



Szent István University

Theses of Doctoral (Phd) dissertation

THE CONTEXT OF THE HUMAN COMPONENTS OF  
ORGANIZATIONAL OPERATIVE DECISION-MAKING

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The PhD school's

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## 1. INTRODUCTION

An inherent part of organizational life is making decisions. The life paths of organizations — similarly to those of humans — are fundamentally impacted by their decisions. Therefore, decision-making is not only a current issue — since every decision-maker through all historical ages had tackle the dilemmas of decision-making — but it is also a complex one because it involves a multitude of different disciplines from economics, through cybernetics and mathematics to psychology.

### 1.1. The research problem

My task as manager was to continuously make decisions. In other cases, I had to implement the decisions of my superiors. The most typical was some combination of these two. My attention was ever more drawn to the fact that **while most decisions seem to be exclusively governed by economic rationality on the surface, in reality, there is a plethora of other factors impacting them but not appearing in profitability calculations at all.** Factors like the interests of decision stakeholders (people affected by the decisions), the environment, the organizational culture, ubiquitous power struggle and the personality of stakeholders all have great effects on decisions, in fact. It is not surprising, when a decision is qualified „bad” during ex post evaluation, if this assessment measures quality against narrowly interpreted economic rationality and ignores all other factors.

## **1.2. Research questions and goals**

The research questions are as follows:

- What do stakeholders mean by a good and by a bad decision? Do they qualify the decision process or just the outcome of the decision?
- What are the chief causes that most typically lead to bad decisions?
- What organizational characteristics influence perceived decision quality most?
- Which operational parameters have the most profound effect on perceived decision quality?
- Which of respondent individual parameters influence perceived decision quality most?
- How do the above factors jointly impact perceived decision quality?

The goal of this research is to reveal the human factors that have the greatest impact on the quality of operative organizational decisions as perceived by those individuals effected by these decisions.

Furthermore, my goal is also to create a complex model that incorporates the effects of all these factors of perceived decision quality.

## **1.3. The research model and the hypotheses**

A vast part of literature — both in Hungary and abroad — approaches organizational decisions from a normative angle. These views have a lot in common. They look upon decision preferences as known, computable and rational. All needful information is available or can be duly estimated. All decision alternatives can be converted into numbers and thus be sorted. Choice is evident. A rational decision-maker cannot choose any option other than prescribed by the algorithm.

The inherent uncertainty of the environment, the deep-seated subjectivity of mankind and the compound web of human societies seem, in essence, disturbing nuances. Contrariwise, the present study examines exactly the role of these relationships in light of the real working of organizational decision mechanisms. Its focus is not on how decisions ought to be made, neither does it assume mandatory, classical economic rationality. The essence of the mental model that serves as the basis of the research: organizations with given characteristics make decisions while working in a given way. These decisions are escorted by certain errors. Decision stakeholders perceive and qualify these decisions in a certain way. The question therefore is how stakeholders perceive the quality of organizational decisions and what factors play a chief role in this?

The following diagram shows the research model and its link with the hypotheses formulated (Figure 1: The relationship between the research model and the hypotheses).

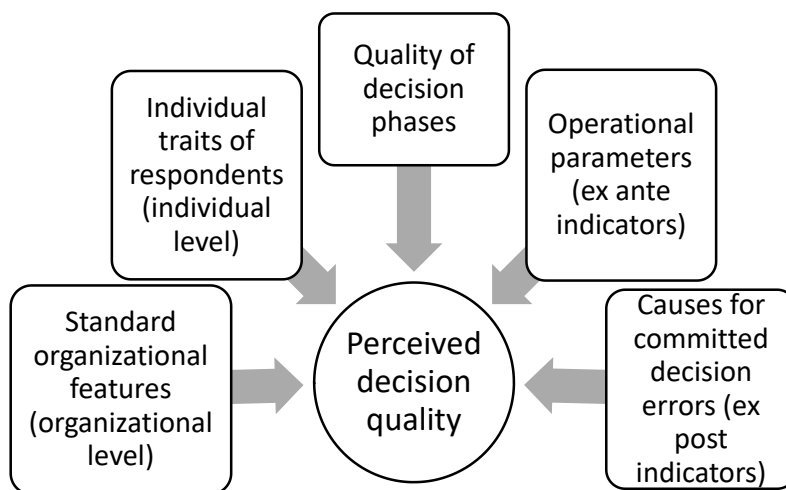


Figure 1: The relationship between the research model and the hypotheses

Source: own edition

**H1: Among standard organizational characteristics, we can identify such features that impact the perceived quality of organizational decisions in an empirically provable way.**

Standard organizational characteristics have a great effect on organizational operation from many angles. Therefore, we can reasonably presume that the perceived quality of organizational decisions is also in connection with these factors.

**H2: Among the personal background features of respondents, we can identify such variables that impact the perceived quality of organizational decisions in a statistically provable way.**

The personal background features of respondents are in connection with their position in the organization and therefore, with their perception of organizational decision quality. We may reckon that a link between certain personal attributes and perceived organizational quality can be found.

**H3: Phases of the decision process preceding and following the point of making a decision have an impact on perceived decision quality. Out of these phases, the utilisation of experiences has the biggest effect.**

The existence of different phases within decision processes is an objective truth which follows from the very nature of decision-making. Decision preparation, choice, implementation, ex post evaluation and utilisation of experiences are all existing logical units in the decision sequence, even if many organizations do not recognize some of these. While the environment and the operation of different organizations is likely to be very distinct for individual organizations, skipping some of the phases of decision-making may impact their decision quality. In our modern, fast-paced organizational environment, it is imperative for any organization to be able to learn from past mistakes and not less from successes. From the angle of a single decision, neither choice nor implementation can be skipped.

In contrast, ex post evaluation and the incorporation of experiences into practice can be utterly left out. This might not be crucial for the given decision but it will have a definite impact on organizational development and on the quality of future decisions.

**H4: Among the operational parameters of organizations, we can identify those that impact the perceived quality of organizational decisions in an empirically provable way.**

Environment, the nature of organizational activities and many other factors (e.g. the degree of centralisation and other facets of organizational culture) are related to decision-making. These serve the efficiency and the survival of the operation, but they also determine the quality of organizational life for employees. I presume, that among these factors, there are some that have a significant impact on the perceived quality of decisions.

**H5: Among the causes of decision errors, those that are related to the personalities of the participants of a decision, have the strongest effect on perceived decision quality.**

Stakeholders may trace back decision errors to various possible causes they perceive. Since decision-making is an inborn human task, therefore, many human characteristics, personality traits, capacities, and skills can be linked to decision processes. I presume, that out of the numerous potential causes of decision flaws, human personality traits have the strongest impact on decision quality perceived by stakeholders.

**H6: Factors influencing perceived decision quality, can be incorporated into a model, which — provided each factor is numerically determined — is suitable for forecasting the quality of organizational decision-making as perceived by members of the organization.**

In H1-H5 — in each variable group — I will have identified variables that are the most important for perceived decision quality. I presume that these variables can collectively forecast organizational decision quality. In other words, they can be amalgamated into a set of mathematical functions, which algebraically predict perceived organizational decision quality.

#### 1.4. The research processes

The process of the research is shown in the following diagram (Figure 2: The research process).

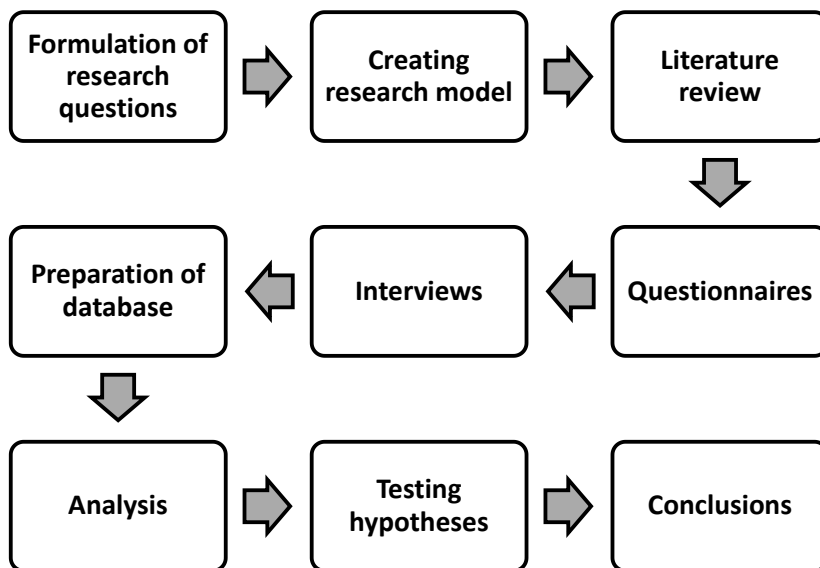


Figure 2: The research process

Source: own edition



## 2. MATERIAL AND METHOD

### 2.1. Data collection

The flagship of data collection in this research is survey method. Bearing in mind the aim to reach a wide range of organizations with minimal expenses and in a short time allotted, this method seemed the most appropriate. The majority of questions use five-grade Likert scale.

The final survey structure:

- Section „A”: questions on the personal background of respondents.
- Section „B”: questions about the standard features of the given organization.
- Section „C”: questions about the operational parameters of the organization and on causes for decision errors.

Target main population is the entirety of Hungarian organizations. According to Hungarian Central Statistical Office, there were 672 322 of them in 2018 (including for-profit, non-profit and all other organizations).

Respondents were members of the following groups:

- Correspondent students of miscellaneous universities and colleges, adult education trainees. These people are all employees who study beside work. I met with them personally, during their school consultations. They received the questionnaires in hardcopies and filled in these on the site. I personally answered all their questions arising.
- Participants of different professional conferences. Like the previous group, they also received hardcopies.
- Web forums, mail lists. They received electronic questionnaires to be filled in online.

- Personal acquaintances. They were sent online questionnaires. Snowball method was fruitful in their case. Not only did they offer me further contacts but also kindly mediated for favourable welcome.
- Clients of banks, accounting offices and consultancy firms. This way, I mainly received names of managers to whom I could send online questionnaires.

The questionnaire was answered by 464 respondents altogether. Out of this, 418 was applicable for further use. Besides questionnaires, structured interviews were also used for the reinforcement of research results. I interviewed 10 organizations.

There were managers and non-managers among interviewees. Their other parameters were also checked.

## **2.2. Statistical methods**

I used univariate (apportionment) calculations and a bivariate (Spearman correlation) statistical methods to describe the characteristics of the sample. I used decision tree method for identifying variables that have the strongest impact on perceived decision quality. I crosschecked the results of these trees by multinomial logistic regression. I invoked factor analysis to form causes of errors into cohesive categories. I applied cluster analysis to classify organizations. The perceived decision qualities of these groups were compared with each other by non-parametric Kruskal-Wallis test. I used discriminant analysis — with the inclusion of variables that are the most related to perceived decision quality — to formulate a mathematical model for forecasting perceived decision quality.

## 3. RESULTS

### 3.1. Testing the hypotheses

#### 3.1.1. Testing H1

**Among standard organizational characteristics, we can identify such features that impact the perceived quality of organizational decisions in an empirically provable way.**

I chose decision tree method for testing this hypothesis. The algorithm found two variables to be significantly related to perceived decision quality: outbound fluctuation ( $P=0,001$ ) and organizational headcount ( $P=0,004$ ).

These results show that higher level of outbound fluctuation causes a decline in perceived decision quality, but it was not possible to prove this in the case of under-average quality decision level. The model also identified headcount as a significant variable on the low-level fluctuation node, although this did not alter the modus of quality. The success rate of model prediction is 50.3% ,68.3% and 0% in the case of mediocre, above average, and sub-average quality categories, respectively. Thus, the overall prediction correctness is 53.1%.

Due to the above results, I reject H1 hypothesis.

#### 3.1.2. Testing H2

**Among the personal features of respondents, we can identify such variables that impact the perceived quality of organizational decisions in a statistically provable way.**

Decision tree method appears fit for testing this hypothesis, too. The results of the decision tree indicate that among all personal features used by this research, employee satisfaction with the job ( $P=0,000$ ) followed by education level ( $P=0,000$ ) — at the “medium level of satisfaction” node — has the

strongest impact on perceived decision quality. The overall prediction hit rate of the model is 61.7%. Average decision quality is predicted correctly in 60.4% of the cases, while this ratio is 63% in the case of above average and 60.8% for sub-average. The decision tree shows a positive correlation between perceived decision quality and employee satisfaction: higher levels of satisfaction is coupled with better decisions. Of course, this may work vice versa, too: the better the decisions, the more satisfied employees are. After satisfaction, education level also has an impact on decision quality: high-educated employees tend to perceive decisions as worse in comparison to employees with lower education.

Consequently, I accept H2 hypothesis.

### **3.1.3. Testing H3**

**Phases of the decision process preceding and following the point of making a decision have an impact on perceived decision quality. Out of these phases, the utilisation of experiences has the biggest effect.**

I used decision tree method to test this hypothesis, as well. The results of the model prove that out of the phases that precede and those that follow choice, implementation has the strongest impact on perceived decision quality: the better the quality of implementation, the better decision quality will be. In the case of medium and high-quality levels of decision quality, decision preparation ( $P=0,009$ ) is also identified as significant, but this variable did not alter the modi of these nodes. Overall prediction correctness ratio was 67%. Average decision quality was predicted 57.2% correct, above average 75%, while sub-average predictions were 64.7% correct.

I accept H3 hypothesis partly: there is a phase among pre- and after-choice phases, but this is not the utilization of experiences. It is implementation.

#### **3.1.4. Testing H4**

**Among the operational parameters of organizations, we can identify those that impact the perceived quality of organizational decisions in an empirically provable way.**

Decision tree was used again for the testing of these hypothesis. The decision tree produced by the algorithm, shows that out of operational parameters stakeholder involvement into decision-making has the most profound effect on perceived decision quality. In the case of organizations that involve their stakeholders at higher levels, perceived decision quality is better. At medium level of involvement, rationality also has an impact: more rational organizations seem to be able to make good decision, while moderately rational ones can make only mediocre decision.

The lowest level of involvement is accompanied by sub-average decision quality. The overall prediction correctness rate of the model was 66.7%. This rate was 57.2% in the case of medium decision quality, 73.1% for above average and 70.6% for sub-average.

I accept hypothesis H4.

#### **3.1.5. Testing H5**

**Among the causes of decision errors, those that are related to the personalities of the participants of the decision, have the strongest effect on perceived decision quality.**

I implemented the testing of this hypothesis in four stages. First of all, I used factor analysis to identify groups of causes for decision errors in which variables are most correlated with one another. Then, I selected variable groups that have the strongest effect on perceived decision quality. In the third step, with the help of these, I created clusters of the organizations.

Lastly, I compared these clusters with one another in relation to perceived decision quality, using a non-parametric test.

The method identified 6 factors:

- Factor 1: toxicity (personality flaw, shortage of skills, irrationality, myopia, self-interest, exaggerated self-confidence).
- Factor 2: inflexibility (errors caused by rules, bureaucracy, pressure from owners).
- Factor 3: conflicts (individual conflicts, group level conflicts).
- Factor 4: lack of self-awareness (self-awareness deficit, self-confidence deficit).
- Factor 5: overload (time shortage, lack of resources).
- Factor 6: turbulence (chance, changeableness).

I used decision tree method to select factors that are most substantial for perceived decision quality. Out of the 6 factors, toxicity — a factor including various personality traits — turned out as the most significant, while inflexibility is second. These are the topmost two factors of factor analysis results. Low levels of toxicity are coupled with higher level of perceived decision quality, while higher levels of toxicity are related to lower level of decision quality. Inflexibility has a role in the case of medium toxicity level. In this case, lower level of inflexibility is in tandem with above average decision quality, while higher-than-average inflexibility is hand-in-hand with medium decision quality. Overall prediction correctness was 62.4%. The best result is in the case of sub-average decision quality: 80.4%. In the case of average quality 63.5%, above average quality 57.2%.

Saving factor scores allows us to classify responding organizations. I used two-step cluster method for this purpose. The input variables for cluster making were toxicity and inflexibility.

The model created 3 organizational clusters:

- Non-toxic: low level of toxicity, low level of inflexibility.
- Toxic: high level of toxicity, low level of inflexibility.
- Inflexible: high level of inflexibility, medium level of toxicity — as compared with the above clusters.

Relationship between these clusters and perceived decision quality can be shown by a non-parametric Kruskal-Wallis test.

It reveals significant differences among the perceived decision quality of these clusters:

- Non-toxic: low level of toxicity, low level of inflexibility, high level of decision quality.
- Toxic: high level of toxicity, low level of inflexibility, low level of decision quality.
- Inflexible: high level of inflexibility, medium level of toxicity — as compared with the above clusters — mediocre level of decision quality.

I accept H5 hypothesis.

### **3.1.6. Testing H6**

**Factors influencing perceived decision quality (standard organisational characteristics, individual background, quality of decision phases, operational features, causes for errors) can be incorporated into a model, which — provided each factor is numerically determined – is suitable for forecasting the quality of organizational decision-making as perceived by members of the organization.**

I used factors identified by H1-H5 hypotheses as impacting perceived quality most, to formulate the complex model. This hypothesis is tested by discriminant analysis.

Result variable is perceived decision quality, while independent variables are those that have appeared to have the strongest impact on it in former hypotheses. These are: implementation quality, outbound fluctuation, involvement, employee satisfaction and toxicity. The analysis revealed two significant discriminatory functions (Function1, Function2). While both functions are significant, Function1 has a much bigger explanatory force versus Function2 (98% vs. 2%). Wilk's lambda indicated good significance level in the cases of both functions (sig=0,000 and sig=0,046, respectively). In the case of Function1, the structure matrix indicates that the most important variables are toxicity, implementation quality, involvement, and employee satisfaction. In the case of Function2, the most important is outbound fluctuation. Overall predictive classification was correct in 71.1%. The ratio of prediction correctness was 78.4%, 64.8% and 74% in the case of sub-average, average and above average perceived decision quality levels, respectively. Consequently, I managed to formulate such discriminant functions — using implementation quality, outbound fluctuation, involvement, employee satisfaction and toxicity — that can predict perceived decision quality in the above sample at a better-than-chance match rate. Therefore, I accept hypothesis H6.

### **3.2. New and innovative scientific results**

This research shows multiple features of Hungarian organizational operative decision-making. More specifically:

1. A mathematical model that can predict the perceived level of organizational operative decision-making, is formulated (H6).



2. It has been proven that out of the groups of decision error causes, variables that belong to toxicity and inflexibility variable groups (e.g. self-interest, excessive self-confidence, bureaucracy) have the strongest influence on perceived decision quality (H5).
3. It has been shown that out of the phases that precede (decision preparation) and follow choice (implementation, ex post evaluation, utilization of experiences), implementation is the most influential regarding perceived decision quality (H3).
4. Based on the empirical research, it has been proven that among standard organizational characteristics, outbound fluctuation has the strongest impact on perceived decision quality (H1).
5. It has been statistically proven that among personal background features of respondents, satisfaction is the most related with perceived decision quality (H2).
6. It has been empirically proven that out of operational parameters, stakeholder involvement influences perceived decision quality most (H4).

## **4. CONCLUSIONS, PROPOSALS**

This study allows us to draw several conclusions and to make proposals.

### **4.1. Conclusions**

#### **4.1.1. The qualification of decisions**

While good decisions are founded by the entirety of the decision process, stakeholders base their judgements on the mere outcomes of decisions. These aspects can be objective but can also be subjective.

The two distinct approaches may parallelly lead to different qualifications of the same decision (Figure 3: Possible differences between objective and perceived decision quality).

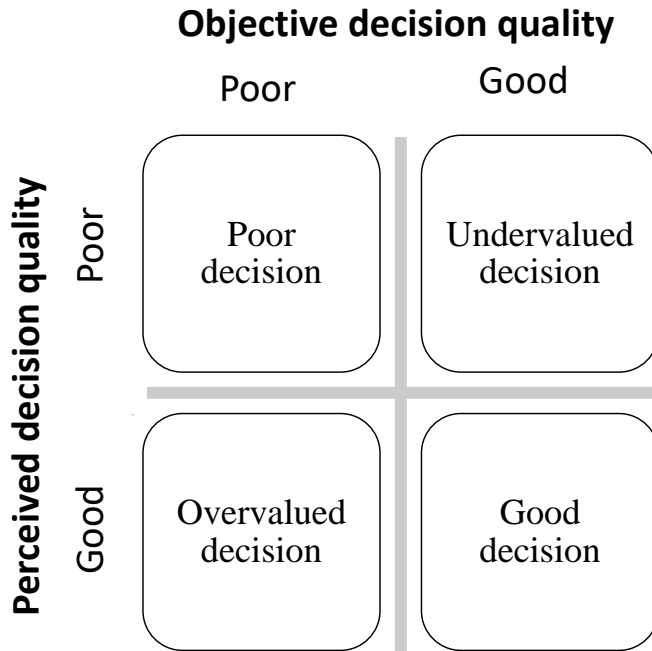


Figure 3: Possible differences between objective and perceived decision quality

Source: own edition

It is in the long-term interest of organizations that stakeholders classify decisions realistically. This is the only way decision-makers can receive multi-aspect feedback on decision quality which is vital for maintaining a high quality decision-making processes. Decisions made by poor quality decision processes may accidentally lead to good outcomes, but this is mostly a gamble. Thus, according to the law of big numbers, outcomes will converge to the real quality of decision processes. In this case, they will be poor. The reversal is true of good quality decision processes.

It is also incorrect to judge decision quality statically. Outcomes that fall behind original goals are not necessarily bad, since circumstances may have changed remarkably in the meantime. On another note, we may encounter such new factors, which should have been taken into consideration before making a decision, but somehow, they were not. Hence, our aspiration level may have rationally changed in the interim. Even making a decision may immediately alter our aspiration level, outdating the very decision itself.

This makes the revision of the decision needful right after the moment of making it. Even if, we continue to strive for widely interpreted profit maximization, we are still forced to adjust our expectations against our decision. As a consequence, even outcomes inferior to original expectations may be good or the other way around: outcomes that at the first glance seem superior to original expectations may justly be considered poor.

#### **4.1.2. The impacts of fluctuation**

The impact of fluctuation on decision quality was only partially identifiable in the sample. It was observable in the case of above average quality decisions, while did not appear in the cases of medium and sub-average decision qualities. I proved this by H1 hypothesis. We can still state that low level outbound fluctuation is beneficial for decision quality. Fluctuation has a danger similar to that of other flaws: getting used to it. If an organization becomes accustomed to a certain level of fluctuation, this habit will infiltrate into organizational culture and soon enough it becomes a new normality. On its side water, decision flaws cropping up from excessive fluctuation also sneak in:

- Losses caused by the inexperience of newcomers at the beginning of their learning curve.
- Losses due to the demotivation of employees who prepare to leave.

- Losses due to the continuous misalignment of employees.
- The potential collapse of the value system of established organizational culture.

#### **4.1.3. Employee satisfaction**

It is worthwhile for organizations to be aware of the overall satisfaction level of employees and also of its drives. The link between satisfaction and fluctuation may break and thus, the two may work detached from each other. High levels of dissatisfaction may occur even if fluctuation is low. This may be deleterious for organizations. Employees with secondary or elementary school level of education tend to rate decision quality higher in contrast with graduated employees. Consequently, proper awareness of employee satisfaction is even more imperative at organizations where graduated employees are in majority.

#### **4.1.4. The involvement of employees into decision-making**

The involvement of employees into decisions exerts profound impact on perceived decision quality. Starting from medium level of involvement up to its highest levels, perceived decision quality appears to be above average. In Hungarian culture, leaders possess definite authoritative power. The picture of a strong leader is the amalgam of flawlessness and omniscience. Therefore, it is not surprising that employee involvement in decisions is one of the least working organizational features. A respectable leader may not even ask subordinates' opinion, even less involve them in decision-making, without risking his/her reputation. Subordinates may not even think of openly criticizing their bosses — not even when it would be well justified.

In lack of sincere feedback, the leader's self-view may deform through many years: the boss starts to firmly believe in his/her invincibility, which is naturally, indeed no more than a destructive daydream.

#### **4.1.5. The implementation of decisions and action phases**

While we ever hear about learning organizations and the significance of organizational learning, it may surprise us that in reality, it is the implementation phase that appears to have the strongest impact — based on respondent opinion — on perceived decision quality. This proposes that decision errors are often caused by managers assume their decisions are properly executed by the rest of the organization. As a matter of fact, implementation may time and again diverge at a great degree from what had been determined in decisions. Hence, consonance between decisions and their implementations has major repercussions on the aftermaths. Managerial control, fine-tuned to the organizational culture, is inevitable.

#### **4.1.6. Organizational toxicity**

Among causes for decision errors, factors related to personality traits turned out as most significant. These can be called toxicity. Second in line is organizational inflexibility, which means that decision processes cannot operate optimally due to organizational rules, bureaucracy or pressure on the organization exerted by its owners. Toxicity and inflexibility may have a joint impact on decision quality. Organizations can position themselves along these two dimensions and they can enhance the force of their corrective measures by concentrating them on the proper issues.

#### **4.1.7. The complex model and the joint impact of factors that have the biggest effect on the perceived quality of decisions**

By using the most decision-quality-related factors, formulating a complex set of mathematical functions, that can forecast organizational decision quality, was successful. Organizations can apply this model for the betterment of their perceived decision quality. They can gauge the input variables by organizational surveys and thus, they can compute perceived decision quality. This way they can not only measure overall decision quality perceived, but also pinpoint the factors that are responsible most. This will reveal organizational strengths and also weaknesses — areas to be ameliorated. The model can be useful for benchmarking multiple organizations. This can be gainful for concerns with numerous branches and for organizations with several directorates.

#### **4.2. Proposals**

- Evaluate decisions not solely by their aftermaths but also by the quality of their processes. By no means should this extended evaluation allow escaping responsibility by excuses.
- Introduce a decision quality audit protocol for the regular and occasional, multiple-aspect evaluation of operative decisions.
- Phase in healthy error culture. Do not let scapegoating take root. Concentrate on the prevention and mitigation of error effects.
- Do not satisfy for the mere detection of errors. Near-misses must also be discovered. These are situations that did not cause errors or accidents only due to good luck.
- For the sake of avoiding harmful tides of fluctuation, thoroughly reveal the causes of people leaving the organization. Exit interview leavers properly and sincerely. Appropriate action must be taken if needed.

- Try to avoid high levels of fluctuation.
- Provided, intensive fluctuation is inescapable, prepare to face its consequences. In such situation, you cannot function the same way as if your fluctuation rate were low. Management practices must be adapted. The importance of management control increases, and the retaining of organizational knowledge becomes a matter of survival.
- Endeavour to keep employee satisfaction high. Do not look at remuneration and financial fringes as cure-all medications.
- Monitor employee satisfaction and its changes.
- As much as applicable, involve employees into all decisions that affect them. This should be done with respect to their individual needs for involvement. Entrench this into organizational culture. Yet, beware of boundaries. Under no conditions shall you abandon your ability to decide.
- Hire employees who are able and willing to properly perform their tasks. Continually improve their skills. Keep their commitment high.
- Give employees feed-back on decision outcomes.
- Secure an adequate information flow. Employees must fully fathom decisions for adequate implementation. Surmounting sheer details is insufficient. They must clearly grasp goals, as well.
- Ward off toxicity. Prevention is a lot easier than cure. This is a managerial duty.
- Establish an organizational ethical codex.
- As a manager, do not underestimate the significance of informal structure. Do not witch-hunt it unnecessarily, but do not allow it excessive power, either. The ability of formal authority to steer the organization is the interest of the organization.

- Once, toxicity has taken root, do not trust the leader who had let it blossom to weed it out. Only owners wield such great a power that this challenge demands.

## **5. THE AUTHOR'S SCIENTIFIC PUBLICATIONS IN THE FIELD OF THE DISSERTATION**

### **Journal articles – in English**

1. Anton F.B., Poór J., Csapó I., Zsigri F. (2017): Determinants of Management Consulting in Croatia and Hungary – Similarities and Differences in Light of Market and Organisational Culture. In: *OBRAZOVANJE ZA PODUZETNISTVO - E4E*, 7 (2), pp. 161-174. (ISSN: 1849-7845)
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5. Zsigri F. (2020): The role of mindsets in decision-making. In: *HADTUDOMÁNY, ELECTRONIC ISSUE*, pp. 1-15. DOI: 10.17047/HADTUD.2020.30.E.1  
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1. Poór J., Zsigri F., Sós T. (2019): A német minta és a hazai gyakorlat, a felsőoktatási duális képzés területén. In: *MUNKAÜGYI SZEMLE ONLINE*, 62 (6) 41-54. p. (ISSN: 2064-3748)
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### **Full conference papers – in English**

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4. Zsigri F. (2018): Real World Decision Making. pp. 712-717. In: Bylok F., Albrychiewicz A., Cichoblazinsky L. (eds.): *8th International Conference on Management: Leadership, Innovativeness and Entrepreneurship in a Sustainable Economy : Book of Proceedings* (2018)(Czestochowa, Poland). p. 723. (ISBN: 978-83-65951-28-1)
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1. Zsigri F. (2018): Az e-learning helyzete szakirodalmi áttekintés alapján. pp. 689-698. In: Illés B. Cs. (szerk.): *Gazdálkodás- és szervezéstudomány: új kihívások az elméletben és gyakorlatban – Volume 2* (2018)(Gödöllő). p. 714. (ISBN: 978-963-269-832-8)
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