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Management by Measurement

Designing Key Indicators
and Performance Measurement
Systems

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Springer

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Designing Key Indicators
and Performance Measurement Systems

With 87 Figures and 62 Tables

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Foreword

For a long time I was troubled by the doubt that those who were criticizing the School of Management Engineering were right, in considering this school a poor imitation, combining both the “old school” of engineers and that of Economics.

In spite of the success of this new professional figure into the working world, I had the irritating suspect that – in a society where everything blooms and withers rapidly – would be the result of a temporary trend, doomed to be substituted by new ones.

This perplexity (it has been difficult for me to make it clear) arose from the lack of a well-grounded and distinctive culture at the basis of Management Engineering, like the culture of the great polytechnic school of Monge and d’Alembert, never untied to the confrontation with the ability of solving new problems.

I was ignoring the fact that, letting things take their course and allowing teachers and researchers do their work, would have finally captured a new and precise identity. An identity derived from the comparison with the different, dynamic and more complex problems proposed by the actual socio-economic system, which requires – as well as the technical-scientific knowledge of the classical engineering – a more agile and flexible attitude and *modus-operandi*.

The manuscript of Franceschini, Galetto and Maisano is a concrete sign of this achievement.

The authors, by means of their robust experience in the metrological area and their long and fruitful work in the quality area, discuss the performance indicators issue, analysing it completely and organically.

Topics under discussion cross the boundary of classical engineering and experimental domain, presenting new questions and giving well-structured answers to the issues which inevitably originate from the use of indicators to evaluate results and performances in complex fields. For example within the public sector, the subject who invests and incurs expenses is not the one who evaluates and benefits from the results.

Fine are the arguments which show that indicators are not mere technical means of evaluating performance, but rather “normative” tools conditioning the behaviours of the subjects whose actions are being examined.

This mechanism – well known by sociologists, but unfamiliar to engineers – becomes an integral and integrated part of the Management Engineering culture.

Authors – real management engineers – develop the issue, not only explaining it by the use of well-fitting examples, but also suggesting the rules for the construction of performance measurement systems, identifying their potential as well as their drawbacks.

Such a text had been missing, and its appearance has made this need more clear.

In conclusion, it only remains for me to wish the authors the well-deserved success for this book.

Sergio Rossetto¹

¹ Dean of the Fourth School of Engineering of Politecnico di Torino (Italy).

Preface

Every day life is literally pervaded by the presence and use of indicators: company performance indicators, price indicators, Stock Exchange indexes, air quality indicators, indicators of social status, and many others. Indicators give the impression to be the real engine of social systems, economy, and organizations. Furthermore, the interest in developing effective systems to measure performance results is growing more and more.

Is it so necessary using indicators in characterizing or evaluating complex systems/processes?

In global competition-oriented frameworks, continuous performance monitoring is not a choice. It is a need. Strategic targets and operational methods to reach and control results are necessary but, unfortunately, not sufficient conditions to ensure the survival of organizations.

In some sense, performance measurements are the core of process management. They start from collecting and analysing data, making it possible to track progress, identify strong and weak points, and – finally – drive improvements.

The purpose of this monograph is to describe in detail the main characteristics of indicators and performance measurement systems.

This text is divided into six chapters.

Chapter one deals with basic concepts about indicators and process performances. The second chapter discusses critical aspects, troubles and curiosities which can be produced representing a generic system by means of indicators. The third chapter focuses the attention on the problem of the “uniqueness” of representation. Given a process, the way to represent it through indicators is univocal? Chapter four analyses indicators properties. Description is supported by a large use of examples and practical applications. Fifth chapter illustrates methods for implementing performance measurement systems: how to activate and maintain them over time. It also examines the role of indicators as “conceptual technologies”. In conclusion, chapter six deals with the concepts of indicator, measurement, preference and evaluation, comparing them from the objectivity and empiricity viewpoints.

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Contents

- 1. Quality and process indicators 1**
 - 1.1 General concepts 1
 - 1.2 Quality Management Systems 2
 - 1.3 The concept of process..... 4
 - 1.3.1 Definition..... 4
 - 1.3.2 Process modeling 5
 - 1.3.3 Process “measurement” 5
 - 1.4 Process indicators..... 7
 - 1.4.1 Indicators functions 10
 - 1.4.2 Aims and use of indicators 11
 - 1.4.3 Terminology 12
 - 1.4.4 Categories of indicators 12
 - 1.4.5 A general classification of indicators..... 14
 - 1.4.6 Comparison between economic and process indicators..... 16
 - 1.4.7 Indicators and research: the state of the art..... 19

- 2. Indicators criticalities and curiosities 21**
 - 2.1 Introduction..... 21
 - 2.2 HDI indicator 22
 - 2.2.1 Life Expectancy Index (LEI)..... 23
 - 2.2.2 Educational Attainment Index (EAI)..... 23
 - 2.2.3 Gross Domestic Product Index (GDPI) 24
 - 2.2.4 Calculating the HDI..... 25
 - 2.2.5 Remarks on the properties of HDI..... 25
 - 2.3 Air quality indicators 32
 - 2.3.1 The American Air Quality Index (AQI) 33
 - 2.3.2 The ATMO index 38
 - 2.3.3 The IQA index 40
 - 2.3.4 Comments on indicators meaning 46
 - 2.3.5 Air quality indicators comparison 47
 - 2.4 The Decathlon competition..... 48
 - 2.4.1 The effects of scoring indicators..... 52
 - 2.4.2 Representation and decision 53

3. The condition of uniqueness in process representation.....	55
3.1 Introduction.....	55
3.2 The formal concept of “indicator”	56
3.2.1 Definition.....	56
3.2.2 The representational approach.....	57
3.2.3 Basic and derived indicators	61
3.3 The condition of “uniqueness”	61
3.3.1 “Non-uniqueness” for derived indicators	61
3.3.2 “Non-uniqueness” for basic indicators	67
3.3.3 Remarks about the condition of “uniqueness”	69
3.3.4 Condition of “uniqueness” by specializing the representation-target	69
3.3.5 The choice of the best set of indicators	71
4. Performance indicators properties	73
4.1 Introduction.....	73
4.2 Local and aggregated performances	73
4.3 General remarks.....	75
4.4 Indicators classification	77
4.4.1 Objective and subjective indicators	77
4.4.2 Basic and derived indicators.....	78
4.4.3 The representational approach for derived indicators.....	80
4.5 A brief outline of the indicators properties in the literature.....	82
4.6 A proposal of a taxonomy for indicators properties	84
4.6.1 General properties.....	85
4.6.2 Properties of sets of indicators.....	91
4.6.3 Properties of derived indicators	98
4.7 Accessory properties.....	101
4.8 Indicators construction and check of properties	102
5. Designing a performance measurement system.....	109
5.1 Introduction.....	109
5.2 The concept of performance measurement system	109
5.2.1 Why performance measurements?.....	110
5.2.2 What performance measures won’t tell you	111
5.2.3 Major difficulties in implementing a measurement systems	112
5.3 The construction process.....	113
5.3.1 The strategic plan.....	113
5.3.2 Identification of the key sub-processes.....	118
5.3.3 Stakeholder needs	120

5.3.4 Vertical and horizontal integration of performance measures	121
5.4 A review of the major reference models	123
5.4.1 The concept of “balancing”	123
5.4.2 The “Balanced Scorecard” method	124
5.4.3 The “Critical Few” method	125
5.4.4 Performance dashboards	127
5.4.5 The EFQM (European Foundation for Quality Management) model	129
5.5 The problem of indicators’ synthesis	139
5.5.1 Indicators synthesis based on the concept of “relative importance”	140
5.5.2 Indicators synthesis based on the concept of “minimum set covering”	142
5.5.3 Indicators synthesis based on the concept of “degree of correlation”	153
5.6 Implementing a system of performance indicators	166
5.6.1 Examples of developing performance measures	170
5.7 Maintaining a performance measurement system	194
5.8 Effective use and misuse of indicators	195
5.9 Indicators as conceptual technologies	199
6. Indicators, measurements, preferences and evaluations: a scheme of classification according to the representational theory	207
6.1 Introduction	207
6.2 Two criteria of discrimination: empiricity and objectivity	208
6.3 The representational definition of measurement	210
6.3.1 An example of ordinal measurement	212
6.4 Evaluations	214
6.4.1 Psychophysical evaluations	214
6.4.2 The evaluation of non tangible qualities	215
6.4.3 Evaluation: a subjective homomorphism	216
6.4.4 Problems and questions still open	218
6.5 Preference	219
6.5.1 The impossibility of the representational form (for preferences)	220
6.6 The concept of “dictation”	223
6.7 Conclusions	224
References	227
Index	237

1. Quality and process indicators

1.1 General concepts

It is widely known that most of the complex organizations implement performance measurement systems, in order to give true attention to results, responsibilities, and targets.

A question arises: are indicators the “key tool” of an enterprise for optimizing process management? Organizations utilize performance indicators for many important purposes. For example, in manufacturing, sales and customer satisfaction performances make possible feeling the pulse of the market or planning the organization’s future development.

Managers utilize indicators to allocate assets or to establish which strategy to implement. While *Quality* standards have become the organizations’ interior operative tool, performance indicators are the *communication protocol* of their health state to the outside world. An extensive empirical research, carried out in the United States, shows that the companies winner of Quality awards are usually those with the highest profits (Singhal and Hendricks 1997).

But, how can we recognize the organizations’ Quality? Quality, in its final analysis, is the ability to fulfil different types of requirements – productive, economical, social – with concrete and measurable actions. The Quality of performances is a basic element to differentiate an organization within the market.

Firstly, to make Quality concrete, we should identify the stakeholders’ needs. Then it is necessary to fulfil these needs effectively, using all the essentials (processes and resources). That requires the ability to observe the evolution of the process and its context. Performance indicators are the proper tools to achieve this purpose. They are not simple observation tools. They can have a deep “normative” effect, which can modify organization behaviour and influence decisions.

If a production line manager is trained to classify as “good” those products that are spread onto the market, his attention will be directed towards

maximizing the products diffusion and expansion. Unintentionally, this strategy could sacrifice long-term profits, or company investments in other products. If a *Call Center* administrator is recompensed depending on his ability in reducing absenteeism, he will try to make the absenteeism indicator decreasing, even if that will not necessarily lead to increase productivity.

The mechanism is easy to work out. If a firm measures indicators “a”, “b” and “c”, neglecting “x”, “y” and “z”, then managers will pay more attention to the first ones. Soon those managers who do well on indicators “a”, “b” and “c” are promoted or are given more responsibilities. Increased pay and bonuses follow. Recognizing these rewards, managers start asking their employees to make decisions and take actions that improve these indicators and so on. The firm gains core strengths in producing “a”, “b” and “c”. Firms become what they measure! (Hauser and Katz 1998).

If maximizing “a”, “b” and “c” leads to long-term profit, the indicators are effective. If “a”, “b” and “c” lead to counterproductive decisions and actions, then indicators have failed. But even worse! Once the enterprise is committed to these indicators, indicators provide tremendous inertia. Those who know how to maximize “a”, “b” and “c” fear to change the course. It is extremely hard to refocus the enterprise on new goals.

Selection of good indicators is not an easy process, with many error possibilities. This book focuses on the construction of performance measurement systems, knowing that “magic rules” to identify them do not exist. Many indicators seem right and are easy to measure, but have subtle, counter-productive consequences. Other indicators are more difficult to measure, but focus the enterprise on those decisions and actions that are critical to success. We try to suggest how to identify indicators that achieve balance in these effects and enhance long-term profitability.

The construction of a Quality System needs to consider these aspects. The first step consists in identifying stakeholders exigencies. Then, it is necessary to define performance levels, to organize and control all the activities involved in meeting the targets (practices, tasks, functions), to select indicators, to define how to gather information, and – finally – to decide on how to take corrective or ameliorative actions.

1.2 Quality Management Systems

A Quality Management System is a set of tools for driving and controlling an organization, considering all different Quality aspects (ISO-9000 2000):

- human resources;

- know-how and technology;
- working practices, methodologies and procedures.

A Quality System – with its resources and processes – should accomplish specific planned targets such as production, cost, time, return of investment, stakeholders exigencies or expectations. It can be useful for the following operations:

- performances evaluation of the whole firm aspects (processes, suppliers, employees, *Customer Satisfaction*...);
- market analysis (shares, development opportunities);
- productivity and competitors analysis;
- decisions about product innovation or new services provided.

For achieving positive results on many fronts (market shares, productivity, profit, competitiveness, customer portfolio, etc..), for each organization it is essential to implement quality management principles and methods.

The creation of Quality Management Systems is supported by eight fundamental principles in the ISO 9000:2000 Standard (ISO-9000 2000):

- *Customer Oriented Organizations*. Organizations must understand the customer needs, requirements, and expectations.
- *Leadership*. Leaders must establish a unity of purpose and set the direction the organization should take. Furthermore, they must create an environment that encourages people to achieve the organization's objectives.
- *Employees Participation*. Organizations must encourage the involvement of people at all levels, to help them to develop and use their abilities.
- *Process Approach*. Organizations are more efficient when they use a process approach to manage activities and related resources.
- *Systems Approach*. Organizations are more efficient and effective when they use a systems approach. Interrelated processes must be identified and treated as a system.
- *Continuous Improvement*. Organizations must make a permanent commitment to continually improve their overall performance.
- *Facts before decisions*. Organizations must base decisions on the analysis of factual information and data.
- *Partnership with Suppliers*. Organizations must maintain a mutually beneficial relationship with their suppliers to help them create value.