Measuring and Safeguarding Intellectual Capital

Despite important contribution of knowledge and services to value creation and growth of modern companies and nations, our management control systems, our economic models and our social measuring instruments concentrate – baring a few exceptions – on physical and financial assets and physically and financially measurable outputs
J.B. Quinn (Adapted from Quinn 1992, p. 243).

Learning Outcomes

After completing this chapter
- You will know what the challenges to evaluating intangible assets are,
- You will be able to differentiate between deductive summarising and inductive analytical approaches to evaluate intellectual assets;
- You will know how to use a Balanced Scorecard as a multidimensional measuring instrument;
- You will be able to assess risks of loss and know how to protect intellectual assets;
- You will be able to establish a knowledge inventory.

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8.1   Finding Measures for Intangible Assets[1]

«What is not measured is not managed» is an often made statement in business practice. The measurement and evaluation system is thus the core system for the perceptions of any company. This system, directly influences the performance measurement and evaluation of the top management and of all employees, and indirectly influences the strategic decisions. Each organisation thinks and functions through its measurement system even if many decision-makers may be unaware of it. The measurement system can be considered as a strategic map which reflects the organisational reality in a certain manner. We all know that the basic difference between various kinds of maps is the purpose they serve; thus we have road maps, hiking maps, flight maps, and climate maps. But all good maps have the following things in common:
- They give an orientation: In a complex environment, maps help us to focus on the important things and to find our path which lies in the future.
- They are rational and goal-oriented models of reality: Maps never depict the reality one to one. For one, it is impossible to do so, and secondly it would not serve the underlying goal to provide orientation, because the complexity of the maps would overburden the cognitive capacity of human beings and the organisation.

So what do the orientation maps in today's organisations look like? On which significant parameters do they help us focus? Do these parameters help us find a suitable strategy? And how is the strategic performance of an organisation defined?

Classic approaches answer these questions with the help of various financial indicators. Starting with turnover, net income or EBIT, these indicators include traditional returns figures such as ROI or ROS up to the new estimates of shareholder value

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1   This chapter is based North and Gueldenberg (2011) and on North (1999, pp. 184).

(ROCE, EVA, DCF, CFROI, etc.). The disadvantage of all these financial indicators is that they are not enough to adequately consider the resource «knowledge» and its significance in the framework of the knowledge economy. These figures thus lead to mismanagement, which in turn negatively affects the success of the organisation in the long run.

According to the disadvantages of the existing performance measurement systems can be summarised in several key statements:

- **We Too Often Measure the Wrong Things**
- To start with, we measure what is easy to measure, without questioning the strategic purpose the results of such a measurement are supposed to provide us. This way, we become prisoners of our indolence and our bounded rationality.
- Financial indicators are the parameters which, in today's organisations, are the easiest to collect. In doing so, we invest all our energy in aggregating these financial parameters to meaningful indicators. Here, usually the mathematical computability dominates the cause-effect chain and the chronological order of the strategic development is overlooked. During all this we also forget the non-financial, intangible aspects.
- Very often we are inclined to measure only the inputs. Input factors usually have very little significance in predicting to the output achieved with them. This is generally decided in the organisation (through its structure and processes).
- We concentrate too much on stock figures and too little on flow figures. In this way, we strengthen our static view about things and loose the perception for the processes in the course of time.
- We try too hard to divide the organisation into individual units, and forget about its synergies and correlations which characterise every organisation and are in fact its raison d'être.

- **Too Often We Measure Using the Wrong Scale**
- Often we measure for the short-term: Our time scale is too short. This way, we end up getting static measurements and not dynamic. We get to look at a series of snapshots instead of the complete film. Thus, for strategic decisions and business understanding, we miss out on noticing important dynamic processes such as delay effects or feedback loops.
- Our measurements are solely quantitative and not interlinked and qualitative. This unnecessarily reduces the quality of the information available to us. We fail to see cause-and-effect relationships and trust the supposedly objective numbers more than our own experience.
- We measure with an absolute standard and not with relative. By their definition, however, absolute parameters are always control-oriented and not learning-oriented, because findings can be drawn only from the relative interplay with other parameters.
- We measure only internally and relate very little between the organisation and its environment. This leads to a distorted perception and blinkered attitude to one's work. Concentration on internal mediocrity distorts the view of the possible potentials.

■   **We Do Not Measure What Is Important**

▬ Intangible assets are generally hardly measured or not measured at all. As a result, we rely mainly on tangible assets while making strategic decisions.

▬ We hardly know the knowledge base of our organisation and its strategic value. We are unaware of the areas in which we have a knowledge-edge over our competitors. We do not know how widespread knowledge is in the market. It is therefore difficult for us to form sustainable knowledge strategies.

▬ We do not know how effective our knowledge management system is and what its strategic contribution is. This makes it difficult for us to define a knowledge management strategy.

▬ We know nothing about the quality and nature of the learning potential of our organisation. Are we in a position to learn faster than our competition?

▬ We know nothing about the extent and strategic edge of our organisation-specific intelligence. In which areas do we have structural advantages? Which areas are our strongholds? What constitutes our competitive advantage?

■   **We Measure Without Realising Why:**

▬ Though a number of indicators are available to us, we find it difficult to link these to our strategy. We therefore use indicators to exercise operational control instead of using them for strategic learning.

▬ We find it difficult to interpret deviations. We therefore concentrate on correcting these deviations. But in doing so we overlook strategic opportunities and risks.

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Case Study

Intellectual Capital Statement of Austrian Research Centre, Seibersdorf (ARCS)

The Austrian Research Centre of Seibersdorf (ARCS) is the biggest extramural research company of Austria. Being found as a nuclear research institute, its field of activity was developed into a broad spectrum of different natural sciences, technology and social sciences with about 700 employees at numerous locations.

Intellectual Capital reporting is supposed to document the future value creating potential and present its progress along the strategic re-orientation of the company. Being a largely publicly financed organisation management wanted to increase transparency of resource use and results achieved for the community and A Balanced Scorecard was developed before the project of intellectual capital statement. This Balanced Score card was supposed to deliver specific information for the internal research and knowledge management.

With the implementation of intellectual capital statement, a three-member team was created apart from the control team which comprised members from different parts of the company and external specialists. This three-member team was made up of two employees of ARCS and an advisor. The ARCS intellectual capital statement is based on a process model that illustrates a knowledge cycle within the company over a certain period of time. The broad threefold classification of intellectual capital in human, structural and relational capital was selected for this purpose. Using this model, it is possible to trace the three capital forms that represent the input for the actual value-creation process (see ◼ Fig. 8.1).

The most important core processes of this research organisation are the order and programme research. Three knowledge-based resources are transformed into knowledge within the framework of these processes that are organised in form of projects in the organisation. This model can be illustrated with the following example: A talented researcher (human capital)
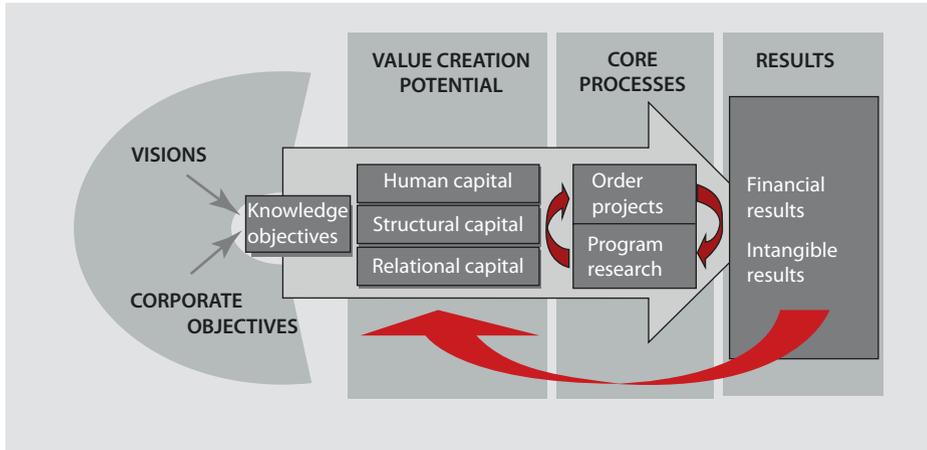
◼ Fig. 8.1 Process model of ARCS

works in one of the laboratories in Seibersdorf (structural capital) within the research network of ARCS (relational capital). He works not only on problems pertaining to fundamental research (programme research) but also on industrial projects for application development (order research).

Thus, on the one hand, new findings arise in form of publication and methods and on the other hand new products or solutions come into being. The employee learns by himself and enhances his experience. Apart from these findings, there are also financial refluxes that are parallel to the business area of ARCS. For this purpose, detailed indicators are developed that can be retrieved just like the complete intellectual capital statement from ► www.arcs.at.
Source: Bornemann and Leitner (2002) and ► www.arcs.ac.at

8.2 Intellectual Capital Reporting

Making the effectiveness of knowledge work measurable means to analyse the end result of knowledge work, i.e. the intellectual assets or the knowledge capital generated. Since the beginning of the 1990s there have been efforts to extend the existing, mainly financially oriented, measurement system to non-financial or intangible assets. Knowledge reporting in companies always has an internal and an external dimension. The internal dimension has mainly to do with strategic control and internal accounting.

The external dimension deals with external accounting and reporting, and thus stresses the significance of communication with external stakeholders of the company, especially with its shareholders (cf. Abhayawansa and Guthrie 2014).

In the following we will not enter into a discussion of International Accounting Standard (IAS 38), where some intellectual assets and their valuation are regulated but refer instead to the relevant accounting literature.[2] A key argument against the

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2   See for example Lev et al. (2005).

Approach	Description
Direct intellectual capital methods (DIC)	Estimate the $-value of intangible assets by identifying its various components. Once these components are identified, they can be directly evaluated, either individually or as an aggregated coefficient
Market capitalisation methods (MCM)	Calculate the difference between a company's market capitalisation and its stockholders' equity as the value of its intellectual capital or intangible assets
Return on assets methods (ROA)	Average pre-tax earnings of a company for a period of time are divided by the average tangible assets of the company. The result is a company ROA that is then compared with its industry average. The difference is multiplied by the company's average tangible assets to calculate an average annual earning from the Intangibles. Dividing the above-average earnings by the company's average cost of capital or an interest rate, one can derive an estimate of the value of its intangible assets or intellectual capital
Scorecard methods (SC)	The various components of intangible assets or intellectual capital are identified and indicators and indices are generated and reported in scorecards or as graphs. SC methods are similar to DIS methods, expect that no estimate is made of the $-value of the Intangible assets. A composite index may or may not be produced

▣ Table 8.1 Methods for analysing the intellectual capital

Table based on: ▶ http://www.sveiby.com/articles/IntangibleMethods.htm

recognition of intangible assets in balance sheets still is the uncertainty of future economic flows from such assets.

We distinguish two categories of approaches to evaluating intellectual capital:

- *Deductive summarising approaches* rate the difference between a company's market value and book value. Some examples are indicators such as market-to-book value ratios, Tobin's q and Calculated Intangible Value (CIV). Such derived indicators evaluate the intangible assets in monetary form but either fail to explain or explain only partially the difference between the market and the book value. Therefore, from a knowledge viewpoint, they are not suitable as sole variables for operative and strategic control of a company.
- In contrast to deductive approaches, *inductive analytical approaches* describe and evaluate and aggregate components of intellectual assets with the purpose to arrive at an overall value. One such approach is an intellectual capital statement as an instrument for targeted presentation and development of intellectual capital of an organisation. It shows the correlation between the organisational objectives, the business processes, the intellectual capital and the success of the organisation and describes these elements by means of indicators.[3]

Sveiby (2010) has developed a somewhat wider systematisation summarised in ▣ Table 8.1.
In the following we will explain some of the approaches relevant for practice.

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3   ▶ www.akwissensbilanz.org

8.2.1 Deductive Summarising Approaches

«Market-to-Book Value» Relation

The simplest indicator of the value of an intangible asset is the difference between the market value and the book value. For companies listed on stock exchange, the market value can be calculated easily as share price multiplied by number of shares. The book value can be taken from the annual balance sheet. This happens under the assumption that everything that is not attributed to the book value is based on the components of intangible assets. Thus, if a company such as Microsoft is worth approximately 86 billion US dollars and the book value is approximately 7 billion US dollars, the value of its organisational knowledge base is 79 billion US dollars.

Though this calculation is easy, it is not very helpful because of the following three reasons (Stewart 1997):

- The stock exchange value changes rapidly and is not characterised by rational and suggestible factors. A 5% drop in the stock exchange price without any change in the book value of an asset does not mean that the value of knowledge base has reduced by 5%.
- A company's book value and even market value to a certain extent are set too low. Through extensive use of depreciation, the book value appears to be lower than its real value (keyword: hidden reserve).
- The informative value of the sentence «the intangible assets of Microsoft are worth 79 billion US dollars» is restricted. What can a manager or an investor deduce from this sentence?

Instead of considering the difference between market value and book value, it makes more sense to analyse the quotient that is obtained when market value is divided by book value. With this quotient, a company can compare itself better with similar competitors. If they operate in the same economic zone and are exposed to similar exogenous factors, a benchmark between different companies appears to be meaningful and informative. A diminishing market-to-book value quotient can be an indicator of a warning that enough investment has not been made in organisational knowledge base, maintenance of brand or development of an image and its transparent presentation.

Tobin's q

James Tobin, winner of the Nobel Prize for Economics, developed a quotient that relates market value of an asset to its replacement value. If $q < 1$, the market value of an asset, a building for instance, is lower than the replacement cost. As a result, the company will ensure that such assets are purchased or held as funds in as less numbers as possible. If $q > 1$, it means that the market value of the asset is higher than the replacement cost. This is particularly applies to knowledge or experts. A high value of q reflects the value of investment in technology and employees. If q is very high, e.g. $q = 2$, the use of this asset is considered to be very profitable. In this respect, q can be seen as a measurement for «monopoly return». The company gains high profits with such resources because it is the only one that uses them. Hence, q is also a measurement of inimitableness and sustainable competitive advantages. Thus, for example, a company can buy young

researchers «*at a good price from the market*». The company's ability to integrate and motivate these employees in a functional development team gives rise to technological solutions that are far too valuable than the sum of market value of individual researchers. Imagine the calculation of Tobin's q to get the value of a football team. Tobin's q can be calculated for the entire company as market value divided by the replacement value of fixed assets. The advantage of Tobin's q is that unlike the market-to-book value ratios, it neutralises the effects of different depreciation practices. The informative value of this indicator is highest if similar companies are compared over a longer period of time.

Calculated Intangible Value (CIV)

This evaluation method was developed by NCI Research (Kellogs School of Business, Stewart 1997) to encourage knowledge-intensive companies. Even here, the basic consideration is that a transparent presentation and financial evaluation of intangible assets should encourage the readiness to invest in knowledge-intensive companies. The approach is built analogous to rating of market value. While evaluating brands, if one assumes that instead of similar products, higher price can be achieved through the brands alone, then in case of calculated intangible value one assumes that companies that develop and use their organisational knowledge base in a better way, gain higher owned-capital returns than similar companies with a less developed organisational knowledge base.

While the deductive summarising evaluation manages to assign a value to the organisational knowledge base, they are – as aggregate values – not in the position to shape the cause-effect relation between interventions and changes in the knowledge base. Thus, this class of indicators is suitable only for strategic and operative control of a company from knowledge viewpoint. The inductive analytical method explained below is more suitable for this purpose.

8.2.2 Inductive Analytical Approaches

The analytical description and evaluation of different components of organisational knowledge base as well as other components of intangible assets structured by Sveiby (1997) under the term «*intangible assets monitor*», by Stewart (1997) as «*intellectual capital navigator*» and by Roos et al. (1998) as «*IC index*» or by Bueno et al. (2014) as «*Modelo Intellectus*». The concept of the Austrian Research Centre Seibersdorf (Leitner et al. 2000) has also found its way in creation of intellectual capital statement in Austrian universities. The Seiberdorf model inspired a «*Intellectual capital statement – Made in Germany*» and the European Intellectual Capital Statement (INCAS). In Denmark, approximately 20 companies created intellectual capital statements for a pilot project by following Sveiby's approach (Mouritson et al. 2001). Based on this, the Danish Ministry of Economics published «*The Danish Guideline for Intellectual Capital Statements*» (Danish Agency for Trade and Industry 2000).

Downloads of guidelines for intellectual capital statements

- «*Intellectual capital statement – Made in Germany*»: ▶ http://www.akwissens-bilanz.org/Infoservice/Infomaterial/Leitfaden_english.pdf
- The Danish Guideline for Intellectual Capital Statements: ▶ http://en.fivu.dk/publications/2001/a-guideline-for-intellectual-capital-statements
- European Intellectual Capital Statement (INCAS): ▶ www.incas-europe.eu/

There are some approaches that integrate financial as well as non-financial indicators into a complete system for operative and strategic control of the company. The most prominent representative is the «*balanced scorecard*» developed by Kaplan and Norton (1996). The *multi-stage indicator model* according to North et al. (1998) in particular tries to make the cause-effect chain visible and present the correlation between the financial and intangible resources.

The financial valuation of individual elements of intellectual capital statement is still in its early stages but is already practiced in a due diligence in Mergers and Acquisitions.

The following are some of these approaches that have gained importance in theory and practice.

Intangible Assets Monitor

Sveiby assumes that the market value of a company is made up of visible equity and intangible assets. Intangible assets are composed of components of «external structure», «internal structure» and «competence of the employees». The external structure contains relationships with customer and suppliers. The internal structure covers processes and technologies, in short, everything that remains when an employee leaves the company (Sveiby 1997).

The intangible assets monitor evaluates these elements of organisational knowledge base from the perspective of growth/renewal, efficiency and stability related to employees, internal structure, external structure. Sveiby set his approach to practice in a Swedish company Celemi, which develops and sells learning tools (cf. ◘ Fig. 8.2). From the aspect of their contribution to the knowledge base, the customers are divided in to three categories:

Image-enhancing customers who ease Celemi's task of acquiring new customers and reducing marketing costs come under the «external structure» category in the intangible assets monitor. *Organisation-enhancing* customers who demand «state of the art» solutions, who are relatively new for Celemi and promote development of new products, are posted under growth/renewal section of the internal structure. *Competence-enhancing* customers challenge the knowledge of Celemi's employee and stimulate a common learning process. These customers are posted under the growth/renewal section of the employees.

|	External structures	Internal structures	Employee competence
Growth/ renewal			
Efficiency			
Stability			

◘ **Fig. 8.2** Indicators of «intangible assets monitor» (Source: Sveiby 1997, p. 165)

However, this classification simultaneously brings forth the problem of limitations of indicators. One could argue that organisation-supporting customers should also be considered from the perspective of efficiency wherein, for example, they support just-in-time deliveries or zero-error quality and a 24-h service. In turn, the competence-supporting customer could also be classified under the growth/renewal section in the internal structure.

Intellectual Capital Navigator

Stewart (1997, p. 243ff.) suggested that companies should be evaluated under the same perspectives as mentioned by Sveiby and the result should be presented as shown in ◘ Fig. 8.3 – in a target-performance comparison. The indicators for human capital, structural capital (according to Sveiby's internal structure) and customer capital (the supplier relations are not considered) are shown in addition to the market-to-book value relationships. Three key figures are suggested for each of the latter three categories. However, Stewart does not differentiate between growth/renewal, efficiency and stability. Yet, he implicitly focuses mainly on the indicators of growth and renewal. Motivational measures are taken to create scales for every indicator in such a way that the target value in the graphical presentation rests on the arc. This diagram provides a simple target-performance comparison as a starting point for targeted intervention in organisational knowledge base.
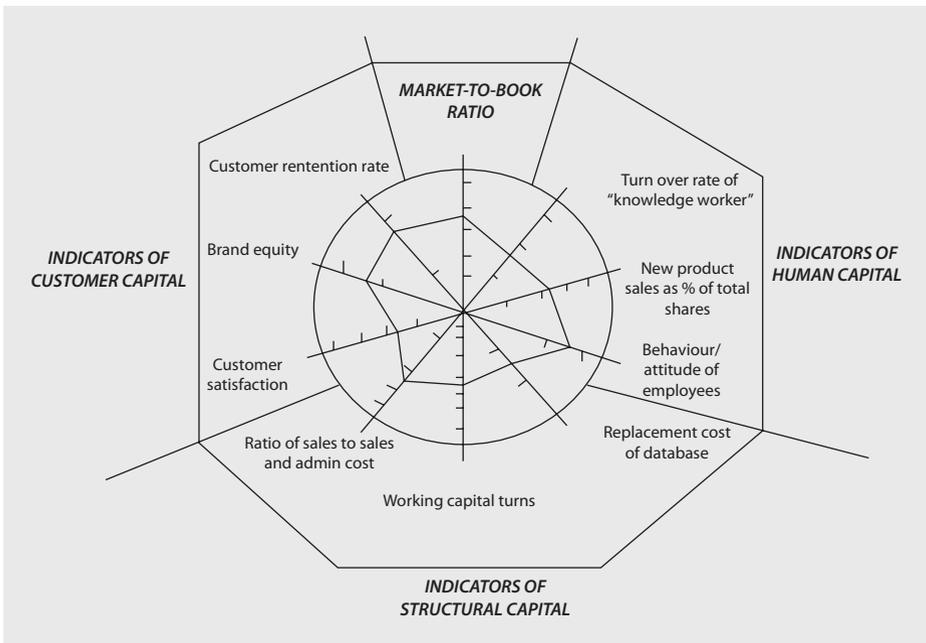
◘ **Fig. 8.3**   The «intellectual capital navigator» (Source: Stewart 1997, p. 245)
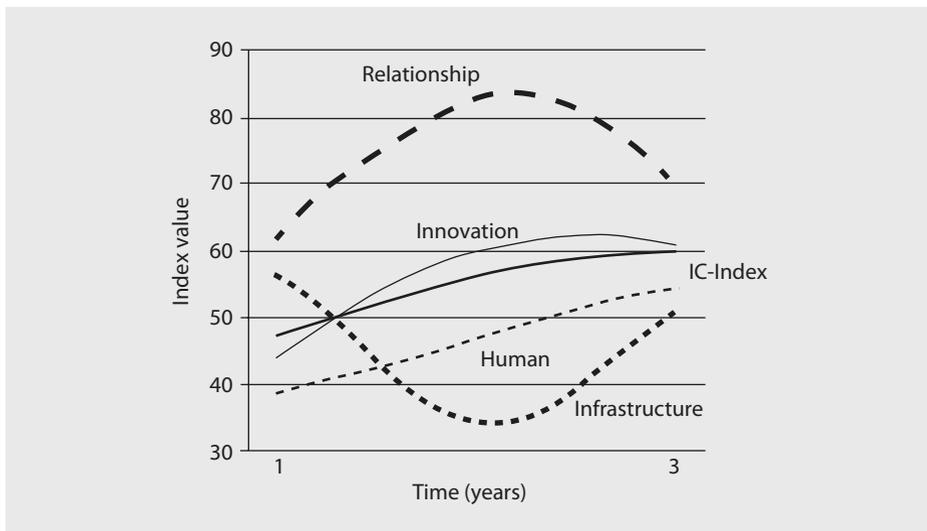
The Intellectual Capital (IC) Index

The IC index of Roos et al. (1998, p. 89) is based on classification of intellectual capital into relational, innovation, human and infrastructural capital. Indicators are built for each of these capitals. Analogous to the cost-utility analysis, they are weighed and aggregated – into an index and an IC index, and presented over a course of time. On the one hand, this presentation of intellectual capital takes into account the need for simplified key figures but on the other hand its significance is restricted only to new trends. Furthermore, the relative weightage of individual key figures is not based on concrete examples (see ■ Fig. 8.4).
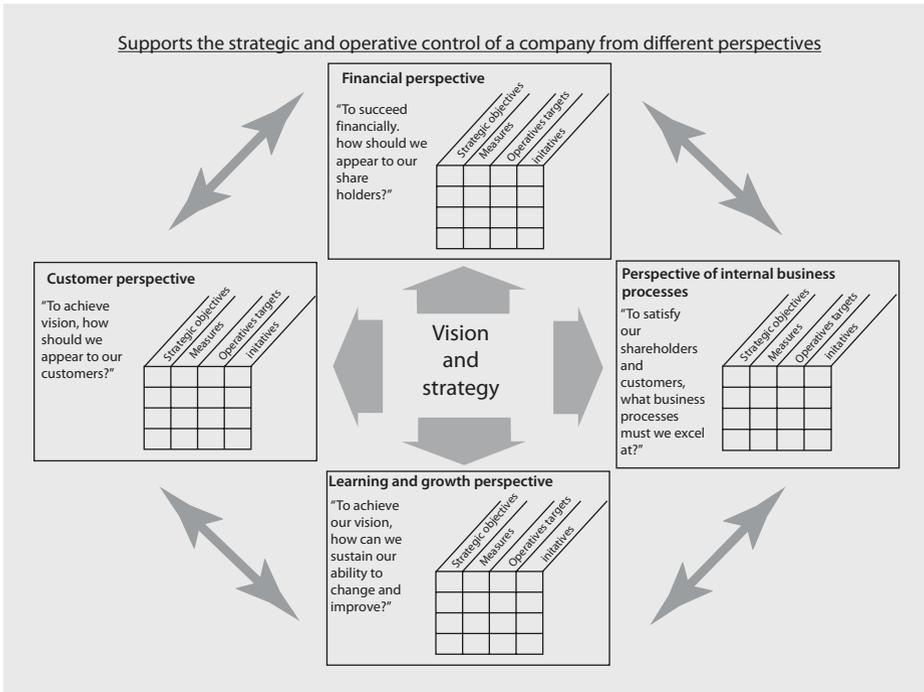
The Balanced Scorecard

The Balanced Scorecard developed by Kaplan und Norton (1996) is a result of one of the surveys in the USA supported by the KPMG auditing and consulting firm in order to increase the informative value of traditional financially-oriented key figures. The model (see ■ Fig. 8.5) views a company from four perspectives – customer perspective, financial perspective, perspective of internal business processes, and perspective of learning and growth.

The Balanced Scorecard is a strategic management system that can be used to support the operative implementation of a long-term strategy. Different perspectives of the company are not only juxtaposed but also shown in their cause-effect correlation. Strategic objectives, measurement categories, operative targets and initiatives are specified for each of the perspectives. Kaplan and Norton compare the balanced scorecard in their application with a flight simulator wherein a complex number of cause-effect rela-

■ **Fig. 8.4**   The «intellectual capital index» (Source: Roos et al. 1998, p. 89)

Fig. 8.5   Structure of Balanced Scorecard (Source: Kaplan and Norton 1996, p. 76)

tions of critical variables are considered that describe the flight-route as well as a strategy to reach a destination.

However, there is the awareness that every organisation should compile its own, custom-made and context-specific set of indicators in order to capture and control the dimensions that are relevant for them. Simultaneously, the Balanced Scorecard supports the dense connection of knowledge objectives and knowledge measurement which will ideally lead to fast feedback processes.

InCaS Intellectual Capital Statement: Made in Europe

Based on the Austrian methodology (see case on p. 256) the German Federal Ministry of Economics and Labour supported the trial of a methodology called «*Intellectual capital statement – Made in Germany*» which was then tested and adapted in the European context by pilot companies. The «*Intellectual capital statement-*»[4] developed is considered as an instrument for medium-sized enterprises to present their intangible assets in a structured form and evaluate these assets. As an instrument for strategy development and organisational development, the intellectual capital statement allows systematic deduction of measures for optimised internal controlling of business processes. As an instrument for external communication, the intellectual balance sheet

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4   Further information under ▶ www.akwissensbilanz.org
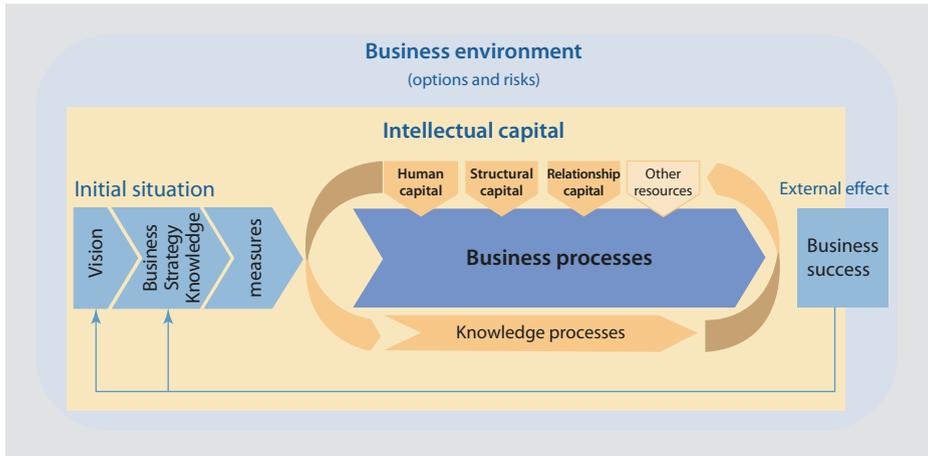
◼ **Fig. 8.6** The intellectual capital statement model developed by the Intellectual Capital Statement Project Group (AK-WB)

facilitates the decisions pertaining to banks and investors for instance, because future potentials of the company are made transparent.

The intellectual capital statement comprises intangible assets in form of human capital (employee competence, employee behaviour), structural capital (IT, intellectual property, organisational culture, process organisation etc.) and relational capital (relationships with customers, suppliers, others partners and public).

◼ Figure 8.6 shows the intellectual capital statement model. The statement starts with the initial situation of vision and strategy of the organisation and gives an overview of options and risks in the business environment. From this, the organisation derives a range of measures on how it wishes to position itself according to the different dimensions of intellectual capital, namely human, structural and relational capital.

The interaction of business and knowledge-based processes, together with the other tangible and financial resources which are not observed in the intellectual capital statements, leads to business success. From this result, the organisation draws conclusions for the future which can lead to changes in visions and strategies. The knowledge gained from the intellectual capital statement on the knowledge processes and the relevant resources make it easier to derive measures in a new cycle and to facilitate the sustained orientation of the organisation.

The complete intellectual capital statement is created using five steps with four milestones:

- *Milestone I* presents the intellectual capital statement in its simplest form. Three steps are needed to achieve this milestone: assessing the initial situation relating to business environment and strategy, recording intellectual capital, and self-evaluation of intellectual capital. The target group of Milestone I is the management of the organisation which can define measures for improvement on the basis of the results.
- *Milestone II* targets the same group but goes one step further in supporting self-evaluation with indicators. Thus, self-evaluation is given further concrete form and supported using facts. The collection and assessment of indicators is, at the same time, preparation for internal or external communication.

- *Milestone III* provides a processed document or a presentation of the organisation's intellectual capital. It is tailored for a specific (external and/or internal) target group and describes the most important information attractively and in a structured form.
- *Milestone IV* works out a full intellectual capital statement which is also suited to monitor the organisation. It integrates amongst other things correlation analyses and assessments which provide information on where the measures should be initiated in order to optimise business success.

The first draft of the intellectual capital statement is best implemented in a cohesive step-by-step project over a period of between 4 and 12 weeks. Different time allocations can be calculated for the effort, depending on the initial situation and number of individuals involved. As a minimum, Milestone I demands an effort of half a work-month. Up to three work-months can be required for full implementation up to Milestone IV. The goals pursued with the intellectual capital statements should always be synchronised with the milestones. This makes it possible to implement the intellectual capital statement in a cost-effective, result oriented and step-by-step manner.

Danish Guideline for Intellectual Capital Statements

Following a 2-year research project, Danish Agency for Trade and Industry published the first «*Guideline for Intellectual Capital Statements*» in November 2000.[5]

The intellectual capital statement begins with a *knowledge narrative*. Based on the customer requirements, the *use value* of a company's product is presented to the customer. This gives an idea of the extent to which the features of the product, that create value for the customer, depend on the company's intellectual capital.
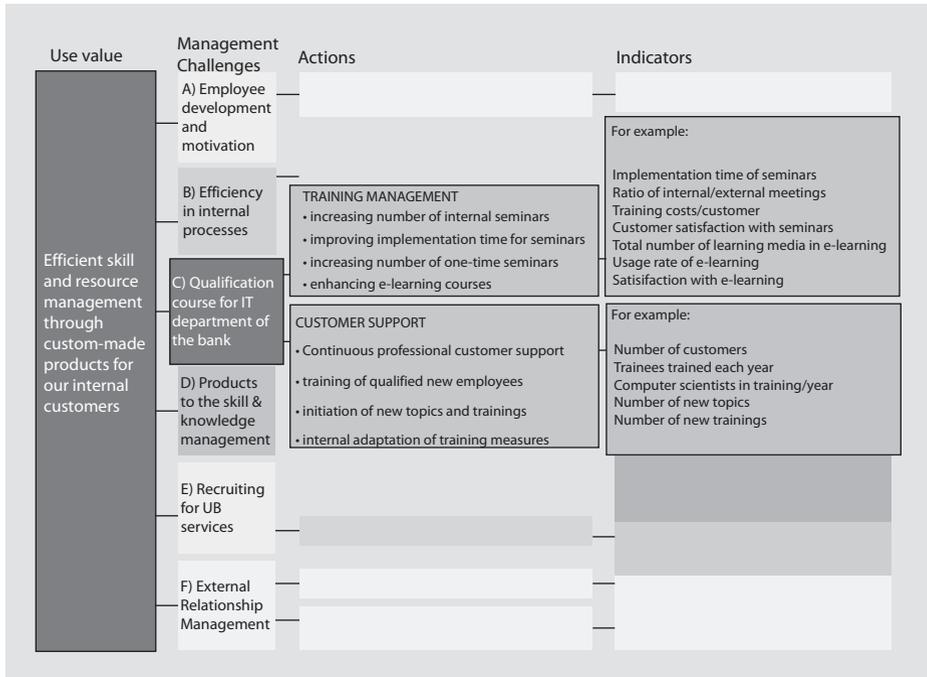
This future knowledge-oriented strategy is subsequently broken down in a set of different objectives – *the management challenges*.

In the third step, *actions* are derived from such challenges. Actions are operative measures necessary for achieving knowledge objectives. In order to make their effect measurable with reference to the set objectives, actions are supported with *indicators*. The development of the intellectual capital in the previous period can be read and new goals can be set for the following period from the realisation level of the ascertained goals.

The findings of these processes are interpreted in the intellectual capital report and presented to the internal and external target groups in different details.

The implementation of these process components within IT skill resources is shown with examples in ◙ Fig. 8.7. Based on the guidelines, certain goals, measures and indicators were defined with the respective team leaders. Finally, 84 different key figures were measured considering two deadlines. An intellectual capital statement is divided into human capital (objective A), structural capital (objective B) and relational capital (objective C with F) along the formulated objectives. In order to achieve the objective of «qualification courses for the IT area of the bank», it is necessary to take different measures in the field of training management and customer service (cf. ◙ Fig. 8.7). They are

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5   Danish Ministry of Science, Technology and Innovation (Hrsg.) (2002), "Intellectual Capital Statements in Practice – Inspiration and Good Advice", p. 3. ► http://www.videnskabsministeriet.dk/fsk/publ/2002/intellectualcapstatements/intcapst.pdf [15-08-2002].

Use value	Management Challenges	Actions	Indicators

Efficient skill and resource management through custom-made products for our internal customers

A) Employee development and motivation

B) Efficiency in internal processes

C) Qualification course for IT department of the bank

D) Products to the skill & knowledge management

E) Recruiting for UB services

F) External Relationship Management

TRAINING MANAGEMENT
• increasing number of internal seminars
• improving implementation time for seminars
• increasing number of one-time seminars
• enhancing e-learning courses

CUSTOMER SUPPORT
• Continuous professional customer support
• training of qualified new employees
• initiation of new topics and trainings
• internal adaptation of training measures

For example:

Implementation time of seminars
Ratio of internal/external meetings
Training costs/customer
Customer satisfaction with seminars
Total number of learning media in e-learning
Usage rate of e-learning
Satisfaction with e-learning

For example:

Number of customers
Trainees trained each year
Computer scientists in training/year
Number of new topics
Number of new trainings

◼ Fig. 8.7   Implementation of Danish guideline for IT skill resources department of a bank (an extract)

measured by means of the described indicators and evaluated within the intellectual capital statement. By means of this intellectual capital statement, it is possible to read the development of intellectual capital of a unit over the course of time as well as with reference to the goals set for oneself.

Case Study

Intangible Assets Monitor Applied to a Cricket Team

Let us consider the intangible assets of a first division cricket team. Firstly, the players of the team are the employees that gain a market value by their transfer fee and success in the game in the ongoing season. The players not only have an individual value as «*experts*» but also as a team. Furthermore, a value can also be assigned to the trainer as an employee as well as to the assistants etc. who could also be described in the internal structure and processes (guiding processes, team development processes) and can be quantified admittedly with some difficulties. Externally, the customer and relations with (loyalty of the fans) have a high value.

8.2.3   The Multi-stage Indicator Model

The model developed by North, Probst and Romhardt (1998) is composed of a multi-stage indicator system that separates the indicators of knowledge base, interventions, transfer effects and results of business activity. This model (◼ Fig. 8.8) shows how
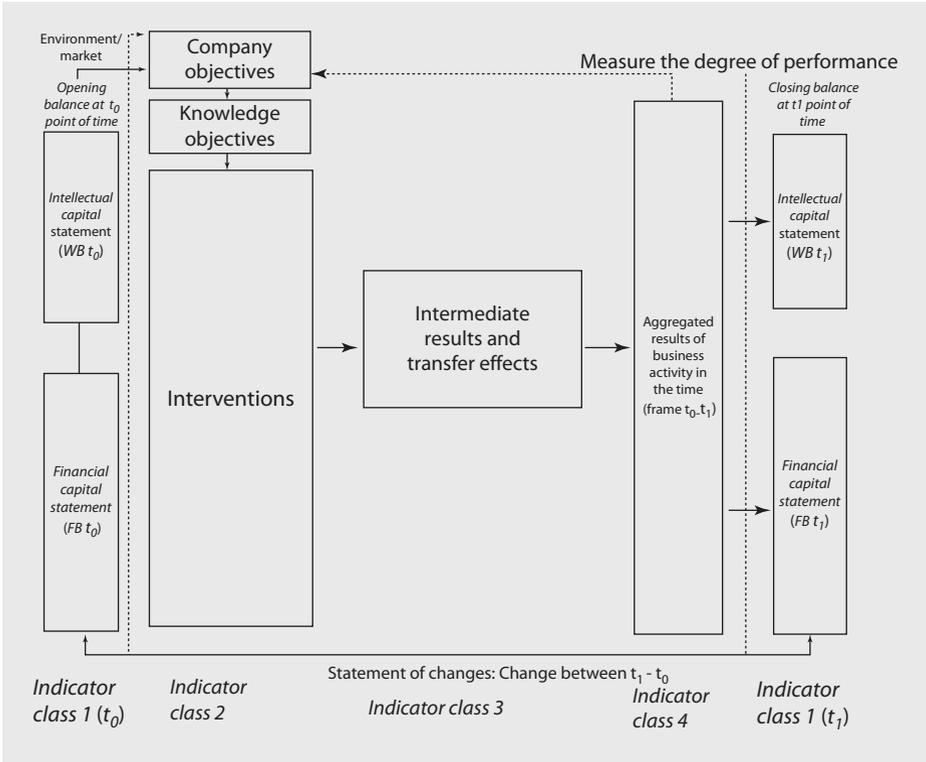
▢ Fig. 8.8   Process of measuring and transforming knowledge

company objectives can be achieved through targeted interventions in the organisational knowledge base and whether the results can be measured/can be made measurable.

Considering our processes of measuring knowledge, there are four classes of indicators.

- *Indicator class 1* describes the organisational knowledge base.
- *Indicator class 2* describes inputs and processes as measurable factors of interventions for changing the organisational knowledge base.
- *Indicator class 3* measures intermediate results and transfer effects.
- *Indicator class 4* measures financial as well as non-financial results.

Using this model, it is possible to create a cause-effect correlation and measure changes in the organisational knowledge base with reference to business results.

We will use the aforementioned indicator system to explain the following example of a case study of a home and savings association.

Case Study

Intellectual Capital Statement of a Home Loan Bank

■ **Initial situation**

A home and savings association with 800 part-time external staff wishes to improve customer service and contract contingent for two of its most popular construction-financing products by introducing an expert system built on modern information and communication technology. For this purpose, the following company objectives should be operationalised:
- Improved quality of advice,
- Lower cancellation rate,
- Higher premium volumes
- Reduced consulting expenses

The intellectual capital statement at the beginning of the business year, (time T_0, indicator class 1), shows for the employees a training level between secondary school (two third of employees) and school leaving examination, with subsequent administrative training (one third of employees), conservative attitudes that confront the use of experts system sceptically in absence of customer, a high variance of product competence measured through self-evaluation and a competence for using information and communication technology that is marked by the dominance of the popular windows applications.
In the internal structure, the process of advising and closing deals are less structured and supported rudimentarily by information and communication technology. The ICT structure is characterised by individual laptops of external advisors who have not yet been linked and do not have access to a central server. In the external structure, the customer relationships are affected not only by ample loyalty but also by a certain amount of dissatisfaction over the lack of ability of the external staff to provide information.

■ **Actions**

The following interventions (indicator class 2) were made in the organisational knowledge base for achieving the knowledge objectives:
- An expert system was developed.
- 800 PCs of the field staff were made capable of multimedia.
- In 3 days, all the 800 external staffs were trained to use the new software and the changed method of desired customer dialogue.
- Over a year, the competence of the field staff in dealing with the new software and the desired behaviour towards the customer was improved in a coaching process wherein the regional groups shared their experiences.

At this level of intervention, the indicators measure the input that can also be expressed in monetary form. In our example, the input indicators appear as follows:
- Development of software: 16 employee months, information and communication inputs, and creation of a CD-ROM.
- Upgrading the PCs: 800 multimedia upgrade sets for laptops.
- Training: Cost of trainer, cost of rent of premises/logistics, unpaid investment of external staff, 3 days of training $\times$ 800 – 2400 employee days and coaching user groups: X days experienced coach.
- Travelling cost, logistics and 800 external staff.
- Unpaid expenses of external staff: 4×0.5 days $\times 800 = 1600$ days.

■ **Intermediate result**

The intervention in the knowledge base of a company creates measurable intermediate results (indicator class 3) of quantitative and qualitative form. We can describe them as follows: Availability of expert system across the group, 760 external personnel passed the counselling interview with test-customers successfully, 20 employees were retrained and 20 others were rejected because they were not willing to work or were incapable of working with the expert system. The third quarter of the year witnessed an increase in business volumes and reduction in contract cancellations. In their own log sheet, the external staff recorded reduction in time taken by them to close a deal.

The following business results (indicator class 4) were seen at the end of the business year (T_1):

━ Business volume increased by 15% but volume per employee increased only by 17.5% because the rejected external employees were not replaced.

━ External product testing of home and savings association and insurance companies reveals an improved image and a higher customer satisfaction with the qualit y of advice.

Thus, the set company objectives are achieved. The change in organisational knowledge base is reflected in the year-end intellectual capital statement (final balance sheet). The external staff confronts the multimedia-supported deals and customer dialogue positively. They have improved their product competence for selling products A and B. Simultaneously, they have also improved their competence pertaining to information and communication technology. The value of the internal structure has increased by PC upgrades, information and communication structure and improvement in processes of customer counselling and closing deals. But none of these processes can be evaluated detached from the employees. However, employee experience is documented and codified in an expert system so that it is possible to train new employees quickly. This «shortened learning curve» accelerates the growth process of the company. The changes to the external structure refer to an improvement in the customer relations by increasing customer satisfaction and gaining new customers (15% increase in volume refers to new customers). The value of the brand increases due to the image of the company as a modern service provider. These new customer relationships can also have financial implications, e.g. increase of value of a customer of a home and savings association.

8.2.4 Evaluation of IC Reporting Approaches

Which conclusions can be drawn from the explanation of the IC reporting models above?

There is no *one* particular model yet for accounting the intellectual capital because each approach has strengths and weaknesses. The weaknesses particularly refer to standardisation and objectified methods as well as informative value for internal and external target groups (see also Veltri and Bronzetti 2015).

All the models evaluate intellectual capital with the help of a set of indicators as opposed to aggregated key figures and present cause-and-effect relation to a certain extent. Thus, the models prove to be advantageous for evaluating internal processes are of limited value to an outsider.

The present communication of results is a central aspect of IC reporting because companies publish Intellectual Capital Reports willingly without any statutory provisions. Thus, today many companies balance their intellectual capital to position themselves externally as an innovative company rather than for internal purposes. Accordingly, there is a lot of interest in presenting positive results. Intellectual capital statements may be a marketing instrument in danger of «window dressing».

The size of the company is a restrictive factor. Today, primarily smaller companies or units are balancing their intellectual capital. The desire for objectivity incorporates a number of objectives, success factors, data clusters and correlation between these elements in the analysis. Therefore, the models should be oriented at smaller units within this company.

Publishing sensitive, internal data has a negative effect on competitive advantages of a company. Often, the extent of this effect goes unnoticed. The field of innovations itself comprises this aspect that clearly pleads for a differentiation between creation of internal and external reports. Even if the necessity for such differentiation is mentioned in the model, it does not provide any approaches for a concrete course of action. Hence, there is a risk that the published balance sheets would include only those values that have little informative significance or would have been derivable anyway from other sources. This would contradict the original approach of uncovering hidden assets which use knowledge accounting and are largely responsible for creating explanatory gaps between market value and book value of a company.

Even the investors should make themselves familiar with this new type of capital and its accounting. This is because the intellectual capital statement is actually generated only if it is read and interpreted by management and investors correctly. The present debate on the implementation of new rules for lending by banks offers a big chance of bringing the topic of intellectual capital statement out in public. The Brazilian Development Bank BNDES, for example, evaluates Intellectual Capital and intangible assets to determine prospects of competitiveness as a basis of giving major loans. The extent of success in developing transparent, comparable and significant levels will decide whether the intellectual capital report will find its place or will remain purely a marketing instrument.

8.3 Protecting Knowledge

8.3.1 Loss of Knowledge: The Organisation Forgets

As a result of the measurement of Intellectual Capital, companies are often more aware of what significance is being assigned to their intangible assets. Companies often wonder about ways to protect themselves against complete loss or loss in value of knowledge as well as prevent or reduce knowledge-related risks. As we have seen in the previous chapters, knowledge lives in the brains of employees, is stored as information in the respective systems, takes a concrete form in processes as well as technologies and is legally safeguarded by patents, licences and corresponding contracts.

The dilemma of knowledge protection and knowledge sharing is of particular interest in a increasingly networked economy (Hurmelinna-Laukkanen and Tarkiainenen (2011). The conflicts between the two are easy to pinpoint: if certain intangibles are protected against copying and imitation, the firm is typically not willing to let others use those assets freely, and certainly not without compensation. Moreover, many protection mechanisms inherently make knowledge exchange impossible or highly difficult, and firms relying on those mechanisms are often bound to keep the knowledge within the firm – whether they want it or not. On the other hand, the firm can choose

to provide other firms with an access to its knowledge assets, in which case it typically needs to put keeping secrets aside. Networking and collaboration for innovation presents one area, where knowledge exchange is imperative for reaching the wanted outcomes.

Considering the chances of an enterprise to reap profits from its know-how, the first thought is that it should reach the position of the sole beneficiary of the knowledge assets – or at least being the one to control the use of these assets. In other words, appropriability mechanisms should enable keeping certain technological or operational advances secured from the use of anyone else. Intellectual property rights (IPRs) are by definition designed to protect intellectual creations and aim at granting the creator the rights that provide certain ownership over the intangibles and at fostering diffusion of ideas and further innovative creations IPRs create barriers against harmful imitation. However, intellectual property protection is only one among many barriers to imitation.

The knowledge asset can suffer damage either because it is lost due to changes of employees and employee teams or because it loses its value due to innovations. The effect of loss of knowledge and unavailability of knowledge are similar. ◨ Figure 8.9 describes the forms of knowledge loss based on individual and collective loss of employees as well as loss and unavailability of electronically stored information.

Mode \ Type		Individual	Collective	Electronic
Memory has been deleted		❏ Termination ❏ retirement ❏ death ❏ …	❏ dissolving adjusted teams ❏ reengineering ❏ outsourcing functional areas	❏ Irreversible data loss through: ❏ virus ❏ hardware errors ❏ system crash ❏ insufficient back up
	Limited	❏ overload ❏ transfers ❏ illness/vacation ❏ inadequate training ❏ service according to regulations	❏ making taboo of routines ❏ collective sabotage	❏ reversible data loss ❏ overload/limited ❏ interface problems
	Permanent	❏ overload ❏ no awareness of importance of own knowledge ❏ inner termination	❏ sales of company divisions ❏ migration of teams ❏ …	❏ permanent incompatibility of systems ❏ overload/permanent ❏ wrong codification

◨ **Fig. 8.9** How do organisations forget? (Source: According to Probst et al. 1997, p. 311)

8.3.2 Ways of Safeguarding Knowledge

A company can protect itself from loss or devaluation of knowledge by taking three types of measures – employee-related, technical and legal.

Employee-related measures establish conditions to ensure that qualified employees are retained in the company, knowledge is constantly passed on to colleagues and as far as it is relevant, continues to be available even after an employee leaves the company. The value of employees' knowledge can be safeguarded by continuous training and development combined with practical application of knowledge. Furthermore, knowledge can be safeguarded by identifying key employees and evaluating the value of their knowledge for the company. Employees should have a feeling that their knowledge is at least as valuable in the company as outside. This not only involves matters of compensation but also handling competent employees in the company and their job and labour facilities. Allocating positions at the right time, familiarising new employees with the work and using valuable knowledge of employees after they leave the company are some other ways of preventing loss of knowledge.

Systematic transfer of knowledge to the next generation of employees has gained a lot of importance, especially against the backdrop of demographic development.

The following are some principles that should be considered during knowledge transfer:

- *Motivation*: Senior management should highlight the need and trigger and control the process of sharing knowledge across generations of employees.
- *Recognition*: Reward successful knowledge transfer by way of monetary incentive if need be or in target-setting for present and newly recruited employees if necessary.
- *Involving in work groups*: Organise the tasks in such a way that an experienced employee is included in a work group, mentoring or shadowing concepts are helpful.
- *From push to pull*: Do not ask the leaving employee to «*just write everything down*» and push-out his knowledge. Instead, ensure that successors may pull relevant experience.
- *From managing to advising*: Use the experience gained by working on projects to provide advice to new project teams. For example the construction manager will step aside sometime before retirement and become a consultant of the construction team.
  - *Future-orientation*: In a fast changing business environment many past experiences are not longer relevant in the future. Rather address questions like: What would you have willingly implemented if you had time? What potential business strategies do you perceive?
- *Integration in business processes*: Make knowledge transfer an integral part of daily business by defining clear organisational measures.

Volkswagen's Knowledge Relay

With the knowledge relay, the experts of the Volkswagen's knowledge management team have developed an instrument that ensures optimum transfer of specialist, expert and project knowledge to the successors and assures valuable learning to the company. Custom-made expert interviews are the main highlight of this process. They are organised, moderated and documented by a team of specialists so that the participants can concentrate completely on communicating and receiving knowledge. Three different methods were developed under knowledge courier. The first method for change in discipline focuses on transfer of specialist knowledge, the second method for change in leadership emphasises transfer of «relational knowledge» and experience, and the third method for project closure is based on identifying the lessons learnt.

The course of such methods is explained below with help of an example of change in leadership:

The quality assurance manager at VW plant in China was just about to retire. His successor, who came from a managerial position of another company, should give his best in this new position – but how? A new company, a new plant, new colleagues and a predecessor who was about to retire were all waiting for him. VW plant wanted to retain the knowledge of their long-tenured quality assurance manager within the company. His experience primarily comprised important contacts, experiences, processes and organisational procedures.

A handover session was organised between the predecessor and the successor as well as between the successor and his seniors. The session helped the participants to get to know each other, exchange experience, build trust and establish a positive relation. This dialogue was designed and prepared very well by the specialists beforehand. By means of a subject catalogue and support of advisors, the predecessor and successor decided inde-pendently over topics that were important from their perspective and about which they wanted to talk to each other. The successor invested five evenings with advisors of Volk-swagen management to filter out questions that were important for him and to identify the persons to whom these questions were to be asked. They worked with mind maps. A tree was generated from each topic and every branch corresponded to a sub-topic, a question. The questions were checked for redundancy and it was ensured that the questions were not repeated. The actual handover discussion not only included numbers, organigram, quality and budget but also involved important key persons or dealing with a secretary. A one-day seminar – a Transition Workshop – was held with the new manage, the outgoing manager and all employees. This created a foundation for interaction between the new management and the employees. The employees bombarded the new comer with ques-tions like «How do you encourage your employees?» or «What is unacceptable to you?» In doing so, the new comer could learn something about his team. Supported by a competent moderator and coupled with knowledge of the predecessor, the successor managed to make an optimum start in the new role. In case of a change in discipline, the knowledge management team calls for IT-supported documentation in addition to personal interviews and expert interviews.

Source: ► www.volkswagen-coaching.de

The second form of safeguarding knowledge is using *technical systems.* Elements of explicit knowledge can be stored as information in the databases such as project pro-file, customer contacts, presentations, etc. Furthermore, knowledge of employees becomes an integral component of processes or technologies. Knowledge becomes explicit and is given a concrete form as employees contribute in increasing productiv-ity and quality in continuous improvement processes. Technical systems are capable of

storing explicit knowledge. Implicit knowledge takes a concrete form in the behaviour of employees. Technical systems are also suitable for controlling selective access to information, laboratories, buildings, etc. thus allowing only specific employees to access information and knowledge. Thus, information and knowledge are protected from unauthorised use.

Knowledge is *legally protected* by patents, license contracts, franchising contracts or know-how contracts of external knowledge bearers with alliance partners, suppliers and customers. However, contracts alone cannot provide complete protection against loss of knowledge as knowledge is held by employees who perceive it as power. The loss of implicit knowledge caused by leaving employees is generally more significant than the loss caused by the illegal transfer of documented explicit knowledge. Generally, legal safeguarding protects companies against imitation only for a certain period of time and ensures exclusive use of innovation for this period. Patents have less importance in industry sectors having a very high rate of innovation such as electronic industry, as against pharmaceutical or chemical industries which have long development time frames and product lifecycles.

Harvey and Lusch (1997) suggest a security plan for intangible assets similar to the one for tangible assets. Such a plan should analyse and find out which knowledge losses are most consequential for a company. Based on this, it is necessary to determine preventive options of knowledge protection and execute them systematically. Among other things, Harvey and Lusch suggest that the company should think about how much they spend on protecting their tangible assets considering the value of these assets and they transfer this percentage even on the intangible assets. This approach can contribute to the awareness that the intangible assets of a company should be protected as much as tangible assets. It is also advocated to create the role of an «intangible assets risk manager».

Case Study

Better Use of Patents at Dow Chemical (Petrash 1996)

Dow manufactures approximately 2000 chemical products in 15 business units over 40 joint ventures worldwide. With a turnover of approximately 20 billion US dollars (of which approximately 1 billion goes in R&D) and about 4000 employees, Dow owns approximately 25,000 patents and spends about 30 million US dollars every year for patent management. Because of inadequate overview of the patents, Dow set a goal of using its patent know-how in a better way and developing it systematically. Dow chose the following procedure for this purpose:

1. *Creating patent portfolio for every business unit*: Identify all the patents. Find out whether they are still active. Find the business unit that gains benefit from the patent or sponsors it (i.e. bears the costs related to the maintenance of the patent).
2. *Rating the use of patents*: Rate the patents as per the criteria such as «is used», «will be used», «will not be used» etc. Take decisions pertaining to the patents belonging to the categories «will not be used», «abandon patents», «search possible licence numbers», etc.
3. *Integrating the patent portfolios in the company strategy*: Check how the existing patents can be integrated in the business strategy in order to use the knowledge optimally. Identify «know-how gaps» that arise while implementing the business strategy. Think how the missing know-how can be obtained externally or developed and stored internally.

4. *Supporting the strategy by reviewing technology and conducting technological analysis of competition*: Estimate the value of the existing patents and the possible cost of purchasing external know-how or developing the know-how. Systematise the patents as per technological criteria and conduct a technological analysis of the competition (Dow uses a «patent tree» for systemisation).

5. *Investments in the patent portfolio*: Decide about acquiring and developing additional know-how according to the points 3 and 4. Use the «not required» patents existing externally (waiver, licensing). Since many of the «not required» patents have a little value, Dow took the path to abandon these patents by bestowing them on universities and similar institutions so that they can perhaps be used in such institutions.

6. *Managing the patent process*: Install decentralised responsibility for the patent management. Dow has launched over 75 «*Intellectual Asset Management Teams*». These teams are responsible for managing patents at the business unit level. The management of different functional areas of a business unit meets 2–3 times every year to discuss about improving the patent process and using patents. This team of managers is lead by an Intellectual Asset Manager.

7. *Supporting the decentralised patent management by a central technology management*: Through a tech-centre, Dow supports the decentralised activities of the developing technology by systematising knowledge as per the themes, building networks of experts, updating information systems, conducting training and advance training and supporting the decentralised patent management process. Furthermore, the tech-centre should plan and systematise the business strategy keeping the development of «intellectual assets» in mind.

As per the information provided by the company, the improved patent management has yielded over 40 million US dollar to the additional capital and reserve for the business areas until now.
Source: Petrash (1996), S. 365–373

8.4   Key Insights of Chapter 8

— With the increasing sensitisation for the importance of knowledge as a resource, the companies are looking for options for describing and evaluating knowledge and measuring the excellence of a knowledge-oriented management process.

— There are a number of approaches to structuring and evaluating intellectual capital. The «one best method», however does not exist. The implementation of these new approaches in practice is impeded not only by concrete description of organisational knowledge base of a company but also by lack of available of data.

— It is not possible to create a universally valid set of «ten most important knowledge indicators». Each organisation has to define organisation-specific and context-specific indicator systems.

— A company can secure itself from loss or devaluation of knowledge by means of employee related measures, technical systems and legal measures.

8.5   Questions

1. «What can be measured is not always important and what is important cannot always be measured». Discuss this in the context of intellectual capital reporting.

2. Traditional lending models look for a history of profitability, tangible assets and a reasonably predictable business environment. Knowledge-based businesses do not fit this paradigm'. Discuss.
3. Which components of intellectual capital are usually considered in intellectual capital reporting?
4. Identify the major knowledge assets/components of intellectual capital in an educational institution/university/business school and indicate why you consider them to be assets
5. What can an organisation do in order not to lose important knowledge?

8.6   Assignments

1. **Intellectual capital reporting**
   Establish an outline of an intellectual capital report for a business school based on the INCAs- methodology.
2. **Intellectual capital risk management**
   You have been assigned the new position of «Intellectual capital risk officer». Your mission is to identify risks to loss and devaluation of intellectual assets and propose preventive measures.

You are asked to develop an action plan

8.7   KM-Tool: Knowledge Inventory

❓ What is a knowledge inventory?
A knowledge inventory is a form of stock taking used to identify and locate knowledge assets around the organisation. This includes the explicit and the very difficult to locate tacit knowledge sources. We suggest that the inventory be focused on specific topic and knowledge areas; for example «What do we know about customers, where is this knowledge located? How and where is it available?»

❓ Why use a knowledge inventory?
  - Provides a mapping or quick overview over your existing knowledge assets
  - Identifies gaps («What we should know and do not know»)
  - Gives us hints hoe to improve availability and accessibility of knowledge
  - Can be a preparation for a more elaborated intellectual capital reporting

❓ How to develop a knowledge inventory?
1. Demarcate a clear topic area (e.g. products, technologies, processes, customers, etc.)
2. The best way to make a comprehensive list of knowledge sources is to segregate it by explicit and tacit knowledge.
3. Some of the questions you might want to ask when **identifying explicit knowledge sources** are:

- What explicit knowledge already exists? – Categories of documents, databases, intranet libraries, links etc.
- Where this knowledge is located? – Locations in the organisations and the various systems that house the information.
- Access and Organisation – How is the knowledge structured and how easy of difficult is it for people to locate this information, and do they have access to it as well.
- Purpose and relevance – why does the information exist? How relevant is it to the users?
- Usage – who uses them? How often?

Identifying tacit knowledge sources is an entirely different proposition. Unlike explicit knowledge, tacit knowledge is much more difficult to quantify. Though there are a few questions you could ask to create a rough map of where it exists.
- Who we have – The numbers and categories of people working in the organisation.
- Where they are – Identifying where people are located is extremely important when building a tacit knowledge map
- What they do and what they know – job profiles, expertise areas and so on.

The above questions should give you an excellent place to start collating the list of knowledge sources you have in your organisation. Once this is done you can move on to the next step of identifying the gaps after comparing this information to the information you've garnered from the knowledge audit.

Source/link: ► http://itsallkm.wordpress.com/2007/03/12/what-is-a-knowledge-inventory/

► http://www.kmtalk.net/article.php?story=20060905001530455

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