

CAT MODEL FOR COMPLEX EVALUATION OF ORGANISATIONAL MATURITY IN SMALL AND MEDIUM ENTERPRISES

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Abstract

This paper deals with the need to complexly evaluate maturity, management, stakeholder relationship and resources utilisation of an organisation. It searches for an assessment tool independent on time and industry contexts. The research was conducted in two phases. The literature review on a set of existing performance models did not find any suitable tool. Based on that, a new performance model was created to assess the maturity of an organisation, focusing on soft factors like its leadership, processes and culture. It had been tested using structured interviews with managers in Czech, Slovak, German and Chinese companies. The model is based on a set of 17 non-financial criteria, divided into categories Management, Stakeholders and Resources. The results are given for each criterion, category and as an overall score. This article briefly describes the developed CAT model, methodology of its creation and validation and explains how it can be applied as an assessment tool. Its results can be benchmarked among different organisations/overtime to track development progress.

Implications for Central European audience: This model gives both practitioners and researchers a lean, yet powerful tool to evaluate the maturity of an organisation with structured and measurable results. The new possibilities for quantitative research using the CAT model are now available for researchers to assess even larger samples of organisations with reasonable effort. For practitioners, the value is in a quick discovery of own weaknesses/strengths with structured results and recommendations. Model structure and selection of respondents ensures that the results are measurable and cover views of both management and employees.

Keywords: maturity; assessment; benchmarking; performance model

JEL Codes: L26, L10, M14

Introduction

The maturity level of an organisation is an essential part of future success, regardless if it is a company or non-profit organisation. Most organisations strive to improve the efficiency of strategic changes implementation as they are weak at realising a change (Balogun & Hope Hailey, 2004; Neely et al., 2002, and others). Neilson et al. (2009) cite a Booz & Company survey on 1000+ companies, where out of 125 000 employees, 60% themselves admitted

their companies are weak at change implementation. So how to help companies to adapt in order to survive?

Scholars generally accept the influence of organisational maturity on a performance (Belt et al., 2009; Dijkman et al., 2015, among many others). In our focus are also other soft factors like company culture, leadership, stakeholder relationship and resources utilisation. The extent and direct link of this influence are discussed (Kotter & Heskett, 1992; Ogbonna & Harris, 2000; Peters & Waterman, 1982; Danso et al., 2019.) The complex set of factors having a direct or indirect influence on a company success will be in the paper called Maturity. We accept a definition of an organisational maturity by Nenadál (2016, p. 206): "*The maturity of management system indicates such a state (level) of a managerial system in a certain organisation that enables long-term over-average and effective fulfilment of all stakeholders' requests*". Having accepted that maturity and (directly or indirectly) other factors have an important influence on the long-term performance, are we capable of measuring them?

The goal of the study was to find a tool or performance model, which describes the soft factors in terms of qualitative, computable, but non-financial evaluation to give valid feedback to the organisation's management and owners. There are numerous performance models or financial analysis models already in place. Our focus was not laid on financial models. Although we acknowledge that financials are the ultimate result of company performance, management and processes, they still have certain drawbacks, analysing historical data instead of being predictive among the most serious ones. Among others (Hálek, 2016, p. 9-10) states that "*In a global environment, where a major part of a business operates in an international environment, financial indicators seem insufficient, because for the most part they are historical indicators and do not reflect future developments*". Therefore, the focus was on performance models and management techniques. The aim was to evaluate the maturity of an organisation. The result of evaluation must be delivered in numerical, comparable terms, focusing on questions like: *Is there the purpose of the company expressed in terms like vision, mission, strategy? What is the alignment of the mid-level management and front-line employees to these? Does the company perform on its maximal utilisation level of its resources, or exists there a potential for better performance?* These are just examples of important questions which – if not being actively managed by the organisations, can lead to the suboptimal performance and resources utilisation in the long run.

1 Existing performance models

Otley (1999) defines performance measurement as an information system that helps managers performing their job and managing the behaviour of the organisation. Maisel (2001) defines it as a system that enables an organisation to manage its performance and ensures that all the functions and activities are in line with the strategy to achieve the business results and create shareholder's value. Every such a performance model has been developed for a certain purpose and therefore has strong and weak sides. Also, the place and time of its creation have to be considered (Oger et al., 2002). Thought a unified definition is missing; the conclusion can be met that the performance management systems (PMS) have been developed primarily for the purpose of improving the management and performance of a company.

A well-designed measurement system must be accompanied by the process, people, systems and culture. The process can be defined as an existence of a process for reviewing,

modifying and deploying measures, People – the availability of the required skills to use, reflect on, modify and deploy measures, Systems – the availability of flexible systems that enable the collection, analysis and reporting of appropriate data and culture is described as *the existence of a measurement culture within the organisation ensuring that the value of measurement, and importance of maintaining relevant and appropriate measures, are appreciated* (Kennerley & Neely, 2003, p. 217). It also has to have strong cause-effect descriptive power, in best case in a form that describes the key processes/value flow in an enterprise and have good forecasting capabilities (Kaplan et al., 2000).

As most famous PMS, let's name Balanced Scorecard (Kaplan & Norton, 2000), Performance prism (Neely et al., 2002), Performance pyramid - SMART (Lynch & Cross, 1990). The practical usability in business can be questioned. Based on empirical researches (Frost, 2003; Suchánek, 2013; Afonina, 2015 and others), the most commonly used tools are SWOT analysis, Porter's five forces, PEST analysis and Balanced scorecard.

As practical usage does not provide us with any tool being able to give a non-financial assessment of an organisation, the theoretical research was conducted. After a literature review, there is a wide variety of performance models, tools and techniques. All of the selected and analysed tools are shown in Appendix 2.

This article thus introduces a new model serving mentioned purposes for evaluating and comparison of the maturity of an organisation. It will serve the management/owners of a company to better understand their company and to identify strong/weak sides. It enables them to compare the results over a certain time period or benchmark with other organisations.

2 Methodology and data

There were several phases of the research. The first phase consists of a review of existing models. In a second phase, an analysis of 37 existing PMS was conducted, deriving critical success factors, merging them into functional groups. As a next phase, a model has been created using the functional groups as categories and also using the business, management and controlling experience of the author. A testing and refining phase can be considered as a parallel because, after each interview, the feedback has been considered and reflected. However, the major change of the model emerged after seven evaluations, and that version forms the current model with minor improvements only. Having adopted all the valuable feedback from the business community, last two interviews have been conducted with three participants, with a results presentation not only on top management level but to middle management in one case and to all company staff in another.

In the first phase, the research was conducted on a literature review to identify PMS suitable for the purpose of evaluating and benchmarking the level of culture, leadership and maturity of an organisation. For the literature review, Wiley Online, Emerald and EBSCO Academic Search databases were reviewed, and Google Scholar was also used to look for relevant sources. In addition, books from the business and management fields were reviewed. Compilations and models overviews have also been used to increase the coverage. Still, there are several limitations to the literature review. Regardless of the effort and extent of a literature search, potentially valuable studies might have been missed. There is also the problem that only published studies have been taken into account, which creates a potential bias as unpublished studies might contain different outcomes. Another potential bias is the

presence of subjectivity in the study retrieval process, which can occur in the choice of literature sources to include (de Waal, 2010).

The attempt to mitigate these biases was to include not primary sources only, but to include reviews and Recherches too. This should increase the span of the review and reduce the subjectivity bias. To find an acceptable PMS, there were three criteria based on Main Dimensions of PMS Models (Garengo et al., 2005) used and the desired model shall comply with all of them. They were:

1. Is the model dealing with culture, maturity & leadership? [Strategy Alignment; Strategy Development; Focus on Stakeholders]
2. Are the results clear and comparable? [Depth; Breadth; Causal Relationships; Process Orientation]
3. Is the usage of the model easy even for SME? [Clarity and Simplicity; Balance]

note: In brackets are corresponding Garengo's dimensions. The Dynamic adaptability dimension was omitted as this is a trait for performance management systems and not applicable to (short term) evaluation tools).

Altogether, 76 models, tools and techniques were divided according to their purpose to groups Financials; Management tools; Performance management systems (PMS); Marketing and strategy tools; Tools and techniques – others. Out of them, only PMS were evaluated based on above-stated criteria, as the others were not PMS and therefore would not meet the purpose. The rankings were simple – comply (1), partly (0,5) or not compliant (0). Out of analysed PMS, none has reached the required score, as is shown in Table 1. The complete list of models analysed and literature sources are listed in Appendix 2. It has to be noted that the ranking shows the appropriateness of a PMS to our purpose only, not an overall quality or usability of a model.

Table 1 | Comparison of PMS based on Garengo's set of dimensions.

Performance management system (PMS)	Crit. 1	Crit. 2	Crit. 3	Total
Baldrige performance excellence model	1	1	0	2
BSC (Balanced Scorecard)	0.5	0	1	1.5
Capability Maturity Model	0.5	1	0.5	2
Dixon's performance questionnaire	0.5	1	0	1.5
Dynamic Performance Management (DPM)	0.5	1	0.5	2
EFQM	1	1	0	2
ENAPS	0.5	1	0	1.5
Keegan's performance measurement matrix	0.5	0.5	0.5	1.5
Medori and Steeple Framework	0.5	0	0.5	1
Performance Prism	0.5	0	0.5	1
TOPP System	0.5	1	0	1.5
A performance measurement system for SMEs taking part in Quality Award Programmes	0.5	1	0.5	2
High Performance organisations framework	1	0.5	0	1.5
ISAT	0	1	0.5	1.5
Performance measurement system model	0.5	0	0	0.5
The Enterprise Maturity Matrix	0.5	1	0.5	2
Bititci's Reference model	1	0.5	0	1.5
Performance Pyramid (SMART)	1	0	0	1
The Results and Determinants Framework	0.5	1	0.5	2

Source: own elaboration

None of the PMS analysed scored well if we want them to compare the results among entities/overtime as they lack the measurable and comparable output while focusing on “soft” criteria. The only performance models fulfilling the need for clear and comparable results while dealing fully with Culture, Maturity and Leadership are EFQM and Baldrige award criteria, which are both very similar. Using Radar logic (EFQM) gives a score on a scale 0-1000, which enables the researches and management/owners of the company to evaluate and even to benchmark. Both tools have quite a broad usage, and therefore the base for comparison is large enough. Moreover, the EFQM model is suitable also for non-profit organisations. Yet there is a serious obstacle for broader usage of them – the usage of these tools and assessment is complicated and especially small and medium organisations do not have enough resources for it (Aschenbrennerova, 2010). Its deployment requires to undertake a multiday training and hiring an external assessor. The assessment itself takes several days, which represents an effort that SMEs are usually not willing to invest. Moreover, as identified by (Rusev & Salonitis, 2016, p. 277) *“...the existing assessment tools are generally either biased towards process improvement or towards results. Assessment tools developed by Institutes that award prizes such as the MBQA and EFQM are results driven with little focus on culture and process efficiency”*.

2.1 Creation of the model

Failed to find an appropriate model, next phase was to analyse the broad set of performance models and techniques which deal with strategy management or change management to derive a set of critical success factors (CSF). Only models that fulfilled the criteria being generally accepted (either published in an academic journal, or in own publication) have been included. Also, they have to be structured, and in a way, key factors can be drawn from the structure of the model. Certain models, therefore, cannot be included, though they are very popular (blue ocean strategy, benchmarking, customer satisfaction analysis etc.). Thirty-seven models have been therefore selected and analysed (see Table 1).

Table 1 | Performance models, tools and techniques overview

Name of the model	Author(s)	Name of the model	Author(s)
5Forces model	Michael Porter	Good to Great	Jim Collins
BCG	McKinsey	Performance Pyramid (SMART)	Cross & Lynch
BSC (Balanced Scorecard)	Kaplan, Norton	Performance Prism	A. D. Neely
EFE matrix	Fred R. David	Stankosky's Four Pillar Knowledge Management Model	M. A. Stankosky
IFE matrix	Fred R. David	Harry Pollak's viability model	Harry Pollak
PESTLE	Francis J. Aguilar	Argenti A-score	John Argenti
SPACE	Radder & Louw	Capability Maturity Model	Watts Humphrey
SWOT	Albert Humphrey	Six Sigma Business Scorecard	Bill Smith
VRIO	Jay B. Barney	Keegan's performance measurement matrix	Daniel Keegan
Leavitt's diamond	Harold J. Leavitt	Sink and Tuttle model	Sink&Tuttle
McKinsey 7S	McKinsey	Dixon's performance questionnaire	Dixon et al.
MIT 90's	MIT team lead by M. S. Morton	TOPP System	SINTEF
EFQM	EFQM Foundation	Brown's model	Brown et al.
Baldrige performance excellence model	M. Baldrige	Six dimensions performance measures	Fitzgerald et al.
Lewin's three stage model of change	Kurt Lewin	AMBITE	P. Bradley
Four phases of change	Thomas B. Lawrence	ENAPS	ENAPS
Kotter's Eight Step Change Model	John P. Kotter	Medori and Steeple Framework	Medori & Steeple
CorSet framework	CorSet Framework Institute	Dynamic Performance Management (DPM)	Maltz et al.
Model CAF	European Institute of Public Administration		

Source: (Bititci, 2015; Bencsik, 2017; Štamfestová 2013; Afonina, 2015), own elaboration.

Out of the selected models, a list of 215 critical success factors has been identified. It provides a basis for the creation of criteria which CAT model uses. All the CSF derived are listed in Table 2.

Table 2 | Overview of key success factors derived from PMS's and their appearance

CSF	Occurrence	CSF	Occurrence	CSF	Occurrence
processes	12	effectiveness	1	style	1
employees	10	stakeholder's satisfaction	1	social responsibility	1
finance	9	openness	1	customer loyalty	1
quality	9	society	1	portfolio	1
Innovativeness	9	entry barriers	1	logistics	1
customers	8	process stimulation	1	change of systems	1
market	6	management support	1	locality	1
technology	6	infrastructure	1	implementation	1
leadership	6	future growth	1	investors	1
management	5	external environment	1	marketing	1
flexibility	5	systematic work	1	equipment	1
suppliers	5	sales and distribution	1	firm's performance measurement, analyse and improvement	1
R&D	5	objectives	1	KPI	1
costs	4	patience	1	management methods	1
customer satisfaction	4	over debt	1	services	1
strategy	4	market share	1	metrics	1
environment	3	efficiency	1	resource value	1
time	3	persuasion	1	defects rate	1
structure	3	truth acceptance	1	rate of improvement	1
culture	3	processes performance	1	systems	1
profitability	3	reaction on outside impulses	1	cost position	1
vision	3	capital structure	1	results durability	1
education	3	regulation	1	reason for change	1
IT	2	market research	1	design	1
competition	2	fixation of desired state	1	turnover	1
purchase management	3	competitiveness	1	waste	1
government	2	controlling	1	Cash Flow	1
organisation	2	supply chain	1	resource scarcity	1
communication	2	resources utilisation	1	delivery reliability	1

productivity	2	culture of discipline	1	operative effectiveness	1
resistance overcoming	2	change management	1	shared values	1
growth	2	knowledge management	1	supplies	1
planning	2	diversification	1	abilities	1

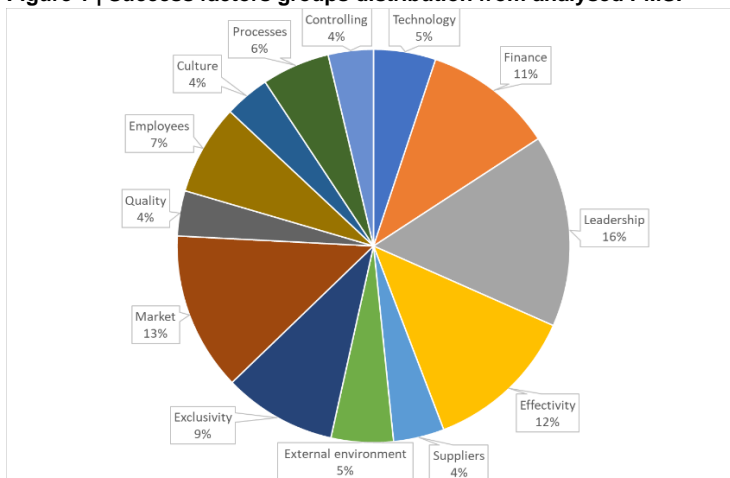
Source: own elaboration

Many of the factors were similar, which lead to the necessity to merge them together by relevance. The grouping method was similar to those of de Waal (2010): *Because every author used a different terminology in his study, the elements were grouped into categories within each factor. Subsequently, a matrix per factor was constructed in which each category constitutes a characteristic.* The only difference is that de Waal used 6% weighting of a characteristic to call it characteristic of High-Performance Organisation and that he verified the process with external academic, what was omitted in our case.

The process has had several iterations, grouping factors that were the same in content in a first step (e.g. KPI & metrics). After that, the merging into functional groups followed, using besides de Waal HPO characteristics (Organisational design, Strategy, Processes, Technology, Leadership, Individuals & Roles, Culture) also EFQM model characteristics (Leadership, People, Policy & Strategy, Partnership & Resources, Processes, Customers, Society, Performance). This was refined according to the real distribution of factors. So, groups like Exclusivity & Quality were identified not being mentioned by either HPO or EFQM; Individuals & Roles (HPO) was transferred to People (EFQM) and Employee selection (new criterion).

This process finished when all categories contained at least eight factors (3 % relevance ratio) and no unassigned factors remained. 13 groups outstand, which were so distinct that further merging would mean loss of information. The groups are Technology, Finance, Leadership, Effectivity, Suppliers, External environment, Exclusivity, Market, Quality, Employees, Culture, Processes and Controlling. Their distribution is shown on Figure 1.

Figure 1 | Success factors groups distribution from analysed PMS.



Source: own calculation

Using the thirteen groups, the first version of the model was created. It has been developed based on principles of Globerson's (1985) performance criteria system, Garengo's et al. (2015) eight dimensions of performance measurement systems and principles of advanced quality systems (Nenadál, 2016).

The scaling of the model is in a range from 1 to 5 with 0.5 steps. The very simple and intuitive scaling also followed a logic used by most common process maturity models as they use the same principle (with the exception of 6 grades in case of ANSI/ASIS model). The 0.5 steps were added based on experience from field research when refinement was often needed. The overview of process maturity models is in Table 3.

Table 3 | Scaling overview of selected maturity models

Model description / Maturity level	QMMG	CMM	COBIT	PMPM2	ANSI/ASIS
	Quality management Maturity Grid	Capability Maturity Model	Control Objectives for Information and related Technology	Project Management Process Maturity Model	American national Norm
1	Uncertainty	Initial	Initial/Ad hoc	Ad-hoc	Pre-awareness
2	Awakening	Managed	Repeatable, but intuitive	Planned	Project approach
3	Enlightenment	Defined	Defined process	Managed at project level	Program approach
4	Wisdom	Quantitatively Managed	Managed and measurable	Managed at corporate level	Systems approach
5	Certainty	Optimising	Optimised	Continuous learning	Management system
6					Holistic Management

Source: (Jokela et al., 2006; CMMI, 2010; Ariyadi & Dirgahayu, 2015; Kwak & Ibbs, 2002; ASIS, 2013, Nenadál, 2016).

2.2 CAT Evaluation process

Assessment procedure of target organisations is based on a structured interview with three key persons from an organisation (see chapter 6 for reasoning and selection). The main advantages are a direct information flow; ability to manage and control the assessment; correct potentially misunderstood questions; influence the selection of interviewees and instant feedback for the organisation. When the assessor has at least partial knowledge of the organisation, he can also evaluate the openness and fairness of the answers and therefore, the validity of the assessment.

The structured interview approach was also chosen as there are certain disadvantages of information gathering based on questionnaires, what would be a second, less demanding option. Firstly, the researcher has no control over the response rate and who has, in reality, responded (more often than not happens that top managers delegate the task of returning the questionnaire to a secretary or other staff member, diluting thus the results); secondly, as good the questions and answers might be, there is always a room for own interpretation; thirdly, some interviewees want to show their organisation better than it really is, tending to answer more favourably. Similarly, (Malina et al., 2011, p. 19) states: *“We would also like to emphasise the importance of the method of questioning and reflective reasoning in creating*

important new insight. The Socratic method of questioning and logical reasoning is the backbone of academia and research”.

To ensure comparability of results, the desired state for level 1, 3 and 5 are clearly described. For each criterion, there is a leading question. The respondent describes the state of the art of his organisation. The interviewer compares the answer with the prescribed evaluation for 1/3/5 and suggests a result, reading the respective description. If the agreement is not met, they try to adjust the score comparing the actual situation with prescribed rankings. If no agreement can be met, the interviewer makes a final decision.

It is advisable that the evaluation is done by an assessor experienced with the CAT model, but not necessary. The testing can be done by own means, preferably a person from controlling or strategy department, having some knowledge about performance models and assessments (e.g. ISO, internal risk reviews...).

2.3 Testing of the model

Based on the above, it was decided to carry on the testing in the same way a real assessment would be, it means by accomplishing a series of structured interviews with managers of companies.

The objective of the testing was to evaluate and improve the model and get feedback from the business community. The model was adjusted and upgraded several times, so the results are not comparable at this time. The process involved several stages of iterations, improvement and reformulating (Malina et al., 2011, p. 17): *“It is likely that the “finished” product that readers see is the result of much iteration of searching and interpreting the data, writing the results, and sparring with reviewers and editors”.* The testing phase was conducted similarly as if it is the real evaluation. The final version of the model is described in chapter 4.

3 CAT (Complex Assessment Tool) model

A new model is formed by three categories – Management, Stakeholders & Resources with a total of 17 criteria covering the identified functional groups from Chapter 3.1. They are: for **Management** - Leadership, Corporate culture, Quality, Performance, Controlling, Processes, for **Stakeholders** - Communication, People, Employee selection process, Customers, Suppliers, Owners, Public authorities and for **Resources** - Financials, Exclusivity, Technology, External factors. All of 13 categories of CSF have been turned into criteria in the CAT model. During the testing period, based on the business community feedback, there were 3 criteria added to the model. All of them were added to the Stakeholders category: Communication, Owners (investors) and Public Authorities. The criterion Communication covers both internal and external communication within the organisation and namely, internal communication management/employees were often seen differently from the line employees and from the top. Internal communication is understood here as the strategic management of interactions and relationships between stakeholders at all levels within organisations (Welch & Jackson, 2007). And original also Freeman’s stakeholder model supports the addition of Owners and Public authorities (Freeman, 1984) criteria. Thereby 17 criteria divided into 3 categories form the CAT model.

Each functional category has its subtotal to better identify strong/weak sides of an organisation. Total achievable score is 17 – 85, where upper quartile score - above 68 points indicates well managed, mature organisation, lower quartile (under 34) on the other hand, poorly managed entity likely to fail in a near future. The results are visualised for every respondent (and an average result) on a web chart indicating strengths and weaknesses.

The CAT model consists of the assessment methodology, the model itself, graphical output and structured interpretation of results.

The model includes “soft” factors of management like culture, leadership, vision and strategy. It stresses the utmost importance of these factors for an organisation’s future. However, without transferring the visions into daily business by addressing factors like processes, stakeholders’ relations and resources utilisation, no long-term success can be expected.

3.1 Assessment methodology

It includes the instructions on how to conduct an assessment, described in detail in chapter 3.2.

Instructions:
The model is designed for three respondents:
- a top manager or owner
- high-level manager with a good overview of processes and daily business (executive director, financial director,...)
- an opinion maker, a person close to employees - HR manager, head of trade unions...
Each participant is interviewed separately.
The structured interview follows these steps:
state for level 1, 3 and 5 is clearly described. For each criterion, there is a leading question.
The respondent describes the state of the art of his organisation.
The interviewer compares the answer with the prescribed evaluation for 1/3/5 and suggests an evaluation, reads the description.
If the agreement is not met, they try to adjust the score comparing the actual situation with prescribed rankings.
If no agreement can be met, the interviewer makes a final decision.
After all interviews are complete, publish both graphical output and evaluation comments.
Limitations:
the CAT model is not suitable for micro organisations with fewer than 20-25 people
the CAT model is not suitable for multinational corporations

Source: own elaboration

It can be estimated that 1 hour is required for one interview. After completion of all responses, the graphical output is generated automatically. The interpretation is rather intuitive, looking for highest/lowest scores and for high spreads, which may indicate discontent in the organisation.

3.2 CAT model

Table 4 | CAT Model

Criterion	No. Criterion	Description	1	3	5	Average score	Score A	Score B	Score C
Management	1 Leadership	Has the organization defined a vision, values, purpose and strategy clearly communicated? Has the organization implemented its strategy consistently in operational activities?	Vision, values, purpose are not explicit or not clear. Strategy is not clearly communicated. Operational activities are not consistent with vision and values. No measurable objectives set.	Values and vision exist and the team can find them. Strategy exists. There is no direct connection between vision and strategy. Objectives are not clearly defined within the organization.	Values and vision/purpose are regularly communicated and most employees know the main vision and mission more than just their own. Strategy is aligned with them to improve and deliver value without harming organization.	3.0	2.0	3.0	4.0
	2 Corporate culture	Is the culture of organization open, friendly and motivating?	Employees are not encouraged to share ideas or opinions. There is no support for innovation or experimentation. Nobody is interested in an opinion of their own staff.	Openness is encouraged. There exists no formal/informal behavior. No support or encouragement of individual interest in the costs of organization is accepted.	Culture is inspiring. Its main to listen to and agree different opinions, high grade of employee's engagement. The culture of freedom and accountability leads to social responsibility for results.	3.0	2.0	4.0	3.0
	3 Quality	Is the quality the cornerstone of a company?	No quality in either considered unimportant or no effective measures are in place.	There is a balance and measures regarding quality. Effect of measured and not measured.	Quality is being valued as a regular basis. Individual is committed to it, a grade of personal responsibility for quality. Result being evaluated on regular basis.	4.0	3.0	4.0	5.0
	4 Performance	Is individual performance measured/managed? Is the compensation based on performance?	No. The individual performance of each individual is not measured, no goals set, no effect on remuneration.	Individuals are encouraged to set their own goals. Goals are set but not real influence on salary/not measure of regularity, no direct connection to performance strategy.	Comprehensive control plan goes far beyond most important KPIs, describes the value how and cause-effect relations and provides information for key decisions. It provides important information in advance. Bad news and detailed results are received and solved. Processes sufficiently described, regularly tested, evaluated and improved based on KPIs.	2.5	2.0	2.5	3.0
	5 Growth/Inng	Company is managed based on hard data key performance indicators are evaluated. Key processes are described. The efficiency of processes is being monitored.	There is no structured controlling concept in place, periodic measurement of accounting data might exist. Key processes are not described, no processes effectively monitored.	Key performance indicators are used to measure and improve. Key processes are described, key processes have its own, no effective evaluation/improvement in place.	Very good internal communication both formal and informal. Cooperation improve internal relations supportive communication concept exists based on organization's objectives and desired results to key stakeholders.	4.2	4.5	3.0	5.0
	6 Innovation	Is the organization innovative? Are new products/processes being developed?	Internal communication is poor. The cooperation among departments is poor (especially management <-> employees), cooperation among departments is inefficient, communication with customer/public is not of importance.	Regular formal issues of internal communication exist. The cooperation issues are being solved systematically. There are barriers for external communication (customers, suppliers, owners, public).	Organization develops necessary competences and resources at key points. It invests in the employee retention.	1.8	2.0	1.0	2.5
	7 Communication	The communication and cooperation with key stakeholders are an important topic.	Employees are not human resources, easily replaced, the main goal are personal expenses. Key employees are not invited with company, main reason for stay is the salary.	Employees are remunerated in such a way that they do not leave for salary purposes. They are motivated by non-financial factors like company culture, openness, a possibility of personal development, safety.	Employees are hired (and fired) according to their identification with organization. Organization develops necessary competences and resources at key points. It invests in the employee retention.	2.2	1.5	3.0	2.0
	8 People	Organization is a partner for its employees.	For a selection of staff of certain employees set no reasonable reasons. Despite of low personal contribution they stay e.g. because of personal relations.	There are clear selection criteria. The employee initial training/adaptation processes work well. Employees are encouraged in innovations and improvement.	All positions have a frequent contact with customer, R&D sales, manufacturing services are fully aligned with a customer requirements, which company often knows sooner than the retail customer.	2.5	2.0	2.5	3.0
	9 Employee selection	Employee selection process is transparent and respects values and objectives of an organization.	No customer dedication, internal issues more important.	Regular customer contact from sales people, manufacturing services are fully aligned with a customer requirements, which company often knows sooner than the retail customer.	TCO is key decision factor. Long term relations (frame contract) establishable of cooperation with supplier (e.g. in R&D) in place. The sourcing process is transparent and documented.	2.5	2.0	2.5	3.0
	10 Suppliers	The interests of the owner (the same as of the company).	Main selection criteria is price/discount. A reasonable share of purchasing decisions is not transparent.	Owners are ready to sacrifice part of remuneration in order to further develop the company's strategy in long run. Requirements are clear and transparent.	The owners and company interests are clearly aligned, owners support the company investments, development, R&D. Suppliers are not in a position to influence the benefit with their own authority, experience and wealth.	3.2	4.0	3.0	2.5
11 Public authorities	The relationship is mutually beneficial.	Owners is always short term financial/other interests only.	Owners are ready to sacrifice part of remuneration in order to further develop the company's strategy in long run. Requirements are clear and transparent.	TCO is key decision factor. Long term relations (frame contract) establishable of cooperation with supplier (e.g. in R&D) in place. The sourcing process is transparent and documented.	1.8	2.2	3.5	2.5	2.0
Stakeholders	12 Sector of industry stakeholders	Financial targets of an organization (tasks, costs, productivity, EBIT...) in three consecutive years are falling or exceeded.	Realistic financial targets are set at the beginning of each year. Organization invests on average 4-5% of total year operation costs on average 4-5% in last three years (on average).	Key financial targets of the company are exceeded on average by more than 30%, set points are falling or exceeded.	4.0	4.0	3.0	5.0	
	13 Products	Has the organization any unique or different products, brand, customer's passion, costs, logistics or other advantages?	Organization has and managed advantages over the competition. The R&D process is not systematically directed to keep/improve exclusively.	The exclusivity is actively utilized for a long-term development. Also R&D systematically works on its maintaining/development.	3.7	3.0	5.0	3.0	
	14 Technology	Organization develops such technologies and infrastructure suitable for ensuring long term stability/development.	Some technologies exist. No long-term concept in place. Investment in R&D is not sufficient. The infrastructure of the organization is adequately protected.	Technologies enable an organization to gain a leading position. There exists an assessment of absence and there is a regular assessment of the effectiveness of the technologies used.	3.0	2.0	3.0	4.0	
	15 External factors	Was there a significant external factor influencing the company performance within last three years (political, economic, social, technological, market changes)?	Yes, the performance was positively influenced significantly.	Yes, the performance was negatively influenced significantly.	3.2	2.5	3.0	4.0	
	16 Sector of industry changes	Was there a significant external factor influencing the company performance within last three years (political, economic, social, technological, market changes)?	Yes, the performance was positively influenced significantly.	Yes, the performance was negatively influenced significantly.	1.8	1.5	1.8	2.2	
Total					50.7	45.5	50.5	56.0	

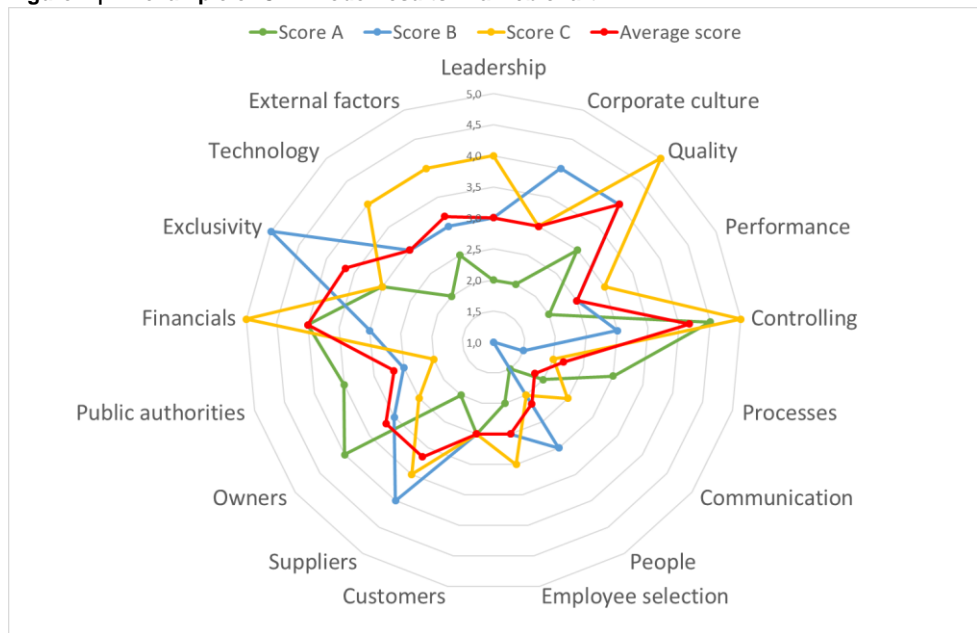
Source: own elaboration

The model consists of 17 criteria grouped in 3 categories, a leading question for each with descriptions of rankings 1/3/5. Figure 2 shows illustrative scoring for three virtual respondents, their average score and score for each category. The interpretation is based on the descriptions of each criterion, where level 3 means no better than the average result with a room for improvement. Results scoring better than 3 need no particular attention, just in case the deviations are high for a criterion it needs explanation. In case the result is below 3, attention is needed, particularly for results under 2. Result 1-2 is unsatisfactory with a potential negative impact on an organisation's performance over the long term.

3.3 Graphical output

Figure 2 shows the graphical output of a CAT model. It allows the assessor to evaluate each respondent (could be disclosed for publication for ensuring anonymousness, if needed). Average score and main deviations from it are a concern for the evaluation.

Figure 2 | An example of CAT Model results in a web chart



Source: own elaboration

3.4 Structured interpretation of results

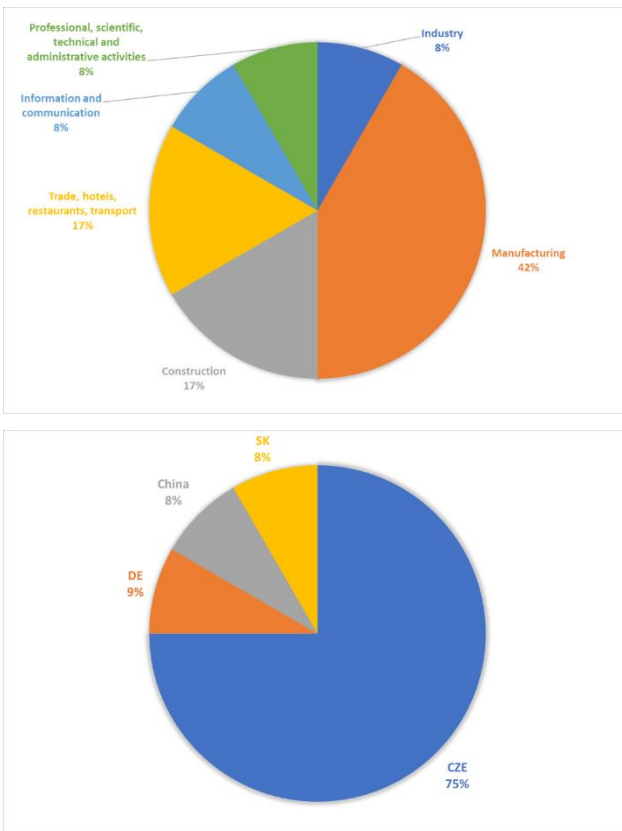
This part of the model allows the assessor to provide the tested organisation with unified, structured comments and identification of strong/weak sides. It is based on the overall model score and also scores reached in each category/criterion. In certain case, it can also provide proposals for improvement. A comparison with older results and possible development over time can also be evaluated here.

4 Model verification

Every model created has to undertake a verification and testing phase. The verification of the model took over a year and was based on 12 companies. Long et al., 2020 states that appropriate is 8-16 test subjects, what is compliant with our testing procedure. Testing based on the questionnaire can extend the number of subjects but would reduce the quality of feedback as the personal contact would be missing. Therefore, the CAT model has been tested on 12 different Czech and international companies, from micro-enterprises to branches of multinationals (see Appendix 1 for further details).

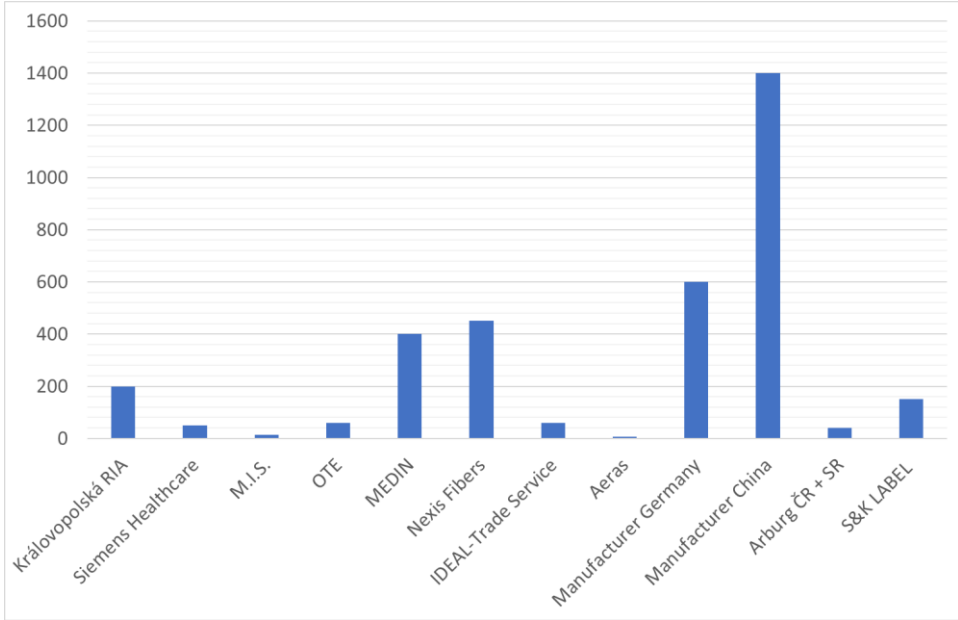
The selection of organisations was not random, as no interpretation of results was foreseen. The selection criteria were to involve different companies regarding its size, country of origin and businesses. The graphical overview is presented in Figures 3a & 3b and 4.

Figure 3a & 3b | Participating Organisations – division acc. to the country of origin and industry sectors



Source: own elaboration

Figure 4 | Participating Organisations – number of employees



Source: own elaboration

During the research, a number of three participants from an organisation proved to be optimal. Less than three is biased by the “helicopter view” of top management. More than three tends to be more resources demanding not contributing to the better results significantly (see chapter 6 for more detailed view). To get unbiased results, it has proven better to get an open answer from a participant and only then to scale it. Otherwise, they tend to evaluate themselves, often to look more favourable than in reality. Several other improvements during the verification phase were developed (graphical output, a subscore for each category, redesign of categories and criteria).

The feedback received from participating managers was very positive, and four of ten tested companies used assessment results, even though obtained from the beta version, for their own improvement purposes. So even in the testing phase, the CAT Model has had some positive effects on evaluated organisations (which is actually the purpose why the CAT model was created). Some others expressed interest in using its finalised version to track their development. Especially micro-companies were not interested very much as their management systems still need to evolve. Also, the feedback from multinational concern was positive, but no further interest was expressed. This can be because of so many own controlling, reporting, audit and management tools exist that no new tool is particularly welcomed. Based on that, the testing of the model was finished, and the model validation phase began.

The last phase of the research, after a literature review, CSF identification, model creation and testing was the final model validation on two companies. It consisted of backward interpretation, it means, the results have been discussed with the management of the companies in detail and compared to their own view of the organisation. In both cases, the

results were accurate, corresponding with the management view. The first assessment was presented on management meeting with employees with very positive feedback – the strong/weak points were acknowledged, and further improvement process started. Disclosure of further details was not allowed by management. In the other case, it was part of change management, provided material for strategy meetings with owners and management and formed a basis for the transformation process. The process had shown positive financial effect after three months from deploying. It consisted of personal changes, customer profitability analyses, calculation and sales processes changes, improvement in logistics and manufacturing. The usage and the model results were recommended for practical usage. Thought further modification is possible and probable (e.g. EFQM Model is being updated every two years), we consider the model as usable in both academic research and business praxis.

5 Usability, constraints, further research

Based on the results of the verification process, described in chapter 5 in detail, the CAT Model finished its development phase and is ready for its practical use. In spite of the fact that future development and reengineering might take place, it is a robust and reliable tool at this stage to evaluate an organisation. Its expected use is in mid-sized organisations, which aim to develop themselves or want to identify a possible root cause of their problems (e.g. productivity, fluctuation, quality,...). Organisations can perform an assessment over a certain time period to evaluate possible improvement in critical areas.

There are several rules/constraints which have to be observed during the execution of an assessment based on the CAT model. Firstly, the model is designed for three respondents. The reason is that interviews on top management level have proven that they sometimes possess a “helicopter view” leading to biased results (usually, but not always, overestimating certain categories like communication and culture). More respondents make the assessment more resource demanding, not contributing to higher reliability significantly. The reason is that the balance among the top management, executive management and employees shall be balanced. If we increase the number of participants, we shall either increase in all three categories described below, what might not be possible or to increase the weight of responses of category, which is not represented by so many respondents. This seems not an appropriate way of conducting the assessment. If broader sample opinion is wanted, it is, of course, possible to include questions from the CAT model into, e.g. employee satisfaction survey.

The correct assessment shall therefore include a top manager or owner, in case he is managing actively. The second respondent shall be another high-level manager, who has the best overview of processes and daily business—preferably executive director, financial director or similar. The third respondent shall be an opinion maker, a person who is close to the front-line employees but has a good overview of the organisation. This can be HR manager, head of trade unions, compliance officer, ombudsman or alike. It is important that such a person has respect from employees, knows their opinions, but on the same hand has certain managerial ability to be able to cope with questions on the desired level. Each participant is interviewed separately.

Secondly, the CAT model is not suitable for micro organisations with fewer than 20-25 people. The processes are usually not set, most of the operations and decisions are spontaneous,

and communication is informal. The results of an evaluation are usually low /average, even for well-performing companies. The obtained responses and subsequently, evaluations are sometimes inadequately strict. On the other hand, it shows the management/owner of the areas they have to develop if they aim for further growth.

Thirdly, also for branches of multinationals, there are some constraints. The strategies, values, processes etc. are set from HQ, and people from subsidiaries may not be fully aware of them. Therefore, the results might be influenced. For corporations can be an EFQM model recommended as it has strong descriptive power (at the cost immense effort, not comparable with CAT).

Lastly, it is important that the interviewer has a good knowledge of the model to be able to scale the results correctly. It is instructive as much as it can be, but still, the answers, in reality, can vary from description states, and it is desirable to have standardised and comparable output.

For further research were two main areas identified. Firstly, to conduct a quantitative in-field research to obtain a broader database of results, enabling to scale the results better and to create a benchmark over certain parameters (size of a company/industry/life cycle of the company), thus improving also the feedback to the companies. Secondly, further qualitative research leading to incorporate non-profit organisations in the model. It has been built non-prescriptive (generally used for any kind of organisations), so no obstacles shall exist to use it for non-profits too. In the development phase was this segment not present, so no relevant results can be given.

Conclusion

There are many performance models in place. Existing performance management tools and models are in the majority not designed to assess an organisation, or even to provide comparable results, with the exceptions of EFQM and Baldrige's Award Criteria. Both are too complicated and resources /knowledge demanding to be used in smaller organisations; after a literature review, no existing model able to assess a management quality of an organisation with measurable results is known to the authors.

A contemporary tool has been created to evaluate the level of maturity in an organisation. The CAT model offers a strong, yet lean and easy-to-use tool for both the academic sphere and practitioners. The model and assessment methodology aims at small and medium enterprises as they generally do not have enough resources and expertise to conduct a large-scale assessment on their own. The results are scalable, comparable over time and enable benchmarking. Field testing was conducted during the model development phase on 12 international companies leading to gradual improvements of the model. Its results have been acknowledged not only by managers but also by middle management and employees. It offers not only a descriptive and benchmarking tool, but the intention is to give owners/managers a tool to identify strong/weak sides of their organisation to further develop it. They are able to compare their own results over time so that they can evaluate the success of change efforts.

Appendix 1: A list of companies interviewed

Královopolská RIA, a. s.

Královopolská RIA is a Czech construction company founded in 1996. It has had approx. 200 employees in a time of evaluation. Since 2017 it has filed for bankruptcy.

Siemens Healthcare, Czech subsidiary of world leader in medical equipment in fields of screening, diagnostics and postprocessing, employing 60 people.

MIS s.r.o. provides IT solutions for media and broadcasting companies. It was founded in 1995. MIS has under 20 employees.

OTE, a. s. acts as an operator on Czech energy market. It is a public company with 60 employees.

MEDIN, a. s., is a private company producing steel implants for traumatology, surgery, orthopaedics and stomatology. MEDIN has over 400 employees.

Nexis Fibers a. s. is Slovak company producing artificial fibres. It employs over 450 people.

IDEAL-Trade Service, spol. s r.o. delivers solutions for painting workshops, chemicals for surface treatments and compressors. Has been founded in 1993 and has over 60 employees.

Aeras, s.r.o. is a construction company delivering dedusting technologies for heavy industry. It has under 10 employees and is one of micro-companies in a survey.

Manufacturing plant Germany

Manufacturing plant China

This companies do not want to be disclosed, only number of employees (600 / 1400 respectively) can be given. Both are a part of an international corporation.

Arburg Czech/Slovak subsidiary

Company Arburg is leading producer of plastics injection machines. Local subsidiary has 40 employees.

S&K LABEL spol. s r.o. operates since 1991 as a central European leader in self-adhesive labels. It has over 160 employees.

Appendix 2: A list of models, tools and techniques analysed

Financials	Management tools	Performance systems (PMS)	management	Marketing and strategy tools	Tools and techniques - others
Altman Score	Z- AMBITE	Baldrige excellence model	performance	5Forces model	Brown's model
Argenti score	A- CorSet framework	BSC (Balanced Scorecard)	BCG	EFE matrix	
DuPont Pyramid	Four phases of change	Capability Maturity Model	McKinsey 7S	IFE matrix	
IN model	Harry Pollak's viability model	Dixon's questionnaire	performance	MIT 90's	Leavitt's diamond
Zero-Based Budgeting	Kotter's Eight Step Change Model	Dynamic Management (DPM)	Performance	PESTLE	VRIO
	Lewin's three stage model of change	EFQM	SPACE	Advanced Analytics	
	Model CAF	ENAPS	SWOT	Agile Management	
	A diagnose matrix for assessing organisational risk maturity	Keegan's measurement matrix	performance	Benchmarking	Business Process Reengineering
	Good to Great	Medori and Framework	Steeple	Blue Ocean Strategy	Complexity Reduction
	Sink and Tuttle model	Performance Prism	Customer Relationship Management	Core Competencies	
	Six Sigma Business Scorecard	TOPP System	Customer Satisfaction Systems	Customer Journey Analysis	
	Principy pokročilých systémů managementu kvality	A performance measurement system for SMEs taking part in Quality Award Programmes	Customer Segmentation	Digital Transformation	
	Six dimensions performance measures	High organisations framework	Performance Change Management Programs	Employee Engagement Systems	
	Phases of performance measurement implementation	ISAT	Mission and Vision Statements	Internet of Things	
	Performance system model	Price Optimisation Models	Mergers and Acquisitions		
	THE MATURITY MATRIX	ENTERPRISE Scenario and Contingency Planning	Organisational Time Management		
	Bititci's Reference model	Strategic Alliances	PDCA Deming cycle		
	Performance (SMART)	Pyramid	Strategic Planning	Stankosky's Four Pillar Knowledge Management Model	
	The Results and Determinants Framework	Supply Chain Management Total Quality Management			

Source: own elaboration

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