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# THE SHADOW PHASES OF PRECARIOUSTHINKINGFOR LEADERSHIP, SOCIETY AND INDUSTRY 4.0

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## ABSTRACT

The research focuses on selected aspects of critical thinking in the context of leadership in a modern environment, from thepoint of view of selecting and preparing professionals and leaders. Critical thinking involves an important set of competencies, skills, and behaviours that can be systematically developed and cultivated. It discusses, in particular, the changes in the professional quality requirements related to the development of industry and society 4.0 as well as selected situational and systemic contexts in which the critical thinking applies in the process of cognition, decision making, and action of professional leaders.The concept of digitizing everything is becoming a reality. Automation, artificial intelligence, IoT, machine learning and other advanced technologies can quickly capture and analyse a wealth of data that gives us previously unimaginable amounts and types of information to work from. Our challenge becomes moving to the next phase—changing how we think, trains and work using data—to create value from the findings obtained through advanced technologies."

***Key Words:*** *Critical thinking, Automation, Internet of Things(IoT).*

## 1. INTRODUCTION

*Critical thinking* is an applied skill that needs to be developed in *leaders* at all levels in all organizations. There is a perception among some that *critical thinking* is a challenging skill to develop. That perception is opinion-based and has no tangible evidence.

Critical Thinking is synonymous with skills necessary to become a master of leadership. With the affluence of information that is easily accessible and

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the gigs of information's that are available to us that has never been available before, being thorough in validating the information's has become exponentially vital to your success.

Critical thinking is an objective way to assess situations and take actions. It requires elimination of false assumptions and evaluation of criteria-based thought for the purpose of drawing analytics-based conclusions and actualizing organizational potential.

Critical thinkers are skeptics (this does not translate to pessimists) –…think Yoda, not Homer Simpson. Critical thinkers and skeptics seek alternative viewpoints (though don't accept all views) from a non-emotional, yet emotionally-intelligent, non-biased, analytical perspective; they discover truths, communicate clearly and transparently, make decisions, and solve problems based on valid inferences and fact-based scientific comparisons and contrasts.

**Why It Matters**

Critical thinking is applicable whenever need arises to resolve a challenge. This happens regularly in all workplaces at all levels of leadership. Poor decisions almost always negatively impact, sometimes seriously so, business performance. To mitigate this risk, high-performing organizations rely on their leaders to be critical thinkers. In fact, our own research, and as corroborated by others, identifies critical thinking as the single most important skill for leaders and managers in all organizations.

The term Industry 4.0 refers to the combination of several major innovations in digital technology, all coming to maturity right now, all poised to transform the energy and manufacturing sectors. These technologies include advanced robotics and artificial intelligence; sophisticated sensors; cloud computing; the Internet of Things; data capture and analytics; digital fabrication (including 3D printing); software-as-a-service and other new marketing models; smartphones and other mobile devices; platforms that use algorithms to direct motor vehicles (including navigation tools, ride-sharing apps, delivery and ride services, and autonomous vehicles); and the embedding of all these elements in an interoperable global value chain, shared by many companies from many countries. It identifies and develops the qualities and competencies of professionals, leaders, and teams to pursuit functions and activities in such organized conditions and circumstances of missions, situations, and tasks in the security environment.

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## 2. *Analysis of Characteristics of Environment and Requirements for Individuals*

Human Systems and Their Management. The environment that we create as human beings with specific ways of life in different communities is changing and transforming more dynamically than the natural environment. In relation to these changes and transformations the requirements on the quality and capabilities potential of the professionals and leaders, i.e. people who pursuit specific functions and activities related to the organization and management of human systems, are changing either. The environment created by people in the process of human community development has approached the parameters of the unstable environment due to various specific changes and transformations (modern information technologies, globalization, etc.). We identify the characteristic aspects that are indicative of this approach in several areas:

I. Technologies, their development, and application
II. Relationships and their development
III. Thinking, cognition, and information

A partial summary: In terms of the natural potential of human resources in the 4.0 environment, the most significant is the problematics of digitalization of information, artificial intelligence, virtual reality, and mediated communication. All these aspects have, besides undisputed direct and obvious advantages and positive effects, also secondary and asymmetric, hidden or shadowed, complex and nonlinear influences and effects on the psychical condition, mind, and thinking of individuals or communities. The shadow effect of digitization and mediated communication is recorded in two modalities. The first suggests that their excessive use gradually transforms the quality of self-consciousness in the full sense of the term. The second effect associated with the growth of digitization, algorithmization and artificial intelligence is the reduction of intuition and analogy in cognitive processes and the creation of knowledge for decision-making and action in a particular situation, and a reduction in spontaneous adaptability to changes in the conditions and circumstances of task situations.

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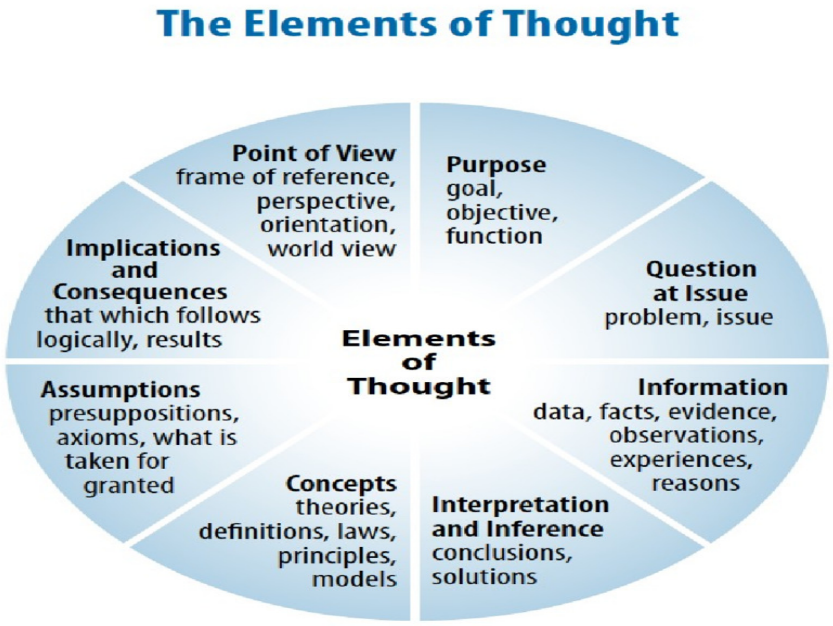


### 2.1. Systemic (ecological) and Situational Mobility

Systemic (ecological) mobility refers to the environment, and is characterized by the ability to stay in an environment with predominantly artificial characteristics and in environments with predominantly natural characteristics as well as in professional and collaborative environments. Situational mobility is shaped asproactivity in the adaptability of changing conditions and circumstances.

### 2.2. Mobility in Relationships

This mobility includes social and organizational mobility. It is manifested on the social continuum (individual vs. team member), on the organizational continuum (hierarchical vs. network organizational structures) and on the management continuum (management/ leadership).

### 2.3. Mental Mobility

It represents the thinking in terms of the ability to generate knowledge for decision-making and action in the process of fulfilling the task and its most effective management (energy / least demanding way of performance).

Mobility on a cognitive, ecological, situational, social, and organizational continuum requires, in the end, a change of the attitude of each team member (the individual), in favor of personal self-development and self-fulfilment, individual development and cultivation of natural potential in the profession and position.The above-mentioned trends and requirements for the level of quality potentials of individuals and human systems require an upgrade in understanding the terms of management

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and leadership. They also need new approaches to identifying and developing the resources, potentials, and qualities of professionals and leaders operating in the current environment.

***3. Think Critically and Imaginatively***

- Engage the imagination to explore new possibilities.
- Formulate and articulate ideas.
- Recognize explicit and tacit assumptions and their consequences.
- Weigh connections and relationships.
- Distinguish relevant from non-relevant data, fact from opinion.
- Identify, evaluate and synthesize information (obtained through library, world-wide web, and other sources as appropriate) in a collaborative environment.
- Engage the imagination to explore new possibilities.
- Reason toward a conclusion or application.
- Understand the contributions and applications of associative, intuitive and metaphoric modes of reasoning to argument and analysis.
- Analyze and draw inferences from numerical models.
- Determine the extent of information needed.
- Access the needed information effectively and efficiently.
- Evaluate information and its sources critically.
- Incorporate selected information into one's knowledge base.
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally.

**3.1 Problem-Solve**

- Identify and define central and secondary problems.
- Research and analyse data relevant to issues from a variety of media.
- Select and use appropriate concepts and methods from a variety of disciplines to solve problems effectively and creatively.
- Form associations between disparate facts and methods, which may be cross-disciplinary.
- Identify and use appropriate technology to research, solve, and present solutions to problems.
- Understand the roles of collaboration, risk-taking, multi-disciplinary awareness, and the

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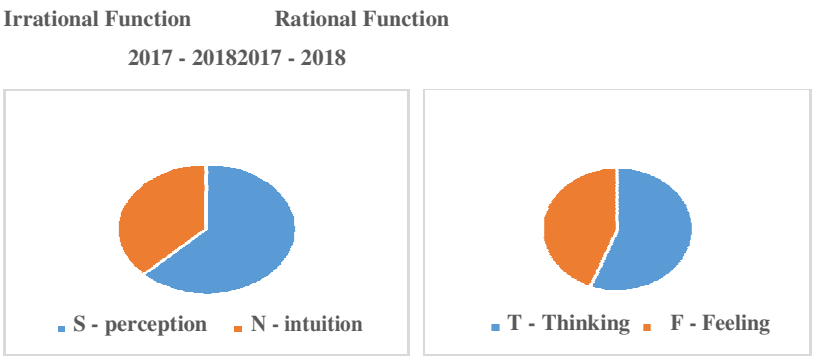
imagination in achieving creative responses to problems.

- Make a decision and take actions based on analysis.
- Interpret and express quantitative ideas effectively in written, visual, aural, and oral form.
- Interpret and use written, quantitative, and visual text effectively in presentation of solutions to problems.

## 4. RESULTS AND DISCUSSION

The results of the environmental analysis suggest that the importance of mental condition and cognitive potential for critical thinking is growing, and it turns out that the quality of mind, thought, and knowledge of a particular individual is a commonelement or a central quality, potential and competence involved in all other competencies. This mental "vitality", as a central quality, has at least two modalities.

The first modality involves critical thinking; mobility on the cognitive continuum and optimal condition of mental functions involved in perception and cognition. The other modality can be considered as a mental mobility for decision-making and action in situations and tasks. Dominant characteristics of this modality are spontaneity (openness, curiosity, and courage) and flexibility (flexibility of thinking). The aspects of the first modality can be traced to a certain extent by various tests that measure the quantity and quality of performance of psychical and executive functions. The other modality level can be analyzed with the help of selected personality aspects that are identified by the different methods of personality questionnaires. Critical thinking as the mobility on a cognitive continuum, concerns both the functions and capacities involved in cognition for correct decision-making and effective action in the situations and the personality, in terms of the inner environment of individuals who evolve in this environment or are temporarily present within.

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| Core Outcomes | |
|---|---|
| **Sample Indicators** | |
| **Level 1**<br>• Limited demonstration or application of knowledge and skills. | • Identifies the main problem, question at issue or the source's position.<br>• Identifies implicit aspects of the problem and addresses their relationship to each other. |
| **Level 2**<br>• Basic demonstration and application of knowledge and skills. | • Identifies one's own position on the issue, drawing support from experience, and information not available from assigned sources.<br>• Addresses more than one perspective including perspectives drawn from outside information.<br>• Clearly distinguishes between fact, opinion and acknowledges value judgments. |
| **Level 3**<br>• Demonstrates comprehension and is able to apply essential knowledge and skill. | • Identifies and addresses the validity of key assumptions that underlie the issue.<br>• Examines the evidence and source of evidence.<br>• Relates cause and effect.<br>• Illustrates existing or potential consequences.<br>• Analyzes the scope and context of the issue including an assessment of the audience of the analysis. |
| **Level 4**<br>• Demonstrates thorough, effective and/or sophisticated application of knowledge and skills. | • Identifies and discusses conclusions, implication and consequences of issues considering context, assumptions, data and evidence.<br>• Objectively reflects upon own assertions. |

## CONCLUSION

The above results serve only as illustrations and suggestions for reflection. They correspond to our "intuitions"and "feelings and insights" of the professionals involved in the selection and preparation, as well as to the need to innovate and adapt the methods of preparation and verification of results to changes in population and environment. Experience shows both theneed for a comprehensive, multidisciplinary approach to identifying the qualities of their potentials and the need to incorporate elements that enable support, training and development of various aspects of critical thinking in favour of mobility on the cognitive continuum. This issue is being focused by the complex project, the program, for the preparation of which we used the analysis and the pilot study, from which we have chosen and presented only partial

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aspects.The requirements of an environment and a situation for the pursuit of activities and functions are constantly evolving and changing.

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