intellectual capital. Nevertheless, there is an unambiguous definition of intellectual capital in accounting theory. This definition states that since capital is the abstract ability to do work, human capital the ability of a person (employee) to do work, intellectual capital is his/her ability (potential) for intellectual performance. Both the scientific formulation of this category and the definitions coined successively by various intellectual capital researchers (Thomas A. Stewart, Leif Edvinsson and Michael S. Malone, Karl M. Wigg, Steven M.H. Wallman or Karl-Erik Sveiby) provide an assumpt to define intellectual capital as an abstract category linked to organisational culture that brings tangible benefits, i.e. a potential that can be transformed into something of real higher value. However, this – seemingly overly general and therefore also problematic – definition offers many possibilities for exploration. Indeed, the elements that make up intellectual capital can be configured freely – i.e. depending on the utility function defined by management. For Safety First, this would be safety culture. The typologies of intellectual capital presented in the literature (e.g. typology by Bogusz Mikuła and Anna Pietruszka-Ortyl<sup>10</sup>) can be, as Niemczyk<sup>11</sup> “explored in all possible directions.”

<sup>6</sup> M. Cieślarczyk, *Teoretyczne i metodologiczne podstawy badania problemów bezpieczeństwa i obronności państwa*, Siedlce: Wydawnictwo Akademii Podlaskiej, 2009, p. 157.

<sup>7</sup> M. Cieślarczyk, K. Kachniarz, “Kultura bezpieczeństwa w lotnictwie w sytuacjach kryzysowych”, *Zeszyty Naukowe – Wyższa Szkoła Oficerska Sił Powietrznych*, no. 2, 2012, p. 27.

<sup>8</sup> J. Fieducik, “Kultura bezpieczeństwa w życiu człowieka”, *Kultura bezpieczeństwa. Nauka – Praktyka – Refleksje*, no. 18, 2015, p. 44.

<sup>9</sup> L. Niemczyk, *Kapitał intelektualny w księgach rachunkowych oraz sprawozdawczości przedsiębiorstwa*, Rzeszów: Wydawnictwo Uniwersytetu Rzeszowskiego, 2015, p. 27.

<sup>10</sup> B. Mikuła, A. Pietruszka-Ortyl, “Studium niematerialnych zasobów organizacji”, *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, no. 820, 2010, p. 27.

<sup>11</sup> L. Niemczyk, *op. cit.*, p. 27.

An approach in which safety culture is treated as one of the elements-components of intellectual capital, or even its only or most important form, is therefore justified. This may be precisely the situation in Safety First organisations. The flagship example of such an organisation is DuPont – where “Safety, Caring and Concern for People, Environmental Protection and Worker and Company Integration are the greatest values and there is no compromise in this regard (...).”<sup>12</sup> Other organisations belonging to this group are: 3M, Guide, uvex, Honeywell, SafetyFirst, Delta Plus, Sundström. It is from their point of view that the operationalisation of the (broadly defined) safety culture will be of the greatest importance.

The problem of operationalisation is synthesised by Czesław Mesjasz. The author’s research shows that operationalisation is the process of defining an object that cannot be unambiguously described (measured), although its existence is indicated by other phenomena. They are, therefore, activities that lead to the measurability of the characteristics of an object. This is why they have become the focus of management science. This is because operationalisation extends the possibilities of empirical research (it makes it possible to measure even such concepts as anger, job satisfaction or efficiency).<sup>13</sup> It makes it possible to make theoretical sense of, occurring in business reality, constructs. These constructs can be both qualitative and quantitative in nature and will be related *ex definitione* to the functioning, management and governance of the organisation.<sup>14</sup> Operationalisation as an idea is also sometimes criticised. This is because it generates the possibility of over-legitimising “metaphysical” concepts.<sup>15</sup> However, its key functions cannot be questioned. This is because, in relation to safety culture, it is the identification and valuation, and thus the provision (or striving to provide) access to data that is stable, cyclical, quantified, expressed in monetary terms and, above all, clarifying the information flowing from the accounting system and financial reports. One of the tools that makes this possible is the generalised ROAH, developed on the basis of accounting theory and presented in many literature items.<sup>16</sup> which represents the relationship between added value and the human and physical capital operating in the entity.

<sup>12</sup> M. Milczarek, “Kultura bezpieczeństwa w przedsiębiorstwie – nowe spojrzenie na zagadnienia bezpieczeństwa pracy”, *Bezpieczeństwo pracy*, no. 10, 2000, p. 20.

<sup>13</sup> Cz. Mesjasz, “Operacjonalizacja cech kapitału intelektualnego”, *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, no. 263, 2016, p. 22.

<sup>14</sup> K. Hryniewicz, *Operacjonalizacja zmiennych psychologicznych*, Metodolog.pl, 18 October 2016, <http://nauka.metodolog.pl/operacjonalizacja-zmiennych-psychologicznych-metodolog-pl> [accessed: 14 April 2022].

<sup>15</sup> Cz. Mesjasz, *op. cit.*, p. 22.

<sup>16</sup> E.g. D. Dobija, *Pomiar i sprawozdawczość kapitału intelektualnego przedsiębiorstwa*, Warszawa: Wydawnictwo Wyższej Szkoły Przedsiębiorczości i Zarządzania im. Leona Koźmińskiego, 2003.

## Operationalisation of the organisation's safety culture

As mentioned, in today's economy there are so-called Safety First organisations for which the main "wealth" and greatest value is safety culture. Examples are DuPont, 3M and the other companies mentioned in part one. The companies described generate their profits, among other things, on the basis of a policy of care, care for people and the environment, health protection, i.e. precisely a broadly defined safety culture. At the same time, they declare that they do not recognise any compromise on this issue. This means, therefore, that safety culture is the feature of intellectual capital that holds the highest rank in an organisation. In other words, the utility function defined by the management points to the baseline safety culture as the characteristic with the highest importance for the organisation's functioning.

A model that can be helpful in identifying and valuing safety culture is that developed from the scientific theory of capital, which is based on viewing capital as an abstract category and defining it as the ability to do work.<sup>17</sup> This model represents the relationship between added value and the human and physical capital operating in an entity. It takes the form of:

$$ROAH = \frac{Z_{brutto} + W}{A + H(p)}$$

where:

$Z_{brutto}$  – profit including taxes, depreciation and amortisation, interest;

$W$  – wages and salaries including also insurance premiums and other benefits;

$A$  – value of company assets;

$H$  – value of human capital of people employed in the company.

The human capital of the people employed by the company, on the other hand, is determined using the formula:

$$H(p) = \frac{L}{p}$$

where:

$L$  – basic salary;

$p$  – economic constant of potential growth equal to 0.08 [1/year].

The verification and evaluation of this tool is carried out by analysing data from the financial statements (obtained from Monitor Sądowy i Gospodarczy [Court and Commercial Gazette] and Ministerstwo Sprawiedliwości [Ministry of Justice])<sup>18</sup> of

<sup>17</sup> A. Giszterowicz, *op. cit.*

<sup>18</sup> The financial statements published in the Monitor Sądowy i Gospodarczy are those covering the period 2003–2016; those published on the Ministerstwo Sprawiedliwości portal (ms.gov.pl) cover the period 2017–2018.

the company Nexus Systems sp. z o.o.<sup>19</sup> It results in comparative statements and charts. The data obtained as a result of the calculation is then evaluated to identify and value safety culture as an economic quantity characterising the intellectual capital of the company.

The calculation table (Table 1) compiles the calculation data<sup>20</sup> necessary to indicate the percentage of ROAH, which allows a company to be diagnosed for the presence of any intellectual capital characteristics. This is done by setting a research-confirmed cut-off value of 8% for this indicator. If the actual ROAH exceeds  $p = 0.08$ , there is an undisclosed quantity in the company's assets (in the denominator of the indicator), which in the case of Safety First companies can be called the company's safety culture (SC).

Table 1. Safety culture of Nexus Systems sp. z o.o. from 2003 to 2018 identified and valued using the ROAH model

| Data extracted from the financial statements                              | 2003              | 2004                | 2005                | 2006                |
|---|-------------------|---------------------|---------------------|---------------------|
| <b>Gross profit <math>Z_{brutto}</math></b>                               | <b>62,391.37</b>  | <b>421,771.38</b>   | <b>456,501.77</b>   | <b>635,809.51</b>   |
| Net profit  | 45,546.37         | 341,455.38          | 370,272.77          | 513,567.51          |
| Income tax  | 16,845.00         | 80,316.00           | 86,229.00           | 122,242.00          |
| <b>Labour costs <math>W</math></b>  | <b>4,831.60</b>   | <b>109,773.08</b>   | <b>344,896.43</b>   | <b>720,193.42</b>   |
| Salaries  | 4,000.00          | 85,446.45           | 287,765.91          | 606,457.43          |
| Additional remuneration components  | 831.60            | 24,326.63           | 57,130.52           | 113,735.99          |
| <b>Value of company assets <math>A</math></b>                             | <b>340,999.48</b> | <b>1,012,000.08</b> | <b>1,856,610.46</b> | <b>2,746,504.51</b> |
| Non-current assets  | 58,000.00         | 50,438.96           | 91,410.71           | 164,409.91          |
| Current assets  | 282,999.48        | 961,561.12          | 1,765,199.75        | 2,582,094.60        |
| <b>Human capital of the people employed by the company <math>H</math></b> | <b>50,000.00</b>  | <b>1,068,080.63</b> | <b>3,597,073.88</b> | <b>7,580,717.88</b> |
| Basic salary $L$  | 4,000.00          | 85,446.45           | 287,765.91          | 606,457.43          |
| Risk premium $p$  | 0.08              | 0.08                | 0.08                | 0.08                |
| <b>ROAH</b>   | <b>0.1719</b>     | <b>0.2555</b>       | <b>0.1469</b>       | <b>0.1313</b>       |
| Data extracted from the financial statements                              | 2003              | 2004                | 2005                | 2006                |
| <b>Subsidiary value <math>V</math></b>                                    | 67,222.97         | 531,544.46          | 801,398.20          | 1,356,002.93        |
| Gross profit $Z_{brutto}$   | 62,391.37         | 421,771.38          | 456,501.77          | 635,809.51          |
| Labour costs $W$  | 4,831.60          | 109,773.08          | 344,896.43          | 720,193.42          |

<sup>19</sup> A manufacturing and trading company operating in the IT sector, in the form of a limited liability company belonging to the SME sector, founded in 2003, with approximately 30 employees, considered a spectacular debut of the optical technology industry at the beginning of the third millennium.

<sup>20</sup> For what appears to be a clearer presentation of the calculation process and to make it easier, an auxiliary value  $V$  was introduced, which is the sum of the gross profit value ( $Z_{brutto}$ ) and the labour costs ( $W$ ).

|  |                      |                      |                      |                      |
|--|----------------------|----------------------|----------------------|----------------------|
| <b>Value of company assets A</b>                             | 340,999.48           | 1,012,000.08         | 1,856,610.46         | 2,746,504.51         |
| <b>Human capital of persons employed by the company H</b>    | 50,000.00            | 1,068,080.63         | 3,597,073.88         | 7,580,717.88         |
| <b>Safety culture SC</b>                                     | <b>449,287.65</b>    | <b>4,564,225.05</b>  | <b>4,563,793.17</b>  | <b>6,622,814.24</b>  |
| Data extracted from the financial statements                 | 2007                 | 2008                 | 2009                 | 2010                 |
| <b>Gross profit <math>Z_{brutto}</math></b>                  | <b>1,158,606.72</b>  | <b>1,236,103.72</b>  | <b>-4,010.67</b>     | <b>34,252.73</b>     |
| Net profit   | 932,956.72           | 996,256.72           | -12,056.67           | 19,054.73            |
| Income tax   | 225,650.00           | 239,847.00           | 8,046.00             | 15,198.00            |
| <b>Labour costs W</b>  | <b>1,070,485.46</b>  | <b>1,395,181.54</b>  | <b>1,623,545.43</b>  | <b>1,731,740.62</b>  |
| Salaries   | 893,702.51           | 1,192,249.39         | 1,382,184.00         | 1,469,406.09         |
| Additional remuneration components                           | 176,782.95           | 202,932.15           | 241,361.43           | 262,334.53           |
| <b>Value of company assets A</b>                             | <b>2,870,569.62</b>  | <b>3,556,716.90</b>  | <b>3,502,798.30</b>  | <b>3,469,901.42</b>  |
| Non-current assets   | 195,284.63           | 196,197.55           | 144,863.89           | 110,168.79           |
| Current assets   | 2,675,284.99         | 3,360,519.35         | 3,357,934.41         | 3,359,732.63         |
| <b>Human capital of the people employed by the company H</b> | <b>11,171,281.38</b> | <b>14,903,117.38</b> | <b>17,277,300.00</b> | <b>18,367,576.13</b> |
| Basic salary L   | 893,702.51           | 1,192,249.39         | 1,382,184.00         | 1,469,406.09         |
| Risk premium p   | 0.08                 | 0.08                 | 0.08                 | 0.08                 |
| <b>ROAH</b>  | <b>0.1587</b>        | <b>0.1425</b>        | <b>0.0779</b>        | <b>0.0809</b>        |
| Data extracted from the financial statements                 | 2007                 | 2008                 | 2009                 | 2010                 |
| <b>Subsidiary value V</b>                                    | 2,229,092.18         | 2,631,285.26         | 1,619,534.76         | 1,765,993.35         |
| Gross profit $Z_{brutto}$                                    | 1,158,606.72         | 1,236,103.72         | -4,010.67            | 34,252.73            |
| Labour costs W   | 1,070,485.46         | 1,395,181.54         | 1,623,545.43         | 1,731,740.62         |
| <b>Value of company assets A</b>                             | 2,870,569.62         | 3,556,716.90         | 3,502,798.30         | 3,469,901.42         |
| <b>Human capital of persons employed by the company H</b>    | 11,171,281.38        | 14,903,117.38        | 17,277,300.00        | 18,367,576.13        |
| <b>Safety culture SC</b>                                     | <b>13,821,801.26</b> | <b>14,431,231.48</b> | <b>-535,913.80</b>   | <b>237,439.33</b>    |
| Data extracted from the financial statements                 | 2011                 | 2012                 | 2013                 | 2014                 |
| <b>Gross profit <math>Z_{brutto}</math></b>                  | <b>380,326.32</b>    | <b>158,858.00</b>    | <b>125,447.91</b>    | <b>131,128.71</b>    |
| Net profit   | 310,786.32           | 125,584.00           | 91,868.91            | 94,930.71            |
| Income tax   | 69,540.00            | 33,274.00            | 33,579.00            | 36,198.00            |
| <b>Labour costs W</b>  | <b>1,957,197.99</b>  | <b>2,130,253.06</b>  | <b>2,163,739.92</b>  | 1,683,022.54         |
| Salaries   | 1,665,597.10         | 1,788,923.16         | 1,801,132.72         | 1,683,022.54         |
| Additional remuneration components                           | 291,600.89           | 341,329.90           | 362,607.20           | 326,010.91           |
| <b>Value of company assets A</b>                             | <b>3,856,207.01</b>  | <b>4,089,958.90</b>  | <b>635,301.04</b>    | <b>4,269,443.89</b>  |
| Non-current assets   | 182,808.72           | 259,867.99           | 237,396.78           | 208,181.74           |
| Current assets   | 3,673,398.29         | 3,830,090.91         | 397,904.26           | 4,061,262.15         |
| <b>Human capital of the people employed by the company H</b> | <b>20,819,963.75</b> | <b>22,361,539.50</b> | <b>22,514,159.00</b> | <b>21,037,781.75</b> |
| Basic salary L   | 1,665,597.10         | 1,788,923.16         | 1,801,132.72         | 1,683,022.54         |
| Risk premium p   | 0.08                 | 0.08                 | 0.08                 | 0.08                 |

| <b>ROAH</b>  | <b>0.0947</b>       | <b>0.0865</b>       | <b>0.0989</b>       | <b>0.0717</b>        |
|--|---------------------|---------------------|---------------------|----------------------|
| Data extracted from the financial statements                 | 2011                | 2012                | 2013                | 2014                 |
| <b>Subsidiary value V</b>                                    | 2,337,524.31        | 2,289,111.06        | 2,289,187.83        | 1,814,151.25         |
| Gross profit $Z_{brutto}$                                    | 380,326.32          | 158,858.00          | 125,447.91          | 131,128.71           |
| Labour costs $W$   | 1,957,197.99        | 2,130,253.06        | 2,163,739.92        | 1,683,022.54         |
| <b>Value of company assets A</b>                             | 3,856,207.01        | 4,089,958.90        | 635,301.04          | 4,269,443.89         |
| <b>Human capital of the people employed by the company H</b> | 20,819,963.75       | 22,361,539.50       | 22,514,159.00       | 21,037,781.75        |
| <b>Safety culture SC</b>                                     | <b>4,542,883.12</b> | <b>2,162,389.85</b> | <b>5,465,387.84</b> | <b>-2,630,335.02</b> |
| Data extracted from the financial statements                 | 2015                | 2016                | 2017                | 2018                 |
| <b>Gross profit <math>Z_{brutto}</math></b>                  | 379,690.59          | 31,940.21           | 58,878.06           | 444,135.97           |
| Net profit   | 298,360.59          | 23,362.21           | 45,883.06           | 356,727.97           |
| Income tax   | 81,330.00           | 8,578.00            | 12,995.00           | 87,408.00            |
| <b>Labour costs <math>W</math></b>                           | 2,213,674.20        | 2,133,142.82        | 1,935,612.27        | 1,975,820.66         |
| Salaries   | 1,854,101.66        | 1,787,470.29        | 1,627,564.05        | 1,655,419.84         |
| Additional remuneration components                           | 359,572.54          | 345,672.53          | 308,048.22          | 320,400.82           |
| <b>Value of company assets A</b>                             | 4,771,699.43        | 5,535,702.82        | 5,308,016.12        | 5,453,024.04         |
| Non-current assets   | 344,796.61          | 1,225,262.64        | 1,204,425.12        | 1,214,360.67         |
| Current assets   | 4,426,902.82        | 4,310,440.18        | 4,103,591.00        | 4,238,663.37         |
| <b>Human capital of the people employed by the company H</b> | 23,176,270.75       | 22,343,378.63       | 20,344,550.63       | 20,692,748.00        |
| Basic salary $L$   | 1,854,101.66        | 1,787,470.29        | 1,627,564.05        | 1,655,419.84         |
| Risk premium $p$   | 0.08                | 0.08                | 0.08                | 0.08                 |
| <b>ROAH</b>  | <b>0.0928</b>       | <b>0.0777</b>       | <b>0.0778</b>       | <b>0.0926</b>        |
| Data extracted from the financial statements                 | 2015                | 2016                | 2017                | 2018                 |
| <b>Subsidiary value V</b>                                    | 2,593,364.79        | 2,165,083.03        | 1,994,490.33        | 2,419,956.63         |
| Gross profit $Z_{brutto}$                                    | 379,690.59          | 31,940.21           | 58,878.06           | 444,135.97           |
| Labour costs $W$   | 2,213,674.20        | 2,133,142.82        | 1,935,612.27        | 1,975,820.66         |
| <b>Value of company assets A</b>                             | 4,771,699.43        | 5,535,702.82        | 5,308,016.12        | 5,453,024.04         |
| <b>Human capital of persons employed by the company H</b>    | 23,176,270.75       | 22,343,378.63       | 20,344,550.63       | 20,692,748.00        |
| <b>Safety culture SC</b>                                     | <b>4,469,089.69</b> | <b>-815,543.57</b>  | <b>-721,437.62</b>  | <b>4,103,685.84</b>  |

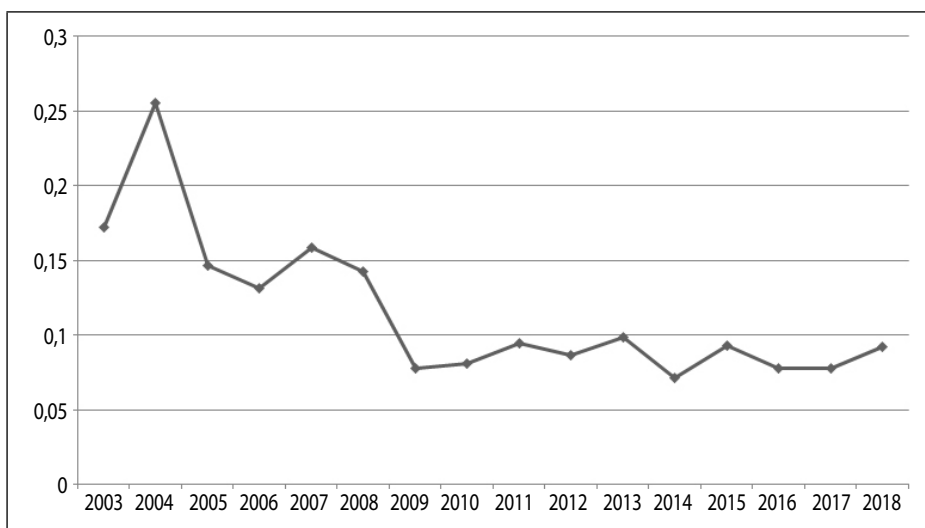
Source: own study.

In the case of the company Nexus Systems sp. z o.o., the value of the ROAH indicator for individual periods of activity (2003–2018) is illustrated by the chart 1. It turns out that the initial phase of the company's activity (2003–2008), i.e. the phase of the most dynamic development (confirmed by the management<sup>21</sup>) is

<sup>21</sup> This information is available on the company's internet site: Nexus System, O firmie, <https://swiatlowody.com.pl/o-firmie.html> [accessed: 14 April 2022].

characterised by high values of the ROAH indicator, as the lowest value from this period is about 13%, and the highest 25%. From 2009 onwards (the moment of gaining market stability and stabilising the size of employment), these values are at the level of 7–10%.

Figure 1. Rate of return on tangible and human assets (ROAH) at Nexus Systems sp. z o.o. from 2003 to 2018 taking into account the safety culture

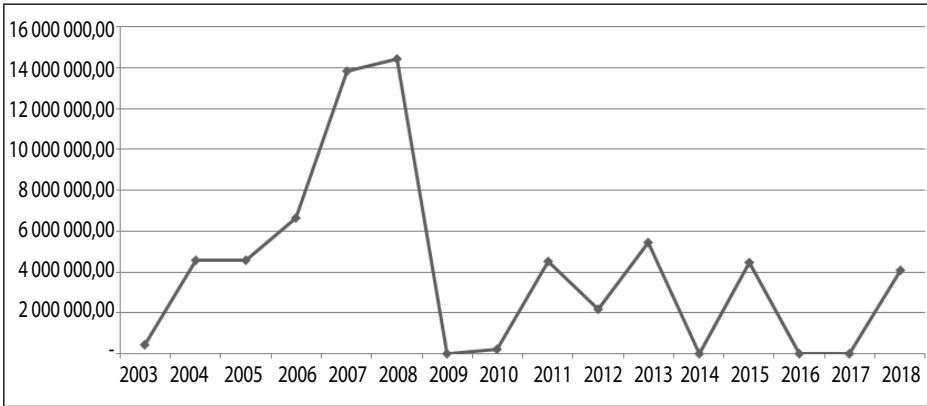


Source: own study.

The percentage values of ROAH (Figure 1) and the values of the intellectual capital characteristics (Figure 2), expressed in PLN, characteristic of the described company in each period of its activity, testify to the existence of high management efficiency and employee effectiveness, as well as to the company's ability to defend itself against business risks. This, in turn, could be attributed to a safety culture if management identified it as the most important characteristic in the process of defining the utility function. Importantly, the disclosed value of safety culture can be presented in the asset balance sheet.<sup>22</sup> This balance sheet can include both the information contained in the "actual" financial statements (2003–2018) of Nexus Systems sp. z o.o. and the results of the calculations carried out using ROAH and the safety culture measurement model constructed on its basis, and therefore takes into account not only information about the company's tangible components and assets, but also information about important and hitherto elusive economic categories.

<sup>22</sup> This refers to the so-called knowledge-based balance sheet according to the concept of L. Niemczyk, *op. cit.*, pp. 78–79.

Figure 2. Value (PLN) of intellectual capital attributes\* of Nexus Systems sp. z o.o. between 2003 and 2018



\* this article assumes that safety culture is a feature of intellectual capital.

Source: own study.

## Conclusions

The aim of the article was to look at safety culture as an object of economic calculation (broadening the perception of the category of intellectual capital) and to answer the question: can safety culture be operationalised? And additionally: can safety culture be a measurable category using a specific profitability indicator?

Through theoretical and cognitive considerations, it has been determined that the category of safety culture can be operationalised and an adequate instrumentarium has been proposed for this purpose. The starting point, however, is to take into account the knowledge that capital – according to scientific theory – is the ability to do work and should be considered in the light of the basic identity of dual accounting. It differentiates tangible assets from capital – the abstract medium within them. Without an understanding of the ubiquitous principle of duality and an awareness that all natural processes are subject to it, it is not possible to properly define and study the phenomena occurring in the economy. These phenomena include, among others, the existence of intellectual capital and its abstract qualities and, therefore, the broadly defined safety culture within a company and its employees.

Despite the fact that the case study does not allow for the generalisation of conclusions, from the point of view of business management, the information obtained appears to be cognitively valuable, and as an added value (created as a result of theoretical and empirical research) should undoubtedly be indicated: the resolution of the issue of the measurability of abstract categories, to which safety culture can be

included, and the introduction, verification and evaluation of a tool capable of realising this objective grounded – as indicated – in accounting theory.

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## *Operationalising a safety culture in the management of a business entity (case study)*

### *Abstract*

Safety culture – along with quality and environmental culture – determines a positive image, competitive advantage and financial benefits. As a result, interest in this category continues to grow (CE or B certification). Safety culture can be considered from the point of view of philosophy, sociology, anthropology, economics and management as evidenced by Andrzej Chodyński’s rich compilation of terms, definitions and points of reference. The aim of the article is to look at safety culture as an object of economic accounting,

thus treating safety culture as an economic category and answering the questions: can safety culture be an object of operationalisation based on the principle of dualism dominant in accounting and, therefore, can safety culture be a measurable category using the general profitability index? These issues are particularly important from the perspective of Safety First companies. The answers to the research problems posed are provided by a literature analysis, an analysis of financial documents and a case study. For the identification and valuation of safety culture, the generalised ROAH was used. The article thus resolves the measurability of safety culture and introduces, verifies and evaluates a tool grounded in accounting theory.

Key words: safety culture, intellectual capital, operationalisation, accounting, ROAH