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ORGANIZATION MANAGEABILITY ENHANCED THROUGH TOPOLOGICAL MODULAR FORMS

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Abstract. Organizational manageability is a crucial aspect of business management, requiring a combination of forecasting, planning, organizing, implementing, controlling and decision-making. Topological modular forms study the properties of objects that are invariant under certain types of transformations and the authors search for and identify a set of key factors that are essential to the organizational manageability (both stable and unstable) and create a framework that captures these factors. Organizational manageability is highly complex and multifaceted field that requires the integration of mentioned elements. In order to simplify incommensurable complexity, authors offer the hypothesis that differentiating the approach to manageability in the two distinct situations "steady and familiar condition" and "unsteady and with considerable uncertainty condition" is effective. Discrimination between those two situations is essential for business success and requires a deep understanding of market trends, customer needs, design of organization and usage of resources. By mastering the principles of organizational manageability based on mentioned classification of situations, businesses can improve their performance, increase their competitiveness and achieve their goals more effectively.

Keywords: controllability, knowledge, performance, topology, uncertainty

Rezumat. Capacitatea de gestiune a organizației este un aspect crucial al managementului afacerii, care necesită o combinație de prognoză, planificare, organizare, implementare, control și luare a deciziilor. Formele topologice modulare studiază proprietățile obiectelor care sunt invariante sub anumite tipuri de transformări și autorii caută și identifică un set de factori cheie care sunt esențiali pentru gestionabilitatea organizațională (atât stabili, cât și instabili) și creează un cadru care surprinde acești factori. Prin prezentul articol autorii își setează obiectivul de a elucida elementele care influențează capacitatea de gestiune a organizației, valorificând importanța fiecăruia dintre aceste elemente în atingerea succesului în afaceri. Gestionabilitatea organizațională este un domeniu extrem de complex și multifațetat care necesită integrarea elementelor menționate. Pentru a simplifica complexitatea incomensurabilă, autorii propun ipoteza că diferențierea abordării capacității de gestiune organizațională în cele două situații distincte "situație stabilă și cunoscută" și "situație instabilă și cu mare incertitudine" este eficientă. Discriminarea între aceste două

situații este esențială pentru succesul afacerii și necesită o înțelegere profundă a tendințelor pieței, nevoilor clienților, proiectării și gestionării organizației și utilizării resurselor. Prin stăpânirea principiilor gestionabilității organizaționale pe baza clasificării menționate a situațiilor, organizațiile își pot îmbunătăți performanța, își pot crește competitivitatea și își pot atinge obiectivele mai eficient.

Cuvinte-cheie: capacitate de gestionare a organizației, cunoștințe, performanță, topologie, incertitudine.

1. Introduction

In the actual article, we approach manageability from the perspective of modular decision making or topological modular forms and it serves as a continuation of our previous article [1].

The notion "manageability" is used in wide range of domains such as construction [2], software engineering [3], manufacturing [4], computing networks [5], transportation [6], production [7]. There are several key elements of the manageability that are essential to effectively managing an organization and these include: clear goals and objectives, effective communication, strong leadership, efficient use of resources, effective decision-making, continuous improvement, performance measurement, adapting to change, empowering employees. "Model modular decision making or topological modular forms" indicates that by breaking down a complex organization into smaller, more manageable modules, decision making becomes easier and more efficient. This can improve the overall manageability of the organization, as decisions can be made more quickly and with greater precision at the module level, rather than relying on a centralized decision-making process. All these elements of manageability work well together in an organization to achieve its goals, improve performance and remain competitive in the marketplace with one essential condition: when the actual and future "situations are stable and known". We are referring to our previous discussion published in the article [1]. What is outcome on manageability of organization is dealing with fluctuations in activity of organization, which is closer to "unstable and with large uncertainty situations"?

In present article we will use a few terms from our previous article: "knowledge in decision making process", "stable and known situation", "unknown in decision making process", "unstable and with large uncertainty situation" [1, pp. 84-85], where the precise definitions of the aforementioned terms can be found.

2. Materials and Methods

Let us start with broad definition of manageability used in current article. Organizational manageability is defined here as the degree to which a system or situation can be effectively directed towards a desired outcome (manageability as knowledge and unknown). While there are many factors that contribute to manageability, one way to represent it as a metaphorical formula is:

$$\vec{M} = \frac{\vec{k}}{u} \tag{1}$$

where \vec{M} is manageability of specific situation (as vector: magnitude and direction), \vec{k} is knowledge in decision making process for specific situation (as vector: magnitude and direction), u is unknown in decision making process for specific situation (as scalar: magnitude, without a direction).

By dividing knowledge by unknown, we can see that manageability increases as knowledge increases or unknown decreases. This means that the more information and understanding a manager or organization has about a system or situation, the better equipped they are to manage it effectively and achieve their desired outcomes. When there are fewer unknown factors and more certainty, the system or situation becomes more manageable because decision-making becomes more straightforward and predictable. Conversely, the more uncertainty and unknown factors there are, the less manageable the system or situation becomes and plan for the future and as a result, decision-making becomes more challenging.

Of course, this formula is a simplified representation of manageability and there are many other factors that contribute to how easy or difficult it is to control a system or situation. However, by considering the role of knowledge and unknown, we can see how important it is to continually gather information and develop a deep understanding of the systems and situations we are trying to manage.

The expression of manageability through the metaphor is fine for imagination, but not practical for calculation. What are the modular elements that form the structure of organization's manageability expressed by exact formula?

In our research these modular elements are: forecasting, planning, organizing, implementation, controlling, risk mitigation, uncertainty reducing activity.

In the article we designed manageability activities with a dual approach, in a modular form, incorporating elements that bolster management (through formula – from the perspective of "knowledge in decision making process" and "stable and known situation") and factors that impede manageability (through descriptors – organization from the perspective of "unknown in decision making process" and "unstable and with large uncertainty situation"). Authors apply minimalist approach to presented formulas (most known and simplest) taking into consideration huge number of methods, techniques, procedures and formulas for each modular element.

A.1 Manageability as forecasting activity in organization from the perspective of "knowledge in decision making process" and "stable and known situation"

There are several forecasting formulas that organizations can use to predict future trends and make informed decisions. Here are some of the most commonly used formulas: A.1.1 *Moving Average (MA) Forecasting Formula:*

$$MA = \frac{(X_1 + X_2 + X_3 + \dots + X_n)}{n}$$
(2)

where $X_1, X_2, X_3, ..., X_n$ are the values of the data set and n is the number of periods. A.1.2 Weighted Moving Average (WMA) Forecasting Formula:

$$WMA = \frac{[(sw_1 * X_1) + (sw_2 * X_2) + (sw_3 + X_3 \dots + (sw_n + X_n)]}{(sw_1 + sw_2 + sw_3 + \dots + sw_n)}$$
(3)

where $X_1, X_2, X_3, ..., X_n$ are the values of the data set and $sw_1, sw_2, sw_3, ..., sw_n$ are the corresponding situational weights.

A.1.3 *Exponential Smoothing (ES) Forecasting Formula:*

$$F_{(t+1)} = \beta * Y_{(t)} + (1 - \beta) * F_{(t)}$$
(4)

where $F_{(t+1)}$ represents the future value of forecast, $Y_{(t)}$ denotes the factual amount for present timeframe, $F_{(t)}$ stands for the estimate concerning the current interval and β denotes the coefficient of smoothing (0< β <1).

A.1.4 Seasonal Index (SI) Forecasting Formula:

$$SI = \frac{(Average of values in a season)}{(Overall average in all seasons)}$$
(5)

where SI is the seasonal index for a particular season.

A.1.5 Trend Analysis (TA) Forecasting Formula:

$$TA = a + bt \tag{6}$$

where a serves as the intersection point of the line, b indicates the steepness of the line and t denotes the temporal interval.

A.1.6 Regression Analysis (RA) Forecasting Formula:

$$Y = a + bX \tag{7}$$

where Y is the dependent variable, X is the independent variable, a is the intercept and b is the slope. Should be taken into consideration that the choice of formula will depend on the type of data being analyzed and the specific needs of the organization.

A.2 Manageability as forecasting activity in organization from the perspective of "unknown in decision making process" and "unstable and with large uncertainty situation"

As mention authors of [8] advanced forecasting methods show promise in predicting oscillated demand in supply chain management, but their effectiveness may be limited by current policies and data availability and trade-offs between reducing demand amplification and managing operating costs or excess inventory must be carefully considered. Effective supply chain management is critical for accurate forecasting and risk identification is an important component of this process. Assessing the impact of risks on the supply chain and employing mitigation strategies can help companies manage disruptions and improve forecasting accuracy.

In "The signal and the noise: why so many predictions fail - but some don't" [9] Nate Silver emphasizes the importance of distinguishing between true signals and random noise in the world of predictions. He argues that those who can make accurate predictions must understand the limits of their data and avoid overconfidence in their models.

In "Prediction machines: the simple economics of artificial intelligence" [10] Agrawal, Gans and Goldfarb argue that Al's impact on the economy will be characterized by lower costs for predictions and decisions, but that it is important for individuals and organizations to think strategically about how to leverage these technologies in order to achieve long-term success. "The black swan" [11] by Nassim Taleb argues that rare and unpredictable events, such as financial crises or major technological advancements, have a greater impact on our world than regular occurrences and we should be prepared for them and in a world of extreme events, it is impossible to predict everything (ambiguity, disorder, lack of attention and decision-making within the realm of unfamiliarity and limited knowledge) and the best mode to deal with uncertainty is to be resilient and adaptable.

Author of the book "Age of invisible machines: a practical guide to creating a hyper automated ecosystem of intelligent digital workers" [12] by Robb Wilson is to use process mining to identify and optimize business processes. Process mining is a technique that involves analyzing data from event logs to discover, monitor and improve real processes by extracting knowledge from data. By using process mining tools, organizations can identify inefficiencies and bottlenecks in their processes and develop strategies to optimize them. Wilson explains that process mining can help organizations in several ways, such as: identifying bottlenecks, measuring performance, improving compliance, predicting outcomes (mentioned process mining can be used to analyze historical data and make predictions about future process performance).

One practical idea from "Applied predictive modeling" [13] by Max Kuhn and Kjell Johnson is to carefully consider the choice of evaluation metric when comparing the performance of different predictive models. The authors emphasize that accuracy is not always the best metric to use, particularly when dealing with imbalanced datasets or when the cost of false positives and false negatives is different. Instead, they recommend considering alternative metrics such as sensitivity, specificity, positive predictive value, negative predictive value, depending on the specific problem at hand. Additionally, they advise using cross-validation to obtain a more reliable estimate of model performance and to avoid overfitting by keeping the number of predictor variables and complexity of the model under control. Real-world guidance from the book "Data mining techniques: for marketing, sales and customer relationship management" [14] by Michael Berry and Gordon Linoff is "to use multiple modeling techniques and compare results. No single modeling technique is always best for a given problem. Try a variety of techniques and compare their results to find the best approach for your specific problem." [14, p. 38]. Actionable recommendation from [14] is to use "lift charts" to evaluate the effectiveness of predictive models. A lift chart is a graphical representation of how well a predictive model is able to differentiate between positive and negative outcomes. It compares the results of the predictive model to random chance and shows how much better the model performs than random chance. To create a lift chart, the authors suggest dividing the data into ten equal segments based on the predicted probability of the positive outcome. Then, for each segment, the actual percentage of positive outcomes is calculated and compared to the expected percentage based on random chance. The lift chart can help to identify which segments of the data the model is performing well on and where it may be falling short. This information can be used to refine the model and improve its accuracy.

Summarizing mentioned sources as well how we think about forecasting we create a short list of factors could remain undiscovered during forecasting and may reduce the manageability of organization:

A.2.1 *External market conditions:* Factors such as changes in consumer demand, shifts in economic trends and geopolitical events can have a significant impact on the success of an organization. These factors may be difficult to predict and can result in unexpected changes to forecasting models.

A.2.2 *Competitor actions:* Competitors may change their products, services, pricing strategies, or other aspects of their business that could impact an organization's forecasting accuracy.

A.2.3 *Technology developments:* Advances in technology can rapidly disrupt markets and alter consumer behaviors. It can be challenging to anticipate how these changes will affect an organization's forecast.

A.2.4 *Regulatory changes:* Changes in laws or regulations can have a significant impact on an organization's operations and financial performance. These changes may be difficult to predict, particularly in industries with frequent regulatory changes.

A.2.5 *Internal organizational changes:* Changes in organizational structure, leadership, or culture can impact forecasting accuracy. For example, a shift in strategy or a change in management could result in changes to budgets, staffing, or other factors that could affect forecasting models.

B.1 Manageability as planning activity in organization from the perspective of "knowledge in decision making process" and "stable and known situation"

There are many different formulas that can be used to help organizations plan, depending on the specific goals, objectives and circumstances involved. Here are some common formulas that may be useful to evaluate the manageability of organization from the perspective of planning:

B.1.1 *Budgeting formula:* Budgeting is an essential component of organizational planning. A simple budgeting formula is:

a. *Revenue:* This formula helps to estimate the total revenue generated by the organization, taking into account the price of the product or service and the quantity sold.

$$Revenue = Unit Price * Quantity$$
(9)

b. *Cost of Goods Sold (COGS):* This formula helps to calculate the cost of goods sold during a particular period by considering the beginning inventory, purchases made during the period and the ending inventory.

$$COGS = Beginning Inventory + Purchases - Ending Inventory$$
 (10)

c. *Gross Profit*: This formula helps to calculate the gross profit earned by the organization after deducting the cost of goods sold from the total revenue generated.

$$Gross Profit = Revenue - COGS$$
(11)

d. *Operating Expenses:* This formula helps to estimate the operating expenses of the organization by taking into account the fixed costs and variable costs. Fixed expenditures are costs that remain unaffected by alterations in output or sales, such as lease payments, administrative personnel salaries, taxes. Variable expenditures are costs that vary in direct correlation with changes in output or sales, encompassing raw materials, packaging, transportation and sales commissions. These costs fluctuate based on the level of production or sales, implying that as the company manufactures or sells more units of the product, its variable costs will rise.

$$Operating Expenses = Fixed Costs + Variable Costs$$
(13)

B.1.2 *Break-even analysis formula:* This formula helps organizations determine the minimum amount of revenue needed to cover their expenses. It is calculated as:

$$Break - even point = Fixed costs / (Price - Variable costs)$$
 (14)

B.1.3 *Return on investment (ROI) formula:* This formula helps organizations determine the profitability of an investment. It is calculated as:

$$ROI = \frac{(Gain from investment-Cost of investment)}{Cost of investment}$$
(15)

B.1.4 *Cost-benefit analysis formula:* This formula helps organizations weigh the costs and benefits of a proposed plan or investment. It is calculated as:

$$Cost - benefit ratio = Total benefits / Total costs$$
 (16)

B.1.5 *Plan management formula:* Plan management formulas are used to plan, monitor and control plan activities. Some common plan management formulas include (we used the expression "plan management" as equivalent to "project management" in the limits of current article):

a. *Earned value management (EVM) formula:* EVM helps organizations track plan progress and forecast plan costs. It is calculated as:

$$EVM = Planned value (PV) * \% complete$$
 (17)

b. *Critical path method (CPM) formula:* CPM helps organizations identify the critical path through a plan and estimate plan duration. It is calculated as:

CPM = Early start (ES) + Activity duration (D) + Early finish (EF) (18)

c. *Program evaluation and review technique (PERT) formula:* PERT helps organizations estimate the expected duration of a plan. It is calculated as:

 $PERT = \frac{Optimistic \ estimate + 4 \ x \ Most \ likely \ estimate + Pessimistic \ estimate}{(19)}$

B.2 Manageability as planning activity in organization from the perspective of "unknown in decision making process" and "unstable and with large uncertainty situation"

Here is pragmatic pointer from the book "Strategic planning: a practical guide to strategy formulation and execution" [15] by B. Keith Simerson: use scenario planning to anticipate and prepare for multiple future possibilities. Simerson emphasizes the importance of scenario planning as a tool for strategic planning. Scenario planning involves creating multiple, plausible scenarios for the future based on different assumptions and drivers and then analyzing the potential impact of each scenario on the organization's goals and strategies. This approach helps organizations anticipate and prepare for a range of possible futures, rather than relying on a single forecast. We would like to mention that usually this approach is strongly rejected by high management as "too costly" or "it was not budgeted" as it requires more resources and rejection do not depend of scale of organization.

The author Eric Ries state in the book "The lean startup" [16] is to use the "Build-Measure-Learn" feedback loop to continuously improve the product or service. This means creating a Minimum Viable Product (MVP), measuring how customers interact with it and then learning from their feedback to make improvements. As Eric Ries explains, "The fundamental activity of a startup is to turn ideas into products, measure how customers respond and then learn whether to pivot or persevere. All successful startup processes should be geared to accelerate that feedback loop." To implement this tip, entrepreneurs should first identify the key metrics that they want to measure to evaluate the success of their product. They should then build a simple version of the product that allows them to test these metrics with real customers. Finally, they should analyze the data and feedback they receive to identify areas for improvement and make necessary changes to the product.

One tangible technique from the book "Strategic planning: a practical guide for competitive success" [17] by Stanley C. A. is: "Focus on a limited number of strategic priorities" [17, p. 62]. The authors argue that a common mistake in strategic planning is trying to pursue too many goals at once, which can dilute the organization's efforts and resources. Instead, they recommend identifying a few high-priority strategic initiatives that align with the organization's mission and vision and focusing on those with intensity and discipline. To implement this tip, the authors suggest using a "priority matrix" that evaluates potential initiatives based on factors such as strategic fit, feasibility and impact. This can help leaders make informed decisions about where to allocate resources and attention.

There are some aspects might be uncertain during planning and constrain the manageability of organization:

B.2.1 *Resource availability:* The availability of resources like manpower, equipment and supplies may be uncertain during the planning process.

B.2.2 *Budget:* The amount of funding available for the plan may not be fully known or may be subject to change.

B.2.3 *Stakeholder requirements:* The needs and expectations of stakeholders involved in the plan may not be fully understood or may change over time.

B.2.4 *Timeline*: The timeline for the plan may be impacted by unforeseen events or delays, making it difficult to accurately plan.

B.2.5 *Regulations and legal requirements:* Changes to regulations and legal requirements may impact the plan and may not be fully known during the planning phase.

B.2.6 *External factors:* External factors such as economic conditions, weather, or political instability may impact the plan in ways that are difficult to predict.

B.2.7 *Technical challenges:* Technical challenges may arise during the plan that were not anticipated during the planning phase.

B.2.8 *Human factors:* The behavior or performance of individuals involved in the plan may not be fully predictable or may change over time.

B.2.9 *Communication challenges:* Communication challenges may arise during the plan that were not anticipated during the planning phase.

B.2.10 *Risks*: Risks to the plan, such as safety hazards, economical threats, or environmental risks, may not be fully known or understood during the planning phase.

C.1 Manageability as organizing activity in organization from the perspective of "knowledge in decision making process" and "stable and known situation"

From the perspective of manageability there are some formulas that can be used to calculate organizing activity in an organization:

C.1.1 *Span of Control:* This formula is used to determine the number of employees that a manager can effectively supervise.

Span of Control = Number of Subordinates / Number of Managers (20)

C.1.2 *Workload Analysis*: This formula helps determine the amount of work that needs to be assigned to employees.

C.1.3 *Staffing Ratio:* This formula helps determine the number of employees needed to complete a plan or task.

Staffing Ratio = Number of Employees Required / Volume of Work (22)

C.1.4 *Resource Allocation:* This formula helps allocate resources such as personnel, budget and equipment to various plans or departments.

Resource Allocation = Total Resources / Number of Plans or Departments (23)

C.1.5 *Job Design:* This formula helps design jobs to ensure that they are efficient and effective.

Job Design = Job Requirements / Employee Skills(24)

C.1.6 *Workforce Planning:* This formula helps to plan for the future workforce needs of an organization.

Workforce Planning = Future Business Needs / Current Workforce Skills (25)

C.2 Manageability as organizing activity in organization from the perspective of "unknown in decision making process" and "unstable and with large uncertainty situation"

Valuable input from the work "Strategic cost management: the new tool for competitive advantage" [18] by Shank and Govindarajan is to use target costing to manage costs throughout the product development process. Target costing is a proactive cost management technique that involves setting a target cost for a product and then designing the product to meet that cost. The target cost is based on the price at which the product can be sold in the market and still achieve the desired profit margin. According to Shank and Govindarajan, target costing can be implemented in three steps: determine the target cost, design the product to meet the target cost, monitor and refine the process. By using target costing to manage costs, companies can avoid cost overruns and ensure that their products are priced competitively in the market.

One practical advice from the "Managerial accounting" [19] by Ray Garrison, Eric Noreen and Peter Brewer: use activity-based costing (ABC) to accurately allocate indirect costs. ABC is a costing method that assigns indirect costs to products or services based on the activities required to produce them. It's useful in situations where traditional costing methods, such as direct labour or machine hours, don't accurately reflect the indirect costs associated with different products or services.

Helpful recommendation from the "Financial accounting: information for decisions" [20] by John J. Wild, Ken W. Shaw and Barbara Chiappetta is matching principle. This principle is crucial in financial accounting because it ensures that the financial statements accurately reflect the profitability of a business in a given period. By matching expenses with the related revenues, the income statement provides a more accurate picture of the company's performance, which helps stakeholders make informed decisions.

It is likely that some aspects could be unfamiliar during organizing activity in an organization:

C.2.1 *Resource availability:* It is possible that the resources required for organizing an activity, such as time, budget and personnel, may not be readily available or may have changed since the planning phase.

C.2.2 Availability of key stakeholders: The participation and availability of key stakeholders, such as sponsors, executives and subject matter experts, can impact the success of an organizing activity. Their schedules may change, or they may not be available when needed. C.2.3 *Interpersonal dynamics:* The relationships and dynamics between team members, stakeholders and leadership can impact how an organizing activity unfolds. Personality clashes or conflicts between team members can impact the success of the organizing activity. C.2.4 *Technological challenges:* Technology can be a significant factor in organizing an activity, from coordinating schedules to communicating with team members. Technical difficulties or a lack of familiarity with new technology can create obstacles.

C.2.5 *Unforeseen events or crises:* Unforeseen events or crises, such as natural disasters, pandemics, or sudden changes in the market, can disrupt the planning and execution of an organizing activity.

C.2.6 *Regulatory changes:* Regulatory changes can impact an organizing activity, such as new laws or regulations that affect the industry or market in which the organization operates.

C.2.7 *Unexpected costs:* Unexpected costs, such as unexpected fees or increases in the cost of materials, can impact the budget and planning of an organizing activity.

C.2.8 *Competing priorities:* Competing priorities within the organization, such as other plans or initiatives, can impact the availability of resources and personnel needed for the organizing activity.

D.1 Manageability as implementation activity in organization from the perspective of "knowledge in decision making process" and "stable and known situation"

There are many different activities that can fall under implementation in an organization, so here are a few formulas for calculating specific implementation activities:

D.1.1 *Employee productivity:* Employee productivity can be calculated by dividing the total output by the total input.

D.1.2 *Budget implementation:* To calculate the percentage of budget implementation, divide the actual expenses by the budgeted amount and multiply by 100.

D.1.3 *Time to market:* Time to market can be calculated by subtracting the start date of the plan from the date the product is launched. Here there are variation how to calculate (starting time, finishing time).

D.1.4 *Quality assurance:* The defect density formula is often used to calculate quality assurance. This is calculated by dividing the total number of defects by the size of the product or service.

D.1.5 *Customer satisfaction:* Customer satisfaction can be calculated using a survey or rating system, with a scale of 1-10 or 1-5. The average rating is calculated by adding up all the ratings and dividing by the total number of responses.

D.2 Manageability as implementing activity in organization from the perspective of "unknown in decision making process" and "unstable and with large uncertainty situation"

Productive proposal from the publication "Agile estimating and planning" by Mike Cohn [21] is the concept of using story points to estimate work items. Story points are a measure of the relative size or complexity of a work item, based on factors such as effort, risk and uncertainty. According to Cohn, story points are a more effective way to estimate work items than traditional time-based estimates (such as hours or days) because they are less prone to bias and more flexible. Cohn emphasizes that story points should be used as a relative measure of effort, not an absolute one. They are intended to help teams compare and prioritize work items, not to predict exact timelines or deadlines.

Meaningful contribution from the "Agile project management: creating innovative products" by Jim Highsmith [22] is to use the "Definition of Done" as a tool for ensuring that each increment of work is truly complete and meets the necessary quality standards. According to Highsmith, the Definition of Done is a collaborative agreement between the team and stakeholders that outlines the specific criteria that must be met for a given feature or product increment to be considered complete. This definition should be developed early in the project and revisited regularly to ensure that it remains relevant and effective. Highsmith recommends that the Definition of Done as a checklist for each increment of work, teams can ensure that they are delivering high-quality products that meet the needs of their customers.

There could be variables that are unclear and could potentially affect implementation activity in organization:

D.2.1 *Hidden dependencies:* Dependencies that were not previously identified or understood may arise during implementation, causing delays or unexpected issues.

D.2.2 *Resource constraints:* Limited availability of resources, such as personnel or funding, may hinder the implementation process and require additional planning and problem-solving.

D.2.3 *Technical difficulties:* Technical problems may arise during the implementation process, such as software or hardware compatibility issues, requiring additional troubleshooting and problem-solving.

D.2.4 *Organizational resistance:* Employees or stakeholders may resist the implementation process, leading to delays or difficulties in executing the plan.

D.2.5 *Communication breakdowns:* Communication breakdowns between team members or with external partners may lead to misunderstandings, delays and inefficiencies during implementation.

D.2.6 *Legal and regulatory issues:* Legal or regulatory requirements may not have been fully considered during the planning phase, causing delays or additional work to address compliance issues.

D.2.7 *Environmental factors:* External factors such as weather, natural disasters, or power outages may affect the implementation process and require contingency plans.

D.2.8 *Cultural differences:* Cultural differences between team members or with external partners may lead to misunderstandings or difficulties in executing the plan.

D.2.9 *Changes in scope or requirements:* Changes in plan scope or requirements may occur during implementation, requiring adjustments to the plan and additional resources or time.

E.1 Manageability as controlling activity in organization from the perspective of "knowledge in decision making process" and "stable and known situation"

There are several formulas that can be used to calculate controlling activity in an organization.

E.1.1 *Variance Analysis Formula:* This formula compares actual performance to planned performance and calculates the variance. The formula is:

Variance = Actual Performance - Planned Performance(26)

E.1.2 *Return on Investment (ROI) Formula:* This formula measures the return on an investment in terms of profitability. The formula is:

$$ROI = \left(\frac{Net \, Profit}{Cost \, of \, Investment}\right) * \, 100\% \tag{27}$$

E.1.3 *Break-Even Analysis Formula:* This formula calculates the minimum level of sales required to cover all costs and break even. The formula is:

$$Break - Even Point = Fixed Costs / (Price - Variable Costs)$$
 (28)

E.1.4 *Cost Variance Formula:* This formula calculates the difference between actual costs and budgeted costs. The formula is:

$$Cost Variance = Actual Costs - Budgeted Costs$$
(29)

E.1.5 *Earned Value Analysis Formula:* This formula tracks the progress of a plan by comparing actual work completed to planned work. The formula is:

$$Earned Value = \% Complete * Budgeted Cost of Work Scheduled$$
(30)

These formulas can be used to monitor and control various aspects of an organization's performance and help ensure that it stays on track to achieve its goals.

E.2 Manageability as controlling activity in organization from the perspective of "unknown in decision making process" and "unstable and with large uncertainty situation"

Beneficial idea mentioned in the book "Strategic management control: successful strategies based on dialogue and collaboration (management for professionals)" [23] is that strategic management control differs from traditional management control in several important ways, including its support for strategy formulation and implementation, use of non-financial information, consideration of long and short-term goals and adaptation to unique organizational strategies. One problem mentioned by author is how to translate strategy in the day-by-day activity and problem is solved through creating strategic maps and dialogue and collaboration is emphasized, highlighting the essential role of communication in successful management control processes.

Insightful tip from the book "Management control systems: performance measurement, evaluation and incentives" [24] is that provides an interesting overview of management control systems and they highlighted four activities to be avoided in controlling: eliminating, automation, centralization and risk sharing. Activity elimination is the situation when managers are dealing with subcontracting, outsourcing and managers has limited control over those activities they try to reduce the volume of such activities. In most managerial situations automated decision-making software are highly precise and the weak point is the feasibility, which requires human intuition and creativity. Centralization activity is indispensable all organization with diverse degree of presence which varia from organization to organization. Managers try to keep control on crucial decisions and delegating rarely to lower positions, managers burn out professionally. The fourth activity is risk sharing which consist of transferring against cost of some risks to insurance companies. The main issue of this activity is what to be transferred to insurance companies. Authors of the book offers valuable insights into the role of management control systems in improving organizational performance and achieving strategic objectives.

It's plausible that certain elements are unidentifiable during monitoring and controlling activities in an organization and they may include:

E.2.1 *Unforeseen external factors:* Some factors that affect an organization's performance may be beyond its control. These factors include natural disasters, political instability, changes in regulations or laws and pandemics. These factors can make it difficult to predict future performance.

E.2.2 *Incomplete or inaccurate data:* Monitoring and controlling activities require accurate and up-to-date information. Incomplete or inaccurate data can lead to wrong decisions and ineffective management. This can happen if data is not properly collected, stored, or analyzed.

E.2.3 *Human error:* People are not perfect and can make mistakes. Errors can occur during data collection, data analysis and decision-making. Even with the best tools and systems in place, there is always a risk of human error.

E.2.4 *Lack of communication:* Effective communication is crucial for successful monitoring and controlling activities. Without proper communication, people may not be aware of the goals, objectives and priorities. This can lead to confusion and conflicting actions.

E.2.5 *Resistance to change:* Organizations may face resistance from employees when implementing new systems or procedures. Resistance can lead to delays and even failure of the monitoring and controlling activities.

E.2.6 *Unforeseen financial issues:* Financial issues such as cash flow problems, unexpected expenses, or economic downturns can impact an organization's ability to meet its goals and objectives. These issues can be difficult to predict and can lead to unexpected changes in performance.

E.2.7 *Cybersecurity threats:* Organizations may face cybersecurity threats such as data breaches, hacking or phishing attacks. These threats can compromise sensitive information, disrupt operations and impact performance.

It is important for organizations to recognize and manage these potential unknown elements to ensure effective monitoring and controlling activities.

F.1 Manageability as risk mitigation activity in organization from the perspective of "knowledge in decision making process" and "stable and known situation"

There are many formulas for calculating risk from the perspective of manageability in an organization, as the specific factors that contribute to risk and the ways in which those risks can be managed will vary depending on the industry, the size of the organization and other variables. However, here are a few formulas that may be useful in assessing and managing risk:

F.1.1
$$Risk = Likelihood * Impact$$
 (31)

This formula is commonly used to estimate the overall risk of a particular event or scenario. Likelihood refers to the probability that the event will occur, while impact refers to the severity of the consequences if it does occur. By multiplying the two together, manager can get a sense of how significant the risk is and how much attention it should receive in risk management efforts.

F.1.2
$$Risk = Threat * Vulnerability * Consequence$$
 (32)

This formula is similar to the one above, but it breaks down the different components of risk into three distinct factors: threats (external events that could cause harm), vulnerabilities (weaknesses in organization's defenses or processes) and consequences (the potential impact if a risk materializes). By examining each of these factors separately, manager can identify specific areas where can focus risk management efforts.

F.1.3
$$Risk = Impact / Probability$$
 (33)

This formula flips the equation around, so that the risk is calculated as the impact divided by the probability. This can be useful for assessing the potential costs of a risk that has already occurred, or for estimating the financial impact of a particular risk scenario.

F.1.4

Risk = (Threat * Vulnerability * Consequence)/Countermeasure Effectiveness (34)This formula takes into account the effectiveness of countermeasures or risk mitigation strategies in reducing the overall risk. By dividing the product of threat, vulnerability and consequence by the effectiveness of the countermeasures, manager can get a more accurate sense of the residual risk that remains after risk management efforts.

F.2 Manageability as risk mitigation activity in organization from the perspective of "unknown in decision making process" and "unstable and with large uncertainty situation"

The book "Cybersecurity threats, malware trends and strategies", Second Edition by Tim Rains [25] serves as a valuable recommendation, presenting profound insights into the dynamic nature of the threat landscape. It delves into the enduring patterns observed in the disclosure and exploitation of vulnerabilities over extended periods of time as well as the variations witnessed in regional occurrences of malware infections. Moreover, the book offers indispensable components that contribute to the formulation of a comprehensive cybersecurity strategy. These components include the alignment of business objectives with cybersecurity goals, the establishment of a clear cybersecurity vision, mission, imperatives and a genuine assessment of the executive board's stance towards potential risks, real position of executive board to risks, risk appetites, security culture.

When calculating risk from the perspective of manageability in the organization, there is a chance that some elements, which could remain unnoticed and obscure, may decrease manageability:

F.2.1 *Lack of clear governance structure and policies:* If the organization does not have clear policies and procedures in place for managing risk, it can be difficult to assess and mitigate risk effectively.

F.2.2 *Incomplete or outdated risk assessments:* If the organization has not conducted a comprehensive risk assessment or if the risk assessment is outdated, it can be challenging to identify and manage risks effectively.

F.2.3 *Limited visibility into the organization's operations:* If the organization lacks visibility into its operations, it can be difficult to identify potential risks and take proactive measures to manage them.

F.2.4 *Inadequate resources and expertise:* If the organization lacks the resources or expertise needed to manage risk effectively, it may struggle to identify and mitigate potential risks.

F.2.5 *Lack of communication and collaboration:* If there is a lack of communication and collaboration within the organization, it can be difficult to identify and manage risks effectively.

F.2.6 *Insufficient training and awareness:* If employees are not adequately trained and aware of risks, they may unintentionally contribute to risk exposure or fail to take appropriate action to manage risk.

F.2.7 *Ineffective monitoring and reporting:* If the organization does not have effective monitoring and reporting mechanisms in place, it may not be able to identify and respond to risk events in a timely manner.

F.2.8 *Limited access to factual data:* If the organization does not collect factual data and information, it can be challenging to assess and manage risks effectively.

F.2.9 *Lack of contingency planning:* If the organization does not have contingency plans in place for managing risk events, it may struggle to respond effectively to unexpected events.

F.2.10 *Inadequate response and recovery plans*: If the organization does not have adequate response and recovery plans in place for managing risk events, it may struggle to minimize the impact of risk events and quickly return to normal operations.

G.1 Manageability as uncertainty reducing activity in organization from the perspective of "knowledge in decision making process" and "stable and known situation"

Thoughtful guidance from the book "High-Stakes Leadership in Turbulent Times: Why Stakeholders Are Your Greatest Assets ... in Good Times and Bad" [26] by Barger is to implement "ethical leadership" to manage complex organizational systems. The author argues that leaders must prioritize integrity, transparency and accountability in all their actions and decisions. He also discusses the potential consequences of unethical behavior and offers guidance on how leaders can avoid these pitfalls. Another important aspect of "High-Stakes Leadership in Turbulent Times" is the emphasis on collaboration and teamwork by building strong relationships with stakeholders and fostering a culture of collaboration, leaders can achieve greater success and overcome even the most challenging obstacles. However, author suggests that these investments in education of managers can pay off in the long run by improving organizational performance and resilience in the face of complexity and uncertainty.

Thera are some common formulas for calculating uncertainty that may be useful from a manageability perspective in an organization:

G.1.1 *Standard Deviation (σ):* The standard deviation measures the amount of variability or dispersion in a set of data. It can be calculated using the formula:

$$\sigma = \sqrt{(\Sigma(xi - \bar{x})^2 / n)}$$
(35)

where xi is the value of each data point, \bar{x} is the mean of the data and n is the total number of data points.

G.1.2 *Coefficient of Variation (CV):* The coefficient of variation measures the relative variability of a data set and is calculated as:

$$CV = (\sigma / \bar{x}) * 100\%$$
 (36)

where σ is the standard deviation of the data and \bar{x} is the mean of the data.

G.1.3 *Margin of Error (ME):* The margin of error is a measure of the uncertainty in a statistical estimate, such as a mean or proportion. It can be calculated using the formula:

$$ME = z * (\sigma / \sqrt{n}) \tag{37}$$

where z is the z-score for a given level of confidence (e.g., 1.96 for a 95% confidence interval), σ is the standard deviation of the data and n is the sample size.

G.1.4 *Confidence Interval (CI):* A confidence interval can be defined as a statistical interval, consisting of both upper and lower bounds, positioned around the mean of a given statistic. This interval is designed to encompass with a certain degree of likelihood an unknown parameter of the population under study. It can be calculated using the formula:

$$CI = \bar{x} \pm z * (\sigma / \sqrt{n}) \tag{38}$$

where \bar{x} is the sample mean, z is the z-score for a given level of confidence, σ is the standard deviation of the data and n is the sample size.

G.1.5 *Risk Exposure (RE):* Risk exposure is a measure of the potential impact of a risk event, taking into account both the probability of the event occurring and the potential consequences. It can be calculated as:

$$RE = probability of risk * potential impact of risk$$
(39)

where the probability of risk is the likelihood of the risk event occurring and the potential impact of risk is the potential financial, reputational, or other impact if the risk event does occur.

G.2 Manageability as uncertainty reducing activity in organization from the perspective of "unknown in decision making process" and "unstable and with large uncertainty situation"

Regarding manageability harmed by uncertainty, we highlight the following elements: G.2.1 *Market fluctuations:* Changes in the market can be unpredictable, which can cause uncertainty in a business. Factors such as supply and demand, consumer behavior and economic conditions can all contribute to market fluctuations.

G.2.2 *Regulatory changes:* Regulations can change frequently, which can lead to uncertainty for businesses that must comply with them. This is particularly true in industries such as healthcare, finance and technology.

G.2.3 *Natural disasters:* Natural disasters such as hurricanes, earthquakes and wildfires can cause significant damage to businesses, disrupt supply chains and affect consumer behavior.

G.2.4 *Technological advances:* Rapid advances in technology can disrupt industries and create uncertainty for businesses. Companies that are slow to adapt to new technologies risk losing their competitive edge.

G.2.5 *Competition:* Competition in the marketplace can create uncertainty for businesses, particularly if new competitors enter the market or existing competitors increase their market share.

G.2.6 *Political instability:* Political instability in a country or region can create uncertainty for businesses operating in those areas. This can include changes in government policies, social unrest and terrorism.

G.2.7 *Supply chain disruptions:* Disruptions in the supply chain can create uncertainty for businesses, particularly those that rely heavily on imports or exports. Factors such as natural disasters, trade disputes and labor strikes can all disrupt supply chains.

G.2.8 *Cybersecurity threats:* Cybersecurity threats such as data breaches and cyber-attacks can create uncertainty for businesses, particularly those that handle sensitive customer information.

G.2.9 *Changes in consumer preferences:* Changes in consumer preferences can create uncertainty for businesses that rely on a specific product or service. Companies that fail to adapt to changing consumer trends risk losing their customer base.

These formulas can help organizations gain better visibility into their forecasting, planning, organizing, implementing, controlling and decision-making processes and identify areas for improvement. However, it's important to note that these formulas should be used in conjunction with other management tools and techniques to gain a complete understanding of manageability in the organization as mentioned above the factors that reduce the power, validity and application of formulas.

3. Results

The decision-making model "modular decision making or topological modular forms of manageability" of an organization presented above consists of two limiting dimensions: clear formulas for "knowledge in decision-making processes" coherently linked with "stable and known situations," and foggy constraints for "unknowns in decision-making processes" derived from "unstable and highly uncertain situations." This model aims to identify the conditions when manageability is high and productive, as well as the situations when manageability is at a low level, with corresponding effects on the organization. At the same time, the model has assumptions, predictive power, validity conditions, uncertainty, risks, interpretation and a range of flexibility. In management, formulas are mathematical expressions that are used to represent organizational concepts and relationships. These formulas allow managers to quantify organizational phenomena and make predictions about economic, material, financial, managerial behaviors. However, it is important to note that not all management phenomena can be accurately modelled using mathematical formulas, indicated by us above through uncertain conditions which reduce the prediction power of formulas. The real situations when managers make decisions are characterized by ambiguity, time pressure, limited resources, risk, uncertainty, fear, ethics, morality, courage, interpersonal dynamics, information availability, accountability.

The model ""modular decision making or topological modular forms of manageability" of an organization serves as a framework or guide for the manager's decision-making process. The unique situation that the manager faces may require adapting the management model to fit specific circumstances. This may involve modifying or combining different management models or developing new strategies tailored to the situation.

The manager's experience, expertise, character and judgment play a critical role in applying the model of management to the unique situation. The manager must assess the situation, identifying the type of situation ("stable and known situation" or "unstable and with large uncertainty situation"), analyze and judge the specific situation, determine appropriate course of action and execute it effectively. The relationship between the model of management (modular decision making) and the unique situation is dynamic and constantly evolving. As the situation changes, the manager may need to revisit and adjust the model of management to ensure that it remains relevant and effective. The success of the manager's decision-making process depends on the manager's ability to balance the demands of the situation with the rules of the model of management. This requires a flexible and adaptable approach that takes into account the unique characteristics of the situation.

The points of intersection between the two limiting dimensions model ("modular decision making or topological modular forms of manageability") and real-life decision-making in organizations are complex and influenced by a wide range of factors mentioned in the article. The presented model can help identify when manageability is high and productive, as well as when it is outside the model and decision-makers face the decision-making process alone. This demonstrates the necessity of delving deeper and finding more widely applicable hypotheses in order to fully understand the underlying mechanisms and principles behind the observed phenomena.

4. Discussion

Based on classification used in our research we will analyze the data from other, previously published research, performed by other authors in order to check how well works our hypothesis. Using data from previous study [27, p.6], more exactly, Table 3, "Descriptive Statistics", we can infer the following conclusions:

First situation:

- ✓ Operational efficiency has a mean value of 0.657 and a standard deviation of 0.147, indicating that companies are generally operating efficiently and consistently.
- ✓ Competition intensity has a mean value of 3.428 and a standard deviation of 1.716, suggesting that competition is not too intense and companies may be able to plan and execute their strategies accordingly.
- ✓ Firm age has a mean value of 40.227, indicating that most of the companies in the sample are relatively mature and experienced.
- ✓ Firm size has a mean value of 21.707, indicating that the sample consists of mediumsized companies.

These variables have relatively low standard deviations, indicating that their values are clustered closely around the mean. The ranges between minimum and maximum values are also relatively small. Therefore, it can be concluded that for these variables, the situation is stable and known. This means that it is possible to calculate and make predictions based

on these variables with a reasonable degree of accuracy. Overall, in this situation, the organization appears to be performing well, with a strong business strategy, efficient operations, moderate manufacturing performance, moderate market uncertainty, moderate to high competition intensity and relatively mature and moderately sized.

Second Situation:

- Market uncertainty has the mean value of 0.080 and the standard deviation of 0.045, indicating that the market is relatively uncertain and volatile.
- Manufacturing performance has the mean value of 0.060 and the standard deviation of 0.112, indicating that there is considerable variability in the manufacturing processes.
- Business strategy has a mean value of 8.856 and a standard deviation of 3.163, suggesting that companies may be struggling to develop effective strategies in such uncertain and unstable situations.

Therefore, it can be concluded that for those variables, the situation is unstable and with large uncertainty. This means that it is difficult to calculate and make predictions based on this variable with a high degree of accuracy, simultaneously, manageability is at a low level and the organization may be facing challenges in managing its operations.

What are the findings of the authors of the quoted research? Here they are [27, p. 10]: "Miles and Snow's typology of business strategies provides a framework for understanding a firm's strategic orientation. It classifies strategic orientation as production orientation (emphasizing efficiency) and market orientation (emphasizing product innovation). Using Miles and Snow's typology, the finding in this study indicates that business strategy is positively and significantly associated with manufacturing performance. Additionally, the finding in this study also shows that a proactive strategy (analyzer or prospector) leads to better manufacturing performance than a defensive strategy (reactor or defender)."

Based on the given data and results made by researchers from mentioned article [27], the following conclusions can be inferred by us related to our hypothesis:

1. In situation, where manageability is high and productive, a firm with a proactive strategy (analyzer or prospector) that emphasizes product innovation and efficiency is likely to perform better in terms of manufacturing performance compared to firms with a defensive strategy (reactor or defender) and formulas usage is fully justifiable ("stable and known situations").

2. In situation, where manageability is at a low level, it can be inferred that firms with a proactive strategy that emphasizes product innovation and efficiency are more likely to be better equipped to handle the challenges and uncertainties associated with low manageability. Such firms are expected to perform better in terms of manufacturing performance compared to firms with a defensive strategy that may not be able to adapt to changing circumstances. The usage of formulas is questionable in the following aspect: top managers set objectives and calculate KBIs and KPIs based on "stable and known situations" and cascaded them down through organizational structure. The achievement of these indicators takes place under conditions of uncertainty, when floor managers and employees make decisions that involve unclear or uncertain situations, tight deadlines, scarce resources, potential risks and ethical considerations, according to our hypothesis "unstable and with large uncertainty situations". The top managers use this trick in hidden mode and this is unfair from the perspective how the indicators were calculated (usually "stable" situation) and how they are implemented (as a rule under "unstable with large uncertainty") and reported back up to the top through reporting indicators which are equal to objectives indicators that are calculated strictly over formula for "stable and known situations". Every position in the company can bring value in the decision-making process, if the top managers show openness and are honest towards the company's employees and if they treat the employees with dignity.

3. The finding from the study suggests that business strategy is positively and significantly associated with manufacturing performance, indicating that firms that have a well-defined strategy (more manageability in terms of our research) are more likely to perform better in terms of manufacturing performance. This finding is relevant to both situations, as firms need to have a clear strategy to achieve their objectives and be successful.

We may affirm that our hypothesis about manageability in two distinct states ("steady and familiar condition" and "unsteady and with considerable uncertainty condition") has garnered considerable support from the previously available data and corroborating research results demonstrated in the text above. At the same time, our hypothesis has limitations in usage when managers face challenging circumstances. For situations with large and extended uncertainty, it is necessary to develop more specific hypothesis ant validate or reject them. We hope, that findings that tested the credibility of the hypothesis and the validity of previous results will serve as a catalyst for further inquiry and exploration in the field.

5. Conclusions

Organizational manageability is an essential aspect of any successful business. It involves a series of modules that enable an organization to achieve its goals and objectives efficiently and effectively. These modules include forecasting, planning, organizing, implementing, controlling and decision-making activities. Each of these activities requires time, resources and effort from the organization's management team.

One of the costs of organizational manageability is the cost of forecasting. Accurately predicting future trends and market changes is essential for any organization that wants to stay competitive. To achieve this, an organization must invest in data collection and analysis, market research and trend analysis. The costs of these activities can be significant, but they are necessary for an organization's long-term success.

Planning is another crucial aspect of organizational manageability. Effective planning involves setting goals and objectives, defining strategies and tactics and allocating resources. To achieve these tasks, an organization must invest in employee training, development and technology. Hiring experienced planners and investing in software and hardware systems can be costly, but it is a necessary expense if an organization wants to achieve its goals efficiently.

Organizing and implementing activities involve the allocation of resources and tasks. Effective organization requires an understanding of the organization's structure, the roles and responsibilities of its employees and the resources available. Implementing activities requires the organization to put its plans into action. This involves deploying resources, managing timelines and ensuring that tasks are efficiently.

Finally, controlling activities involves monitoring and evaluating the organization's performance. This involves measuring progress against goals, identifying areas for improvement, risk mitigation, uncertainty reduction activities and making necessary adjustments. Controlling activities require an investment in data collection and analysis, monitoring systems and feedback mechanisms.

In conclusion, organizational manageability is essential for achieving an organization's goals and objectives. First conclusion: the knowledge costs. Second conclusion: the intellectual efforts to collect data and produce reasonable judgements costs. Third conclusion: the managers and employee involved in management activities needs to have allocated time for data and knowledge acquisition to be set in their job description. Every position in the company can bring value in the decision-making process, if the top managers show openness towards the company's employees. The costs of maintaining this level of management depend on factors such as the organization's goals, risk assessment and desired outcomes. Ultimately, it is the top management's vision and their free will that determine the level of investment required for achieving the organization's objectives. Investing in organizational manageability may be costly, but the long-term benefits are well worth the investment. There is an old saying in which we would insert paraphrasing: "Evil deeds (lack of manageability) often happen without much consideration, while good deeds (ensuring manageability) require intentional planning and deliberate effort." There is no guarantee that good deeds will succeed and the assurance of the manageability of an organization is a neverending process. Therefore, calculated effort should always be applied. With regard to the abilities of managers and employees, we hold a cautiously optimistic view. We believe that they possess the capacity for logical thinking and rational decision-making, as well as the ability to communicate effectively and empathize with others. This allows for productive collaboration, which, in turn, can benefit the organization and the community. However, navigating through uncertainty can be challenging and unpredictable, much like navigating through a dark and treacherous sea. Nonetheless, we remain hopeful that by working together, keeping human dignity and courage, managers and employees can navigate through turbulent challenges, achieve success and remain alive.

Conflicts of Interest. The authors declare no conflict of interest.

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