

Measuring Intellectual Capital: Lessons Learned from a Practical Implementation

Aleša Saša Sitar

University of Ljubljana

Slovenia

Vasilije Vasić

Innovation Centre of Gorenje Group

Slovenia

The paper focuses on the challenge which companies face today when they try to determine their true value; namely how to evaluate their intangible assets. From the overview of different method groups used to measure intellectual capital, a method from each group was chosen and considered for implementation in the Slovene company Gorenje, d. d. The chosen methods were the following: Technology Broker (IC Audit), Market-to-Book Value, Tobin's q, Value Added Intellectual Coefficient (VAIC™) and Balanced Scorecard (BSC). Theoretical descriptions of these approaches seemed very straightforward, but with their implementation in practice the authors encountered several difficulties such as: gathering the right information, estimating values of future returns, interpreting data, etc. By taking into consideration the comparison of practical experience, recognized strengths and weaknesses, usability of chosen methods as well as the true value added into the organization, two methods were chosen for further implementation in Gorenje, d. d.

INTRODUCTION

In the business world where most of the organizational value is based on intangible assets, the ability to recognize and estimate the sources of this value has become vital for companies. In order to be able to manage intellectual assets we have to recognize where this value is coming from and how it is created in an organization. It has become very popular to define and study intellectual capital, and several authors have tried to define it in a unique way and propose their own measurement methods. Though the definitions of intellectual capital are all very similar, describing more or less the same source of intellectual assets, the approaches to measure them differ substantially. They differ primarily in the purpose of the measurement, where some methods are more appropriate for external communication and some for internal use. But what is common

to all the methods is their difficult implementation in practice. There are several problems with the implementation of different measurement methods, such as the lack of necessary data, of accounting standards for intellectual capital, and of detailed method descriptions. Some of these limitations can be overcome by approximation, by subjective evaluation or simply by choosing a different method. Practitioners must be aware of these difficulties before they decide to invest in such projects. But most important of all, an organization has to decide for what purpose the measurement is intended: an internal or an external use.

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This paper is therefore focusing more on a presentation of experience and difficulties with the implementation than on a detailed description of the theory. Though at first a general definition of intellectual capital will be presented with a short overview of the methods, the majority of the paper will be oriented toward the presentation of a practical implementation using Gorenje, d. d. (from now on Gorenje) as a case study. Gorenje is the largest production company in Slovenia, involved in household appliances industry, and is part of Gorenje Group.

Many Slovenian companies, regardless of their size and business, realize the importance of knowledge as a source of sustainable competitive advantage and the foundation for innovativeness and adaptability. In fact, different institutions and companies in Slovenia are already dealing with knowledge management and intellectual capital evaluation and building stronger ties between business and academia in this respect. A good example of such cooperation is the collaboration between the Faculty of Economics, University of Ljubljana, and Gorenje, either directly, project based or via students.¹

Accounting practice is still looking for an appropriate way of reporting the intangible assets. Though, more and more foreign companies have developed and use their own models to measure intellectual capital and the way of reporting it. There are as many methods as there are authors and companies, and no one is universally accepted. Some level of unification is crucial for a comparison of these various methods.

Gorenje intends to implement the evaluation of intellectual capital, therefore some research was conducted in spring 2004. This paper presents our experience encountered during this period and some initial results obtained. Through a comparison of the already implemented methods, major benefits and weaknesses will be presented together with the usability of the methods for different purposes. Finally, general guidelines for future implementation in Gorenje and those selected

TABLE 1 Some definitions of authors about intellectual capital

Author	Definition of intellectual capital
Bontis (1999)	The collection of intangible resources and their flows.
Brooking (1997)	The difference between the book value and what somebody is prepared to pay for it.
Edvinsson (1994)	A source of intangible (hidden) assets that often don't appear on the balance sheet.
Harrison and Sullivan (2000)	Knowledge that can be converted into profit.
Roos et al. (1997)	The sum of knowledge of company's members and practical translation of this knowledge like trademarks, patents and brands.
Stewart (1999)	Intellectual material – knowledge, information, intellectual property, experience – that can be put to use to create wealth.

to measure intellectual capital will be presented. After all, the results of these measurement approaches should be used to form a company's goals and a strategy that will lead to future success.

DEFINING AND MEASURING INTELLECTUAL CAPITAL:
A THEORY OVERVIEW

In the 1990s a broad interest was devoted to intellectual capital due to the rising market value of knowledge intensive organizations. Intangible assets were recognized as the source of the sustainable competitive advantage attained through organizational knowledge (Skyrme 2003). Practitioners and researchers have attempted to define and measure what was until then immeasurable.

DEFINING INTELLECTUAL CAPITAL

Authors have defined intellectual capital in several ways (table 1). What they all agree on is that it represents the intangible value of an organization, something that is difficult to pin down. A short overview of the definitions of intellectual capital shows that the authors have not yet agreed on a single definition. But at the same time the definitions are all alike. They all agree that intellectual capital is a sum of all intangible assets, including knowledge (part of human capital), structural capital, relational capital, organizational capital, internal capital, and external capital (table 2). This knowledge is considered the most important production factor influencing the value of an organization (Bontis et al. 1999).

TABLE 2 Some classifications of intellectual capital

Author	Intellectual capital			
	Human capital	Structural capital		External capital
		Internal capital		
Brooking (1997)	Human-centered assets	Infrastructure assets	Intellectual property assets	Market assets
Edvinsson (1997)	Human capital	Organizational capital		Customer capital
Kaplan and Norton (1996)	Learning and growth perspective	Internal business processes perspective		Customer perspective
Roos et al. (1997)	Human capital	Organization	Renewal and development	Relationships
Sveiby (1998)	Human competence	Internal structure		External structure

If we compare all these classifications of intellectual capital, we realize that they differ in defining structural capital, whereas they all agree that knowledge, as human capital, is a vital component. Therefore the management of intellectual capital to a great extent overlaps with knowledge management. Measuring intellectual capital helps to recognize organizational knowledge flows and critical knowledge issues, to accelerate the learning patterns, identify best practices, diffuse them across the firm, and increase innovation and collaborative activities (Kannan and Aulbur 2004).

METHODS FOR MEASURING INTELLECTUAL CAPITAL

When organizations decide to start measuring intellectual capital, the reasons behind the decision can vary, but can be classified into two groups: internally oriented and externally oriented. Often external reasons such as a better public image, an increase in market value, reducing the difference between market and book value, additional information for potential investors and the market are more important than the internal benefits when realizing its influence on decision making, overall business success, the connection between investments in intangibles and business goals as well as the necessity to manage them (Skyrme 2003; Vasić and Jerabek 2002; Sitar 2003).

Frequently new measurement methods or at least variations of those

TABLE 3 Intellectual capital measurement methods

<i>Market Capitalization Methods</i>	<i>Return on Assets Methods</i>
<ul style="list-style-type: none"> • The Invisible Balance Sheet • Market-to-Book Value • Investor assigned market value (IAMV™) • Tobin's q 	<ul style="list-style-type: none"> • Economic Value Added (EVA™) • Value Added Intellectual Coefficient (VAIC™) • Calculated Intangible Value (CIV) • Knowledge Capital Earnings
<i>Scorecard Methods</i>	<i>Direct Intellectual Capital Methods</i>
<ul style="list-style-type: none"> • Human Capital Intelligence • Balanced Scorecard • Skandia Navigator™ • IC Index™ • Intangible Asset Monitor (IAM) • Knowledge Audit Cycle • Value Chain Scoreboard™ • Meritum Guidelines • Danish Guidelines • Topplinjen/Business IQ • Holistic Value Approach (HVA)* • IC Rating™* • Measuring and Accounting IC (MAGIC)* • Knowledge Assets Map* 	<ul style="list-style-type: none"> • Technology Broker (IC Audit) • Citation-Weighted Patents • Human Resource Costing & Accounting (HRCA) • Inclusive Valuation Methodology (IVM™) • Accounting for the Future (AFTF) • HR statement • The Value Explorer™ • Intellectual Asset Valuation • Total Value Creation (TVC™) • Financial Method of Intangible Assets Measuring (FIMIAM)*

* Methods were added to the original Sveiby 2004 list from other sources.

Source: Sveiby 2004; Pike and Roos 2000; <http://www.intellectualcapital.se>, MAGIC 2004; Rodov and Leliaert 2002; Marr et al. 2004

already known are presented due to the theoretical development in the field and the necessary adjustments in the practical implementation. However, the most structured approach of presenting the available methods was developed by Sveiby (2004; see table 3). The methods are classified into four groups based on the level of measurement and the way of evaluation. These are: Market Capitalization, Return on Assets, Scorecard and Direct Intellectual Capital Methods.

Market Capitalization Methods estimate the total value of intangible assets in financial terms. They measure intellectual capital as a whole, mostly through the difference between the market and book value. The second group, Return on Assets Methods, as suggested by its name measures the intangibles with the help of standard financial measures, similarly as the first group, on an overall organizational level. The Scorecard Method is the only group that estimates intangible assets in non-financial terms through separate components using different indicators. Indicators are then presented separately in tables or graphs. Direct In-

tellectual Capital Methods similarly evaluate different intellectual capital categories separately, but again in financial terms, obtaining the total value through summation (Sveiby 2004).

The key intellectual models of the methods presented in table 3 are the Skandia Navigator, the IC-Index, the Technology Broker (IC Audit) and the Intangible Asset Monitor (Marr et al. 2004). Others, in practice widespread methods, are Tobin's q, Market-to-Book Value and Balanced Scorecard. The methods that have been to some extent implemented in Gorenje are: Technology Broker (IC Audit), Market-to-Book Value, Tobin's q, and Balanced Scorecard together with another known method, Value Added Intellectual Coefficient (VAIC™).

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Technology Broker (IC Audit) (Brooking 1997) as a method estimates the value of intellectual capital through a diagnostic analysis of the answers to 20 questions, covering its main counterparts: human-centered assets, infrastructure assets, intellectual property assets and market assets (table 2). For a more thorough analysis each part is analyzed through additional 178 detailed questions, scoring the answers on the Likert scale. The Market-to-Book Value method (Stewart 1999) is more or less self-explaining. The value of intellectual capital is estimated by calculating the difference between the market value of an organization and its book value, thereby making it easy to use. Alternatively for calculating the Tobin's q coefficient, the stock market value of an organization is divided by the replacement costs of its assets (Sveiby 2004), thereby diminishing the influence of a company's size on the value of its intellectual capital. The Value Added Intellectual Coefficient (VAIC™) developed by Pulić (2004) uses information from traditional financial statements to evaluate intellectual capital and most importantly its efficiency. Thereby it indicates the organizational intellectual ability. The last method, Balanced Scorecard (Kaplan and Norton 1996), focuses more on the strategic objectives of the organization by setting up a system of indicators monitoring its progress through financial and three more intangible perspectives which are: customer, internal business processes and learning and growth perspective. This method does not evaluate intellectual capital as a whole, but it measures part of intangibles, using different measures. It also monitors their progress and influence on financial results.

When deciding for a method to measure intellectual capital one must keep in mind the primary purpose of the measurement – the internal use oriented on better management of the intangibles. External use should come second, in the sense that it should be acknowledged by the market

and competitors for organizational intellectual capital. The decision of implementing a certain measurement method should therefore be based on the analysis of its strengths, weaknesses and usability regarding both purposes.

MEASURING INTELLECTUAL CAPITAL: LEARNING
FROM A PRACTICAL IMPLEMENTATION

Measuring intellectual capital in Gorenje is closely connected with the establishment of the Innovation centre of Gorenje group² in 2004. Intellectual capital, knowledge management and innovation management as the center's core business are defined in the company's constitutional document 'White paper on knowledge management and innovation management' (Vasić and Jerabek 2002). In the EU similar documents exist (e. g. Green paper of innovation). The intention of the innovation center is to encourage innovation élan within the company combined with new ways of thinking to achieve a growth of intellectual capital and thereby the company's market value. The center's guidelines are set in the following areas: productive innovation environment, knowledge management, intellectual capital evaluation, innovation management, technology management, technology foresight and stimulation of processes for value-added growth.

The evaluation of intellectual capital in Gorenje begun as a research project but a progress has already been made. This paper therefore presents our experience with the research and some results gained during the research work. The most important thing that we learned was that a practical approach always shows us the specific demands for a full, practical implementation into a company.

Methods Used in the Case of Gorenje

As briefly described in the theoretical part of the paper, Gorenje decided to implement the following intellectual capital measurement methods: Technology Broker (IC Audit), Market-to-Book Value, Tobin's q, Value Added Intellectual Coefficient (VAIC™) and Balanced Scorecard (BSC). Besides these five methods, two others were considered for implementation in Gorenje: Accounting for the Future and Scandia Navigator but were not chosen due to different reasons. The Accounting for the Future required the estimates of the projected discounted cash flows with and without the company's intellectual capital, which have not yet been made in Gorenje, while the Scandia Navigator model resulted to be very

TABLE 4 Estimation of intellectual capital based on Market-to-Book Value and Tobin's q method for Gorenje, d. d., in 2001–2003

Elements	2001	2002	2003
Stocks in emission	12,200,000	12,200,000	12,200,000
Stocks market value (EUR, last brokerage day)	10.23	19.48	21.04
Stocks book value (EUR)	18.14	19.88	20.51
Company's market value (EUR)	124,760,881	237,664,768	256,732,735
Company's book value (EUR)	221,266,597	242,518,371	250,207,401
Market-Book Value = Intellectual capital (EUR)	-96,505,716	-4,853,603	6,525,334
Market/Book Value = Tobin's q	0.56	0.98	1.03

Source: Gorenje, d. d. 2002; 2003; Gorenje group 2002; 2003.

similar to the Balanced Scorecard method that has already been implemented in Gorenje to a certain extent. The implementation of the latter would therefore result in duplicated efforts.

Technology Broker (IC Audit). Since design and application of the Technology Broker (IC Audit) method demands a long-term process, the primary focus of the research was on how to design a proper implementation procedure and discover necessary measures for the company. The method requires Gorenje to fill in the questionnaire consisting of 178 questions from different topics. Which topics and questions are more relevant depends on the company, its size and strategy. In the case of Gorenje, the focus was on the following: brand name and customers, patents and copyright, employee's education profile and expert areas, company's culture, IT and a database system. According to their importance the answers are weighted and used for the calculation of intellectual capital, using a cost-based, market-based or income-based approach (Bontis 2001).

Market to Book Value and Tobin's q. The value of intellectual capital in Gorenje for the last 3 years, based on the Market-to-Book Value evaluation, is summarized in table 4.

The value of intellectual capital, which was negative in 2001 (EUR - 96,505,716) rose to EUR 6,525,334 in 2003. The reasons for such a negative initial position can be attributed to the specifics of the Slovenian capital market, high interest rates, limited available resources and a lack of saving incentives. Another possible reason is the estimation of the com-

pany's value during privatization and therefore also in a share's book value (Valentinčič 2002), which decreases the difference between the market and the book value. For Gorenje the positive change was due to the change in the managing board, and the subsequent change in organizational structure (divisions) which influenced Gorenje's structural capital. Due to higher expectations regarding new top management as well as new product programmes, higher growth and high cash flows were expected, which lead to a rise in the stock's value and the company's market value.

The limitations in interpreting the results of the Market-to-Book Value Method, particularly when comparing the intellectual capital value between different companies, derive from the fact that organizations are of different sizes. Additionally, the Tobin's q coefficient was calculated (table 4), omitting the influence of size. In the equation the book value was used as a denominator and the market value as a numerator.

The coefficient's value was higher than 1 only in 2003, meaning that the company's assets' replacement value was lower than its market value, which suggests that Gorenje gained higher returns than the amounts invested. The growing coefficient also shows that Gorenje is getting better at managing its own intangible capital and attracts potential investors on the market. This is the case for almost every company with a Tobin's q higher than 1. In 2002 Gorenje's value was lower than 1, but this was also the case in other successful Slovenian companies (e. g. Kolinska, Mercator, Delo prodaja) (Valentinčič 2002).

Value Added Intellectual Coefficient (VAIC™). The VAIC™ coefficient (Pulić 2004) was calculated based on the data obtained from the balance sheet and income statement for Gorenje. The indicator's growth rate for the past 3 years has been calculated as well (table 5). In the analyzed period (2001–2003), the human capital of the company altogether grew 28%. The gradual growth is also evident in the capital employed, which altogether grew 21%. The most uneven growth could be seen in structural capital, which grew 32% in 2003 as compared to 2002, whereas in the same period the value added grew 13%.

Although the efficiency of the capital employed grew throughout the analyzed period, in 2002 the value of the overall company's efficiency (VAIC™) dropped slightly. This slight drop was caused by the drop in the value of both human capital efficiency and structural capital efficiency. Due to the growth of both efficiencies in 2003, the VAIC coefficient grew as well, to reach a value that exceeded its initial value (table 4).

TABLE 5 VAIC™ Coefficient for Gorenje, d. d., in 2001–2003

Elements	2001	2002	2003	(1)	(2)	(3)
Operating income (EUR)	477,709,724	535,347,689	567,560,722	112	106	119
Operating expenses (EUR)	465,294,814	522,242,297	550,304,791	112	105	118
Labor costs (EUR)	67,459,984	78,363,960	86,553,966	116	110	128
Value Added (EUR)	79,874,894	91,469,352	103,809,897	115	113	130
Human capital (EUR)	67,459,984	78,363,960	86,553,966	116	110	128
Structural capital (EUR)	12,414,910	13,105,392	17,255,931	106	132	139
Capital employed (EUR)	281,802,371	303,453,573	341,398,549	108	113	121
Human capital efficiency	1.18	1.17	1.20	99	103	101
Structural capital efficiency	0.16	0.14	0.17	92	116	107
Capital employed efficiency	0.28	0.30	0.30	106	101	107
VAIC™	1.62	1.61	1.67	99	104	103

Note: Column headings are as follows: (1) $I_{2002/2001}$; (2) $I_{2003/2002}$; (3) $I_{2003/2001}$.

Source: Gorenje, d. d. 2002; 2003; Gorenje group 2002; 2003.

For Gorenje it is obvious that both human capital efficiency and structural capital efficiency coefficients, which are part of intellectual capital influence the outcome of the overall efficiency. Although in 2002 income and profits were higher than in 2001, Gorenje was slightly destroying the VAIC™ value instead of creating it. The VAIC™ efficiency therefore clearly contradicts the traditional financial indicators that are showing a positive business conduct. In such case management is truly unaware that it is destroying instead of creating the value (Pulić 2004). In 2003 the situation changed for the better.

This part of the research in Gorenje has so far focused more on the calculation of intellectual capital values for internal use and not so much on the comparison with other (competitive) companies, though the VAIC™ method allows it. This can be seen as an interesting starting point for future research.

Balanced Scorecard (BSC). Gorenje is already acquainted with the BSC method and has invested some effort to introduce it internally. Therefore, our research has concentrated more on the necessary procedure (steps) of the implementation process and its possible positive effects on the future. Our research was based on the analysis of the four-stage process, proposed by Kaplan and Norton (2000): (1) measurement architecture, (2) reaching consensus about the strategic goals, (3) choosing and design of indicators and (4) planning the implementation. The

Balanced Scorecard method is more a strategic tool than an intellectual capital measurement method, but it is also very valuable, since it helps managers to connect a company's strategy with indicators measuring its intangible assets. A list of indicators was developed and proposed for implementation in Gorenje (Cestnik 2004). The proposed indicators are just some of those Gorenje should use to measure parts of its intellectual capital. Following their progress and influence on financial measures will enable Gorenje to plan for future activities and thereby approach in a strategic way the development of its intangible assets.

From the research work, the performed calculations and the attempts for implementation it is clear that each method used has some strengths and weaknesses. Therefore we can easily draw some conclusions about the usability of each method.

The main weakness of the Technology Broker (IC Audit) method is the length of the implementation process as well as the difficulties in transforming qualitative results from the questionnaire into the financial value of the organization's intellectual assets, regardless of the approach we decide to use (Bontis 2001, Marr et al. 2004). This evaluation is very subjective since the person being interviewed is only expressing his/her opinion.

Market-to-Book Value and Tobin's q methods' major advantages lie in their simplicity; they are easy and quick to apply. Both values are fast to calculate, but have three major general disadvantages, which were also encountered during implementation in Gorenje (Stewart 1999). First, the changes in the stock market value are not entirely under management control (influence), particularly in times of takeovers, short business cycles and other unpredictable events, which can often cause oscillation in a company's intellectual capital. And what happens if company's stocks are traded under the book value; does that mean that Gorenje does not have intangible assets? The second problem lies in determining the company's book value. Namely, different accounting methods, procedures and standards mean different presentations of categories. This fact diminishes credibility of calculated results and limits the possibility to compare end results across countries. And third, the methods did not offer any guidelines for a business improvement in the future. Applying the Tobin's q method in Gorenje diminished to some extent the problem of comparing results with other companies. By using both methods we could compare the results with past annual reports and thus have an insight into trends of intellectual capital movement.

The main advantage of the VAIC™ method is its simplicity and explanation of the created value based on investment. Besides, all the necessary data are already available in standard balance sheets and business reports. The method is simple and easy to understand and the results are easily benchmarked with the results from other companies (Pulić 2004). Another very important feature is the possibility to apply this method to all the company's management levels or business processes. The main disadvantage lies in its inability to identify the value creation drivers and offer some information about possible business improvements (Sitar 2003). It is left to the company's leaders to decide where and how to apply the findings and make decisions about the changes.

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The BSC model is very comprehensive, highly adaptable and closely connected with the development strategy. As evident from our research work, the model is suitable for all companies, regardless of size and business. Other advantages of this method are also setting a clear strategy, communicating it to the lower levels, emphasizing non-financial indicators, gaining a culture shift and focusing management's attention on strategically important topics. Since developing a strategy is the first step of the method, it is important that managers devote their full attention to it. This is the most common problem in Slovenia. Despite this, Slovenian companies are generally satisfied with the BSC method (Ložar 2002) and Gorenje had a good first impression on it as well. However the BSC method is limited in its comparison to competitive companies, since every company should choose measurement indicators which are specific to its line of business and other characteristics.

Whatever the method used, none of them solve the problems of reporting intellectual capital value in the traditional accounting system. The way of reporting used today does not recognize the majority of intangible values. Many companies are still not measuring them, at least not in a standardized way. Therefore, for Gorenje, a temporary solution of intellectual capital report as a supplement (appendix) to the company's annual report is proposed. The problem arises when deciding what detailed information to include in these reports, since companies do not want to disclose internal data, albeit this is the information future investors are seeking. For Gorenje, a Danish IC reporting model is recommended (see Bukh et al. 2001). The Danish model is a strategic tool as well as a communication tool for employees, customers and other participants in the business process. Therefore, this reporting model should be included in further intellectual capital studies in Gorenje for a possible future implementation.

CONCLUSION

Frequently new measurement methods or at least variations of those already known to measure intellectual capital are presented, due to the theoretical development of the field and necessary adjustments in the practical implementation. We encountered 32 methods, but our decision about which one to choose for practical use depends on several factors (purpose of measurement, size, and business). Even the approach itself – how to choose and then implement a suitable model to evaluate intellectual capital – can be done in different ways or steps.

As a result of this preliminary research, we propose that in the future Gorenje combines two methods to measure intellectual capital: (1) the Balanced Scorecard (BSC) or one of the scorecard methods and (2) the Value Added Intellectual Coefficient (VAIC™). The main reason for choosing a combination of these two methods lies in an internal and external use of information.

As a method, BSC is more complicated. Nevertheless, it measures the company value on all levels and follows the events from a close perspective. This enables a faster and punctual reporting, which is very useful for managers when taking decisions. It is also more appropriate for internal application. But unfortunately the BSC method has certain limitations when a comparison is made with other (competitive) companies. For comparison purposes we suggest the VAIC™ method, which is very simple to use: all data for the calculation can be gathered in the company's balanced sheets and income statements. It is also easier to understand, not only for management but also for others (e.g. potential investors). The main disadvantage of this method, which could be compensated with the BSC, is the inability to give guidelines (hints) for a better business conduct.

Future intellectual capital studies in Gorenje will face an additional challenge. They will also focus on the development of an intellectual capital reporting model. We propose following the guidelines of the Danish IC reporting model that, as a strategic and a communication tool, adjusts the level of information disclosed on intellectual capital to a certain group of organizational stakeholders.

NOTES

- 1 The authors would like to thank the graduate student Barbara Cestnik, who, with her thesis work has contributed substantially to the implementation of intellectual capital measurement methods in the case of Gorenje.

- 2 In 2004 the former Innovation Research Centre, established in 2002, was transformed into the Innovation center of Gorenje group.

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