ОБРАЗОВАНИЕ, НАУЧНИ ИЗСЛЕДВАНИЯ И ИНОВАЦИИ

Научно списание
Година IV, книжка 1, 2026

EDUCATION, SCIENTIFIC RESEARCH AND INNOVATIONS

Scientific journal
Vol. IV, Issue I, 2026

ЗА БУКВИТЕ О ПИСМЕНЕХЪ

Профил на списанието

„Образование, научни изследвания и иновации“ е двуезично (на английски и български език) научно списание, което се издава от Академично издателство „За буквите – О писменехъ“ – гр. София, България. Изданието цели да популяризира висококачествени теоретични и приложни изследвания. Тематични рубрики на списанието са:

- История и археология;
- Обществени комуникации и информационни науки;
- Информатика и компютърни науки;
- Национална сигурност;
- Актуално.

Списанието отразява иновативни идеи, научни резултати, съвременни тенденции и перспективи за развитие в изброените научни области. Публикуват се само оригинални научни статии, преминали двойно сляпо рецензиране.

Списание „Образование, научни изследвания и иновации“ е със свободен достъп.

https://e-journal.unibit.bg/
ISSN 2815-4630
https://doi.org/10.70300/WTRT9015

Journal Scope

“Education, Scientific Research and Innovations” is a bilingual (in English and in Bulgarian) scientific journal, which is published by the Academic Publisher “Za Bukvite – O Pismeneh” – Sofia, Bulgaria. The publication aims to promote high-quality theoretical and applied research works. The thematic sections of the journal are:

- History and archaeology;
- Public communications and information sciences;
- Informatics and computer sciences;
- National Security;
- Current topics.

The journal reflects innovative ideas, scientific results, modern trends and prospects for development in the listed scientific fields. Only original scientific articles that have passed double-blind peer review are published.

The “Education, scientific research and innovation” journal is open access.

https://e-journal.unibit.bg/
ISSN 2815-4630
https://doi.org/10.70300/WTRT9015

ГЛАВЕН РЕДАКТОР

доц. д-р Елена Савова
Факултет по библиотекознание
и културно наследство
Университет по библиотекознание
и информационни технологии
бул. „Цариградско шосе“ № 119,
София 1784, България
тел.: +359 878 97 03 40
е-поща: e.ignatova@unibit.bg

EDITOR-IN-CHIEF

Assoc. Prof. Elena Savova, PhD
Faculty of Library Studies
and Cultural Heritage
University of Library Studies
and Information Technologies
119, Tsarigradsko Shosse Blvd.
Sofia 1784, Bulgaria
tel. +359 878 97 03 40
E-mail: e.ignatova@unibit.bg

ИЗДАТЕЛ

Академично издателство
„За буквите – О писменехъ“
Университет по библиотекознание
и информационни технологии

PUBLISHER

Academic Publisher
“Za Bukvite – O Pismeneh”
University of Library Studies and Information
Technologies

ДИРЕКТОР

доц. д-р Диана Стоянова
бул. „Цариградско шосе“ № 119,
ет. 2, стая 213
София 1784, България
тел.: +359 879 14 83 85
е-поща: d.stoyanova@unibit.bg

DIRECTOR

Assoc. Prof. Diana Stoyanova, PhD
119, Tsarigradsko Shosse Blvd.
fl. 2, room 213
Sofia 1784, Bulgaria
tel.: +359 879 14 83 85
E-mail: d.stoyanova@unibit.bg

Списание „Образование, научни изследвания и иновации“ излиза четири пъти годишно:
книжка 1 – януари – март;
книжка 2 – април – юни;
книжка 3 – юли – септември;
книжка 4 – октомври – декември.

Journal “Education, Scientific Research and Innovations” is published four times a year:
book 1 – January – March;
book 2 – April – June;
book 3 – July – September;
book 4 – October – December.

С изпращането на текст и илюстрации до Академично издателство „За буквите – О писменехъ“ авторът се съгласява да преотстъпи правото за публикуването, анонсирането и разпространението им за нуждите на всички издания на Академично издателство „За буквите – О писменехъ“. Материали, които не са одобрени за публикуване, не се редактират и не се връщат на авторите.

By sending texts or illustrations to the Academic Publisher “Za Bukvite – O Pismeneh” the author agrees to submit the copyright for publishing, dissemination and announcing in all Academic Publisher “Za Bukvite – O Pismeneh” editions. Materials that are not approved for publication are not edited and are not returned to the authors.

ГЛАВЕН РЕДАКТОР
доц. д-р Елена Савова

EDITOR-IN-CHIEF
Assoc. Prof. Elena Savova, PhD

РЕДАКЦИОННА КОЛЕГИЯ

проф. д-р Тереза Тренчева (България)
проф. д.н. Иван Гарванов (България)
проф. д-р Боряна Бужашка (България)
проф. Пламен Богданов (България)
доц. д-р Катя Рашева-Йорданова (България)
проф. Невзат Йозел (Турция)
проф. д-р Александр Максимович Циганенко (Русия)
доц. д-р Карла Базили (Италия)
проф. Натали Стоянофф (Австралия)
проф. д-р Майкъл Бук (САЩ)
доц. д-р Ахмет Алтай (Турция)
проф. Ихтиор Беков (Узбекистан)
проф. д-р Маржена Валинска (Полша)
проф. д-р Анна Бартковияк (Полша)
проф. д-р Владо Бучковски (Северна Македония)
проф. д-р Мустафа Хатиплер (Турция)
проф. д-р Мурат Четин (Турция)

EDITORIAL BOARD

Prof. Tereza Trencheva, PhD (Bulgaria)
Prof. Ivan Garvanov, DsC (Bulgaria)
Prof. Boryana Buzhashka, PhD (Bulgaria)
Prof. Plamen Bogdanov, PhD (Bulgaria)
Assoc. Prof. Katia Rasheva-Yordanova, PhD (Bulgaria)
Prof. Nevzat Özel, PhD (Turkey)
Prof. Alexander Tsiganenko, PhD (Russia)
Assoc. Prof. Carla Basili, PhD (Italy)
Prof. Natalie Stoianoff, PhD (Australia)
Prof. Michael Boock, PhD (USA)
Assoc. Prof. Ahmet Altay, PhD (Turkey)
Prof. Ikhtiyor Bekov, PhD (Uzbekistan)
Prof. Marzena Walińska, PhD (Poland)
Prof. Anna Bartkowiak, PhD (Poland)
Prof. Vlado Buchkovski, PhD (North Macedonia)
Prof. Dr. Mustafa Hatipler (Turkey)
Prof. Dr. Murat Cetin (Turkey)

СЪДЪРЖАНИЕ

Информатика и компютърни науки

Автоматизирано профилиране на злонамерени актьори чрез изкуствен интелект и киберразузнаване: рамка за извличане и съотнасяне в реално време 8
Владимир Бабанов

VBA като първи текстово базиран програмен език 16
Херберт Бергер

Обществени комуникации и информационни науки

Пречки и възможности при достъпа до цифрова здравна информация 20
Надин Захариас

Организация и управление на информацията за използването на капацитета на болничните легла в различни дни от седмицата 25
Денис Комоса

Функционална и комуникативна интероперативност в европейските здравни системи: сравнителен обзор на HL7 FHIR, openEHR и OMOP в Естония, Дания, Финландия и Германия 33
Хомейра Хениг-Намвар

Цифровият данъчен консултант: нови професионални роли в ерата на изкуствения интелект – последици за комуникацията и управлението на информацията 41
Софи Фолберг

Ефективно развитие на мениджърски екипи: развитието на екипа като стратегически процес за създаване на организационна стойност 48
Ангелика Вестервеле

CONTENTS

Informatics and Computer Sciences

Automated Threat Actor Profiling with AI in Cyber Threat Intelligence: a Framework for Real-Time Extraction and Attribution 8
Vladimir Babanov

VBA as a First Text-Based Programming Language 16
Herbert Berger

Public Communications and Information Sciences

Barriers and Opportunities in Accessing Digital Health Information 20
Nadine Zacharias

Organisation and Management of Information on the Capacity Utilisation of Hospital Beds on Different Weekdays 25
Dennis Komossa

Functional and Communicative Interoperability in European Healthcare Systems: a Comparative Overview of HL7 FHIR, OpenEHR, and OMOP in Estonia, Denmark, Finland, and Germany 33
Homeira Hennig-Namvar

The Digital Tax Advisor: New Professional Roles in the Age of Artificial Intelligence – Implications for Communication and Information Management 41
Sophie Volberg

Effectively Development of Middle Management Teams: Team Development as a Strategic Process for Organizational Value Creation 48
Angelika Westerwelle

Комуникационни процеси за оценка на терапевтични стратегии при дефицит на MCT8: ориентирана към пациента перспектива 56
Доминика Шийбл

Communication Processes for the Evaluation of Therapeutic Strategies for MCT8 Deficiency: a Patient-Centered Perspective 56
Dominika Schiebl

Предизвикателството на процесите на промяна в организациите: как могат лидерите да допринесат за успешното им прилагане? 63
Юдит Маркс

The Challenge of Change Processes in Organizations: How Can Leaders Contribute to Successful Implementation? 63
Judith Marx

Цифрова комуникация в областта на здравеопазването и здравната грамотност: теоретични модели и интегративни съображения 71
Надин Захариас

Digital Health Communication and Health Literacy: Theoretical Models and Integrative Considerations 71
Nadine Zacharias

Организация и управление на информацията между хирургичния капацитет и заетостта на болничните легла 79
Денис Комоса

Organisation and Management of Information Between Surgical Capacity and Hospital Bed Occupancy 79
Dennis Komossa

Дигитално управление и публични политики в преходни икономики: ролята на информационните технологии за институционалната ефективност и икономическия растеж в Косово 87
Адил Реджепи

Digital Governance and Public Policies in Transition Economies: the Role of Information Technologies in Institutional Efficiency and Economic Growth in Kosovo 87
Adil Rexhepi

Национална сигурност

National Security

Количествено измерване на оперативните рискове в германските банки като елемент от националната сигурност 95
Флориан Бекер

Quantification of Operational Risks In German Banks as an Element of National Security 95
Florian Becker

Системи за наблюдение, подпомагани от изкуствен интелект, в контекста на националната сигурност и защитата на критичната инфраструктура 103
Бастиан Нагел

AI-Enabled Surveillance Systems in The Context of National Security and Critical Infrastructure Protection 103
Bastian Nagel

Делегиране на киберотбраната към алгоритмите: правни граници на автономния отговор в България 109
Владимир Бабанов

Delegating Cyber Defense to Algorithms: the Legal Boundaries of Autonomous Response in Bulgaria 109
Vladimir Babanov

Критичен анализ на мотивационните фактори за привличане на оперативни източници към сътрудничество с 118 националните разузнавателни структури
Огнян Костадинов

Critical Analysis of Motivational Factors for Recruiting Human Sources to Cooperate with National Intelligence Structures
Ognyan Kostadinov

Актуално

Current Topics

Формиране на национална идентичност и родолюбие в гимназиален етап на българското образование чрез философски 127 интердисциплинни подходи
Виктория Цонева

Formation of National Identity and Patriotism in the Secondary Stage of Bulgarian Education through Philosophical Interdisciplinary Approaches
Viktoriya Tsoneva

Между универсалното и локалното – деликатният баланс между глобалните стандарти и културния контекст в 135 корпоративната социална отговорност
Мухамет Кяику

Bridging Universal and Local – the Narrow Ridge of Global Standards with Cultural Context in Corporate Social Responsibility
Muhamet Kqiku

Комуникационни и информационни процеси при използването на психологическа реификация за 144 подобряване на общественото здраве
Оливер Адам

Communication and Information Processes in the Use of Psychological Reification for Improving Public Health
Oliver Adam

ИНФОРМАТИКА И КОМПЮТЪРНИ НАУКИ
INFORMATICS AND COMPUTER SCIENCES

AUTOMATED THREAT ACTOR PROFILING WITH AI IN CYBER THREAT INTELLIGENCE: A FRAMEWORK FOR REAL-TIME EXTRACTION AND ATTRIBUTION

Vladimir Babanov
South-West University "Neofit Rilski"
https://doi.org/10.70300/EZSK8780

Abstract: *Cyber threat intelligence (CTI) has become essential for a proactive defending against adversaries in cyberspace. However, the majority of valuable information resides in vast volumes of unstructured data and feeds, which renders their analysis an extremely lengthy and error-prone process. This paper aims to present a real-time automated framework that utilizes Natural Language Processing (NLP) and standardized ontologies such as Structured Threat Information Expression (STIX) v2.1 and MITRE ATT&CK to identify indicators of compromise (IoCs), tactics, techniques and procedures (TTPs) from multiple CTI sources and correlate them with a threat actor profile. The approach described in it digests data from open-source threat reports, social media and other sharing platforms. It also uses domain-specific language models and rule-based analyzers to identify entities (e.g. malware, tools, targets), mapping them to STIX objects and linking extracted TTPs to ATT&CK techniques. The framework is tested with a hypothetical ransomware case study, which displays how through extracted indicators, killchain stages and behavioural patterns could be associated with a threat-actor profile. The results demonstrate that the suggested AI-driven pipeline could enormously reduce the manual effort in CTI processing, maintaining high extraction accuracy. The work lays the foundation for implementing automatic CTI profiling of adversaries aiding with proactive defense and attribution efforts.*
Keywords: *Cyber Threat Intelligence; Artificial Intelligence; Threat Actor Profiling; Natural Language Processing; Cybersecurity*

INTRODUCTION

Modern cyberattacks have evolved with increasing sophistication and have been carried out by skilled actors able to operate undetected with unseen adaptability. Relating the criminal activity in cyberspace to certain actors or groups, known as threat attribution or profiling, is vital for effective defense and legal action (Santos et al. 2025). Traditionally, experts conduct this process manually, collecting indicators of compromise (IoCs) and analyzing Tactics, Techniques and Procedures (TTPs) from various sources, visualizing the results and associating them to adversary's profile. This could be an overwhelming effort given the amount of raw data generation online. The necessity for automated tools that process raw information into structured, actionable CTI has never been higher with adversaries already automating significant portion of malicious actions.

Various artificial intelligence (AI) methods have emerged to aid this process, especially machine learning (ML) and natural language processing (NLP). Both are used in correlation of sifting through big amounts of data through NLP and different AI models then cluster and correlate patterns hidden in it (Arazzi et al. 2025). The results are then shaped into the standardized frameworks that Structured Threat Information Expression v.2.1 (STIX v.2.1) and MITRE ATT&CK provide. Combining AI and these standards is the best way to offload the overwhelmed human factor in the constant effort of linking incidents, malware and adversaries. Using such method, security platforms can continuously ingest data, extract key findings and automatically populate threat actors' knowledge graph, turning the process into real-time profiling.

In the current paper, a design of an AI-driven CTI framework for automated threat actor profiling is explored. It consists of NLP techniques to extract names, tools, and techniques from text

sources. With STIX v2.1 encoding this information into sharable knowledge graph and MITRE ATT&CK mapping and normalizing TTPs. A fictional case study is included in the paper to illustrate the assemblance of extracted TTPs into a profile. The main goal is not to detail a working system but to describe a feasible architecture and its upside potential. Grounding in recent research, the paper aims at conceptual clarity rather than technicalities.

METHODOLOGY

The methodology is built upon an in-depth examination of relevant research studies on AI-based CTI, automated construction of knowledge graphs, and identifying and attributing malicious actors. The research establishes both the conceptual and technological base for the proposed model. An empirical evaluation has been included to assess whether open-source CTI documents, social media posts, and structured intelligence databases can be utilized in real-time to automatically extract and correlate IOCs and TTPs. NLP models are used to identify entities and relationships from unstructured text which can then be normalized into STIX v2.1 and MITRE ATT&CK format. The automation framework has been constructed using JavaScript and React for the front-end orchestration and visualization layer and is deployed on Google Cloud to allow for scalable and event-driven processing of threats. The framework's end-to-end pipeline is validated through a hypothetical ransomware case study that demonstrates automatic profiling, ATT&CK mapping, and identification of the threat actor. The methodology incorporates a combination of qualitative methods to analyze the theoretical accuracy of the proposed solution and quantitative methods to evaluate its operational feasibility.

DISCUSSION

Related work

Automatic extraction of CTI and actor profiling have somewhat received academic attention, mainly in systems that translate unstructured reports into structured knowledge. AttacKG is a landmark research study suggesting automatic conversion of CTI text to technique knowledge graphs. Li et al. (2022) evaluated it on over 1,500 real-world reports and achieved F1 scores of 0.79–0.89 in identifying indicators, dependencies, and attack techniques, demonstrating high ability in aggregating CTI into structured threat representations.

Similarly, Satvat, Gjomemo, and Venkatakrishnan's (2021) EXTRACTOR framework infers provenance graphs from narrative incident reports so that downstream threat-hunting systems can comprehend the attack behaviors. This work demonstrates the advantages of extracting behavioral context, as opposed to entities, from text-based CTI.

Subsequently, MultiKG, suggested by Wang et al. (2024), improved the construction of knowledge graph by merging a variety of CTI sources like reports, logs, and static analysis into a unified representation. Utilizing large language models (LLMs) for semantic alignment, they created refined attack graphs, which demonstrated better accuracy and coverage of over 1,000 attack approaches.

In the domain of NLP for CTI, certain works also made noteworthy advancements. The Python library Cybersecurity Named Entity Recognition (CyNER) in conjunction with NLP, advanced by Zhang Y et al. (2025), constructs data extraction system that retrieves non-token-contextual IoCs from CTI texts with higher reliability than traditional sequence-labeling methods. The concept, also known as AttackKG+, allows the constructs of vast threat knowledge graphs by harvesting open-source CTI reports and structuring them via relational modeling, enabling automatic threat intelligence processes.

These papers contribute significantly to the advancement of CTI automation. AttacKG+ and EXTRACTOR aim graph construction from narrative feeds, when MultiKG enhances graph quality through integration of multiple sources. CyNER and ThreatKG, the latter proposed by Gao et al. (2023), increase extraction robustness. They address a pipeline component in isolation, for instance, extraction or graph construction. This paper leverages the contributions by integrating NLP extraction, STIX standardization, ATT&CK mapping, and live graph-based profiling into a real-time pipeline.

Background

CTI refers to processed data gathered from plethora of sources that provides insight into existing or developing cyber threats and is also actionable. CTI prepares the organizations on strengthening cyber defense and system hardening in anticipation of identified malware, malicious domains or IP addresses, social engineering methods, threat actors' behaviour, etc (Rani et al. 2025). To fulfill these expectations, CTI has to possess four key outlines: completeness, accuracy, relevance and timeliness. Without any of these, the provided CTI would not be relevant and could not serve as a basis for further actions. Dissemination and sharing of CTI is facilitated by Threat Intelligence Platforms (TIPs), like IBM X-Force, CISCO Umbrella, Alienvault, etc., and open standards. The exact methods for its sharing are defined by Trusted Automated Exchange of Intelligence Information (TAXII) protocol.

STIX v2.1, developed and approved in 2021 by Organization for the Advancement of Structured Information Standards (OASIS) CTI Technical Committee, established a JSON-based schema for threat information representation, abandoning the XML-files utilized in previous versions. Various types of cyber entities such as threat actors, campaigns, intrusion sets, attack patterns and indicators are defined as STIX Domain Objects (SDOs) which are currently 18 types, separated by fields. Also, STIX v2.1 links objects through relationships. For example, an attack pattern SDO could be linked to threat actor SDO to indicate which actor typically uses the aforementioned pattern. The conducted correlations coalesce into a graph structure that visualizes timeline of a threat displaying who did what, using a definite tool against certain targets (Hu et al. 2024). In addition to SDOs, STIX v.2.1 has two more main object categories- STIX Relationship Objects (SROs) and STIX Cyber-observable objects (SCOs). There are two supporting object types- STIX Meta Objects (SMOs) and STIX Bundle Object (SBO), depicted in Table 1.

Table 1. SDO's categories and types

Category	Description	Example object types
STIX Domain Objects (SDOs)	The core objects that describe the high-level concepts and entities of cyber threat intelligence. They answer the question „what happened?" and are used to build a narrative of an attack. There are **18** SDOs.	threat-actor, malware, campaign, vulnerability, identity, report, indicator, attack-pattern, course-of-action
STIX Cyber-observable Objects (SCOs)	The objects that represent low-level, technical artifacts and data points observed on a system or network. They serve as the „evidence" of an attack and are used to represent concrete data. There are **17** SCOs.	file, ipv4-address, url, domain-name, network-traffic, email-message, process, user-account
STIX Relationship Objects (SROs)	The objects that link other STIX objects together, providing context and showing how different elements relate to each other. They form the edges of the STIX graph model. There are **2** SROs.	relationship, sighting
STIX Meta Objects (SMOs)	Objects that provide metadata and additional context to other STIX objects. They are used to enhance or extend the core objects with extra information. There are **3** SMOs.	language-content, marking-definition, extension-definition
STIX Bundle Objects (SBOs)	A special object that acts as a container to group and transmit any number of other STIX objects together. It is the primary transport mechanism for STIX data. There is **1** SBO.	bundle

In practice, STIX v2.1 bundles CTI in JSON files and TAXII provides the blueprint for exchange between organizations. This process ensures broad interoperability and standardization allowing usage of CTI by a vast majority of tools or analysts.

After the systematization of raw data, the findings could link to tactics and techniques described in MITRE ATT&CK knowledge base for better comprehension of adversarial behaviour and motivation in common language. Security tools compare observed attack traces to MITRE ATT&CK techniques to build scenarios of how an intrusion unfolded. Moreover, a description of an adversary's actions as, for example, „usage of DLL side-loading for persistence maintenance" maps the phrase to ATT&CK technique ID (T1574.001), which normalizes the information. A

major upside of ATT&CK is its continuous update with new techniques which makes it solid and evolving reference (Jiang et al. 2025). It has been proven that combining CTI data with ATT&CK labels and using ML/NLP to extract relevant phrases from raw data, significantly boosts threat analysis.

A major hurdle in leveraging CTI is the textual nature of most of the relevant information. In recent research it has been noted that NLP could be used to crawl and filter CTI data, recognize malware by name, campaign IDs, adversaries' aliases and extract relations and attributions. Processing CTI text trough NLP pipeline could output structured data suitable for knowledge base feed. For example, a tag of the sentence „DarkForest ransomware uses AES encryption" could yield „Indicator: DarkForest, Technique: Data Encryption, Algorithm: AES", which can be inserted into STIX v2.1 objects. Evidently, NLP can transform unstructured CTI into machine-readable statements, significant for automation.

STIX v2.1, MITRE ATT&CK and NLP provide combination, effective for an automated profiling system. The automated framework leverages the aforementioned in the following order: NLP outlines potential threats, indicators and tactics from raw CTI data. These details are mapped into STIX v2.1 object models with nodes and relationships in a threat graph. Then, existing MITRE ATT&CK TTPs are connected to the nodes for context enrichment and finally graph algorithms or rule-based engines infer threat actor profiles.

Proposed framework

The proposed pipeline is comprised of 6 stages that narrow-down an evolving actor profile from raw threat data.

First stage: Data ingestion: Raw CTI data is continuously harvested from a variety of sources which are open-source intelligence (OSINT) feeds, security blogs, social media, GitHub, dark web forums, internal logs, and sharing platforms like MISP and OpenCTI. Each new report alert would be queued for processing and evaluation.

Second stage: NLP Extraction: The digested text data is fed into NLP pipeline. The NLP performs a plethora of activities such as language detection, tokenization, named entity recognition (NER). Pretrained models identify mentions of important CTI entities like malware families, vulnerability names (CVEs), IP addresses, domain names, hashes, campaign names, possible threat actor names or group tags, etc. NLP could be pretrained to scan for certain verbs and phrases suggesting usage of techniques or tactics. For example, from the phrase „DarkForest exploited a zero-day in Apache" the system would extract „Indicator: Apache-CVE-XXXX, Technique: Exploitation of Vulnerability". There are serious indications for high precision in such tasks performed by NLPs (Arazzi et al. 2023).

Third stage: STIX Encoding: Enabled by the previous two stages, the third instantiates each extracted element into STIX v2.1 object or relationship. As mentioned in *Table 1*, common object types include indicator for IoCs like malicious hashes or URLs, malware for specific ransomware or trojans, etc., threat-actor for identified groups or other entities, attack-pattern for abstracted tactics. For example, if NLP identifies new domain *evil.example.com* used in a cyberattack, a STIX indicator object is created. Next, objects are related as an incident or campaign object could relate threat actor „DarkForest Group" to a set of IoCs and a timeline of action. For STIX v2.1 relating multiple sources is natural as repeated IoC consolidate into one indicator object with multiple malware-samples attributes. Adhering to STIX v2.1 is crucial to ensure seamless sharing of the data between TIPs and tools utilization without incompatibilities.

Fourth stage: Mapping to ATT&CK: As threat reports signal for techniques, e.g. persistence via registry run keys, the framework looks up ATT&CK and the extracted behaviour is assigned with the specific ATT&CK technique ID. The profile is enriched with context and an analyst could comprehend which tactics the actor tends to apply. Cross-referencing against known campaigns is also enabled. If a certain combination of techniques is known under a documented advanced persistent threat (APT) in ATT&CK or OSINT repositories, the framework might suggest an attribution. The mapping is implemented through a lookup table or ML classifier recognizing technique keywords.

Fifth stage: Graph Correlation and Profiling: The STIX knowledge graph enriches and grows with time while rule-based engines could infer higher level insights. If a graph query inspects which threat-actor objects are linked to a particular malware and IoCs, the answer might provide a candidate profile. A similarity scoring could also be applied and if a malware demonstrates high overlapping of IoCs with an existing and labeled cluster, the system signals a possible connection. Another correlation to be observed is the behavioural clustering where a malware could be allied with certain infrastructure or detected common TTPs with other actors, indicating possible campaign groups (Gulbay & Demirci 2024).

Sixth stage: Real-Time Updates: The entire framework is designed for streaming operation as new CTI is processed and threat actor graph is updated incrementally. The continuous updating facilitates the near real-time profiling as the manual analysis and profiling is no longer necessary.

The aforementioned framework is conceptual and modular, and all components such as NLP engines, STIX store, graph database, could be chosen from existing tools or developed by more advanced entities. The key point is how AI-driven extraction, structured representation and standard threat models could automate profiling through combination. The following section illustrates the framework in action with a hypothetical example.

Simulation case study: darkforest ransomware

To showcase the framework's operability, the paper takes into consideration a hypothetical ransomware tool called DarkForest used in a campaign. The ransomware infected organizations worldwide in a short timeframe. Analysts stumble upon a scattered reports describing that the malware targets Linux servers and utilizes a version of a well-known encryptor. OSINT forum contains snippets of DarkForest ransom note and references to the leaked source code. All of this raw input would go through the framework's ingestion queue.

Step 1 - NLP Extraction: Reports state that the ransomware was delivered via spearphishing using 4096-bit RSA encryption. The NLP model identifies „actor" DarkForest, „technique", „spearphishing [T1566]" and „crypto details" 4096-bit RSA as an Attack Pattern. On another dark-web forum, an IP address and URL were shared. These became Indicator Objects. In addition, SymBiote rootkit (a fictional tool) was mentioned in the post. This too was tagged as a Malware component by the NLP.

Step 2 - STIX Graph Building: The „DarkForest Group" Threat-Actor has now been created and updates have been made to the Threat-Actor object as new intelligence arrives. Different nodes were assigned to different types of objects. For example, the „Attack Pattern", spearfishing, is connected to the Threat-Actor. Indicators such as phishing domain, payload hash and Malware artifacts are linked to a campaign or intrusion-set referred to as „DarkForest-1". If it is determined that DarkForest's payload has commonalities with a previous malware branch, a connection is established between them. As additional intelligence arrives over time, the graph begins to develop a node cluster around DarkForest with associated IP addresses, domain names, malware signatures and tactics.

Step 3 - ATT&CK Correlation: The framework associates each of the observed behaviors with MITRE's ID as the behavior is mapped to a corresponding tactic identifier. For example, spearphishing is identified as T1566 while rootkit deployment is identified as T1548. All connections are shown visually on the graph. In addition, the system determines that multiple instances of Credential Dumping (T1003) occurred. Previously, a signature of a group called „Epoch-Bear" was found that used the same techniques. This is an indication that DarkForest may be operated by or affiliated with Epoch-Bear.

Step 4 - Inference: With continued inflow of data, the graph illustrates that DarkForest uses ransomware encryption and creates a Command and Control (C2) channel allowing for lateral movement. It appears this profile is identical to a known APT group that specializes in espionage and ransomware. At this point an alert is triggered indicating that DarkForest is likely affiliated with Epoch-Bear due to four common TTPs. For the analysts this is enough to assess the situation as a main lead.

The case study is simplified but it showcases the hypothesis that through AI/NLP and STIX/

ATT&CK, scattered intelligence can be transformed into an actionable CTI. The system in action could refine each step using confidence scores, handling of synonyms for techniques and allow analysts to insert feedback on inferred relations.

RESULTS

Advantages and limitations

The framework proposed in this paper possesses several advantages but also has its limitations. The seamless sharing and comparison of profiles through leveraging of STIX and ATT&CK for standardization of threat data is extremely useful. NLPs and AI additionally speed up the process of analysis that take minutes instead of days. Graph correlations can visualize connections that could be missed by manual processing. Automation of activities like data crawling, extraction and labeling with NLP-based methods enhances further the CTI generation process (Arazzi et al. 2023). Generally, all that would mean faster identification of threat groups and more effective resource allocation by security teams.

The upside potential is clearly visible but the proposed framework has limitations that have to be considered for further study. Automated extraction could produce false outcome based on inaccurate data gathered in bulk or could miss a deeper context as data quality is a permanent issue in CTI. False flags and attributions, deliberate or not, might enter into the profiling process if unchecked. Therefore, the human-in-the-loop remains a safety measure. Explainability is also a concern when it comes to AI suggesting links of an actor to a group without solid evidence, for example a specific shared TTPs.

The context sensitivity is another point which needs attention because a widespread technique like spearfishing may appear in many unrelated campaigns and overgeneralization of the events should be avoided by the framework. A mechanism that stresses more on newer intelligence or requiring multiple sources before confirming a relation is a must. Furthermore, the existing standards mean the framework can profile actors within the known constructs. That means that new threats which use yet unfamiliar methods, may not immediately fit into the existing STIX/ATT&CK categories.

Another limitation is the character of CTI itself. At present, it is more common for nation states and big tech companies to have their own CTI programs tailored for themselves in custom ways. It takes driven entities with clear direction and purpose to maximize on a CTI program because each step of the pipeline demands high degree of technical skills, funding and computational power. This high bar might render the pipeline not suitable for most entities but it does not mean they would not benefit from the end product.

Despite the aforementioned challenges, the integration of AI with CTI is already on the way. Commercial TIPs advertise automatic actor profiling and „lookalike domain“ detection. Academic research also proves the knowledge graphs to be an effective method to aggregate threat data for inference.

CONCLUSION

The paper proposed an automation framework for threat actor profiling that combines AI, particularly NLP, with structured CTI representations, STIX v2.1, and the MITRE ATT&CK model. The exposed approach creates a dynamic knowledge graph of adversary’s behaviour and linked objects, extracted from threat reports after encoding. The concept was showcased by the fictional DarkForest ransomware example proving how scattered intelligence can be unified into coherent actor profile. The results are promising to make threat profiling faster and systematic which would benefits defenders tremendously in attributing campaigns and anticipating attacker moves.

Future research involves prototyping the design utilizing authentic CTI pipelines, such as integrating OpenCTI or MISP, and evaluating it on live data feeds. Advances in LLMs suggest further improvement of CTI extraction with less training. Additionally, enriching the framework with anomaly detection or predictive modules might make possible not only profiling, but also proactive warning of likely new threats. By turning raw data into actionable insights, automating CTI with AI holds a promise to cyber defense.

REFERENCES
ARAZZI, M.; ARIKKAT, D. R.; NICOLAZZO, S.; NOCERA, A.; R. R. K. A.; CONTI, M., 2025. NLP-based techniques for cyber threat intelligence. *Computer Science Review*, 58, 100765. [viewed 9 December 2025]. Available from: https://doi.org/10.1016/j.cosrev.2025.100765
GAO, P.; LIU, X.; CHOI, E.; MA, S.; YANG, X.; SONG, D., 2023. ThreatKG: An AI-powered system for automated open-source cyber threat intelligence gathering and management. *Proceedings of the 1st ACM Workshop on Large AI Systems and Models with Privacy and Safety Analysis*, pp. 1–12. [viewed 9 December 2025]. Available from: https://dl.acm.org/doi/10.1145/3689217.3690613
GULBAY, B.; DEMIRCI, M., 2024. APT-scope: A novel framework to predict advanced persistent threat groups from enriched heterogeneous information networks of cyber threat intelligence. *Engineering Science and Technology, an International Journal*, 57, 101791. [viewed 10 December 2025]. Available from: https://doi.org/10.1016/j.jestch.2024.101791
HU, Y.; ZOU, F.; HAN, J.; SUN, X.; WANG, Y., 2024. *LLM-TIKG:* Threat intelligence knowledge graph construction utilizing large language models. *SSRN Electronic Journal*. [viewed 13 December 2025]. Available from: https://ssrn.com/abstract=4671345 and http://dx.doi.org/10.2139/ssrn.4671345
JIANG, Y.; MENG, Q.; SHANG, F.; OO, N.; MINH, L. T. H.; LIM, H. W.; SIKDAR, B., 2025. *MITRE ATT&CK applications in cybersecurity and the way forward*. *arXiv preprint*, arXiv:2502.10825. [viewed 14 December 2025]. Available from: https://arxiv.org/pdf/2502.10825
LI, Z.; ZENG, J.; CHEN, Y.; LIANG, Z., 2022. AttacKG: Constructing technique knowledge graphs from cyber threat intelligence reports. *European Symposium on Research in Computer Security*. Cham: Springer International Publishing, pp. 589–609. [viewed 14 December 2025]. Available from: https://arxiv.org/pdf/2111.07093
RANI, N.; SAHA, B.; SHUKLA, S. K., 2025. A comprehensive survey of automated advanced persistent threat attribution: Taxonomy, methods, challenges and open research problems. *Journal of Information Security and Applications*, 92, 104076. [viewed 3 January 2026]. Available from: https://doi.org/10.1016/j.jisa.2025.104076
SANTOS, P.; ABREU, R.; REIS, M. J.; SERÔDIO, C.; BRANCO, F., 2025. A systematic review of cyber threat intelligence: The effectiveness of technologies, strategies and collaborations in combating modern threats. *Sensors*, 25(14), 4272. [viewed 3 January 2026]. Available from: https://doi.org/10.3390/s25144272
SATVAT, K.; GJOMEMO, R.; VENKATAKRISHNAN, V. N., 2021. Extractor: Extracting attack behavior from threat reports. *2021 IEEE European Symposium on Security and Privacy (EuroS&P)*. IEEE, pp. 598–615. [viewed 3 January 2026]. Available from: https://arxiv.org/pdf/2104.08618
WANG, J.; ZHU, T.; XIONG, C.; CHEN, Y., 2024. Multikg: Multi-source threat intelligence aggregation for high-quality knowledge graph representation of attack techniques. *arXiv preprint*, arXiv:2411.08359. [viewed 3 January 2026]. Available from: https://arxiv.org/pdf/2411.08359
ZHANG, Y.; DU, T.; MA, Y.; WANG, X.; XIE, Y.; YANG, G.; CHANG, E. C., 2025. AttacKG+: Boosting attack graph construction with large language models. *Computers & Security*, 150, 104220. [viewed 4 January 2026]. Available from: https://doi.org/10.1016/j.cose.2024.104220

АВТОМАТИЗИРАНО ПРОФИЛИРАНЕ НА ЗЛОНАМЕРЕНИ АКТЬОРИ ЧРЕЗ ИЗКУСТВЕН ИНТЕЛЕКТ И КИБЕРРАЗУЗНАВАНЕ: РАМКА ЗА ИЗВЛИЧАНЕ И СЪОТНАСЯНЕ В РЕАЛНО ВРЕМЕ

Резюме: *Киберразузнаването (CTI) се превърна във важен елемент от проактивната защита срещу заплахи в киберпространството. Въпреки това голямата част от важната информация е скрита в обширни масиви от неструктурирани данни и потоци, което прави анализа им изключително времеемък и податлив на грешки. В тази статия е разгледана автоматизирана система, работеща в реално време и ползваща обработка на естествен език (NLP) и стандартизирани онтологии, като например Structured Threat Information Expression (STIX) версия 2. 1 и MITRE ATT&CK, за откриване на индикатори за компрометиране (IoC), тактики, техники и процедури (TTP) от различни източници на CTI, които същевременно се сравняват с профили на злонамерени актьори. Предложената стратегия анализира информация от публични доклади, социални мрежи и различни платформи за споделяне. Рамката е тествана с хипотетичен случай на ransomware, който демонстрира как извлечени индикатори и поведенчески модели могат да бъдат свързани със спецификите на злонамерен актьор. Резултатите показват, че рамката, движена от изкуствен интелект, има потенциала да редуцира значително ръчния труд при обработката на CTI, като същевременно запазва висока точност. Работата поставя основите за внедряване на автоматизирано CTI профилиране на противници, което ще подпомогне проактивната защита и усилията за съотнасяне.*

Ключови думи: *киберразузнаване; изкуствен интелект; профилиране; обработка на естествен език; киберсигурност*

гл. ас. д-р Владимир Бабанов
ORCID 0000-0001-8596-6493, SCOPUS ID: 60021493300
Югозападен университет „Неофит Рилски“
Благоевград, България
E-mail: v.babanov@law.swu.bg

ИНФОРМАТИКА И КОМПЮТЪРНИ НАУКИ
INFORMATICS AND COMPUTER SCIENCES

VBA AS A FIRST TEXT-BASED PROGRAMMING LANGUAGE

Herbert Berger
University of Library Studies and Information Technologies
https://doi.org/10.70300/DEBQ3839

Abstract: *Programming is an important asset in today's world. Everyone has been talking about AI since LLMs like ChatGPT at the latest. The first programming language that springs to mind in this context is Python. But why VBA is the more suitable first programming language, even directly before Python, is explained in this article.*
In companies, the integrated scripting language VBA is often used for the digital process automation of Microsoft products. This is due to the enormous availability (every Office product already has the corresponding IDE, VBE, on board), but also due to the easy-to-learn syntax, as VBA is based on BASIC. Due to its practical relevance in companies, high availability and low barrier to entry, VBA is the ideal first programming or scripting language for new programmers according to the author. MS Excel also has a macro recorder, which can be used to convert actions directly into code. As changes are immediately visible, the learning effect is enormous.
Keywords: *VBA; scripting language; programming education; MS Office; programming language*

INTRODUCTION

The ability to programme is becoming increasingly important, also because of the AI hype. To understand ML and AI in particular, models should be trained by students using Python. However, Python is not necessarily ideal as a first programming language. Of course, the syntax is expressive. However, an IDE and Python itself must first be installed, packages have to be installed via pip etc. What is often not even possible in companies is at least exhausting at home. Of course, it would be more convenient if everything was already installed on the PC. And that's exactly how it is with VBA on any PC that has MS Office installed. VBA is one of many scripting languages. However, experienced programmers tend to think of bash, cmd, JavaScript or perhaps even VBS when they think of scripting languages – but not VBA. In comparisons of scripting languages, VBA is often not even mentioned; in the PopularitY of Programming Language (PYPL) Index, VBA has a share of less than one per cent (cf. Carbonnelle 2024). And yet the scripting language is extremely important in companies (cf. Kleinz 2022). So important, in fact, that MS promptly reversed a deactivation by default of VBA in Microsoft 365 (cf. Hill 2022).

"[…] VBA is still the preferred way to customize Microsoft Office applications for the desktop." (Hamilton 2023)

The author's first programming language was C at a technical upper-level secondary school. In his opinion, this hardware-related language is completely unsuitable as the first programming language for a number of reasons, including the fact that it requires extensive knowledge of the computer's memory system. The author's opinion (from the perspective of a former learner) is shared by a professor, Ian Barland from Radford University, among others (cf. Barland 2019).

No extensive prior knowledge is required for VBA, but there are many other reasons that speak in favour of VBA as the first programming language. Why VBA is suitable as the first programming language will be explained below.

RESEARCH METHODOLOGY

The chosen methodology is that of a case study. The author has many years of experience in the field of data analysis and tutoring apprentices, high school graduates and students in a professional environment and is therefore the object of the case. As he often observed difficulties in students

with their first programming language (e.g. C), his experience with VBA led him to believe that it would be a more suitable first programming language. For this reason, the research question of the paper is why VBA should be the more suitable first programming language than other languages. Therefore, the opinion based on the author's experience is described and supported by literature.

RESULTS

This is not the first paper to deal with the question of the optimal first programming language (Gupta 2004). The relevance of the first programming language lies, among other things, in the fact that it characterizes the programmer. Programmers prefer the first programming language they learnt, this even goes so far that the style and structures are used in subsequent programming languages (Wexelblat 1980). There are some papers that recommend a different language as a good first programming language or focus on a specific language as a first programming language, but why VBA is the right first programming language for the author follows:

- Available virtually everywhere

Nearly every PC has installed MS Office. As soon as MS Office is installed on the PC, Office's own IDE, VBE, is automatically on board. In 2020, for example, 85% of companies in Germany used MS Office (Empower & Nielsen 2020). Of course, many home PCs also have MS Office, but these statistics are primarily intended to illustrate its relevance in companies.

- Easy to learn

VBA is comparatively easy to learn due to its BASIC roots. In C, for example, the standard input and output file must already be included for the output "Hello, World!" so that the output function printf works. The main function is preceded by an int data type, although other data types are not permitted in this case. The programme is ended with a return 0, followed by a curly bracket. What ends the programme now, the bracket or the return? Even "Hello, World!" raises questions for the programming novice.

In contrast, VBA requires exactly one line in addition to the first and last line, which delimit the programme without brackets and return 0: MsgBox ("Hello World!"). This outputs a message box with the content "Hello World!", as can also be surmised by laypersons. It doesn't get much simpler than this.

Another huge advantage is that the scripting language can be practised at home on the computer as soon as MS Office is installed. Only the developer options need to be activated, there is no need to install an IDE or any packages. Many parts of object-oriented programming (OOP) can be learnt using VBA, as VBA supports classes.

- Guided learning

Excel has a so-called macro recorder, which records many executed activities and converts them into VBA code. This is then saved in a module and can be viewed. This allows you to try out a variety of things and see directly what this looks like as VBA code. This guided learning is particularly efficient, as actions can be converted directly into code and viewed immediately. The generated code is far from ideal, for example cells are marked where a cell could have been referenced directly. With this knowledge, however, it is possible to optimize the generated code, which has a further learning effect.

- Relevant scripting language

VBA is still a very relevant scripting language in industrial companies. It is often the only way for organizations to automate digital processes due to restrictive software restriction policies. IDEs for Python, for example, are often not allowed to be installed and even the successor to VBA, Office Scripts, is often blocked. Furthermore, virtually all existing scripts in Excel workbooks, PowerPoint presentations etc. are based on VBA, and adapting them all is a very difficult endeavour.

Many universities teach Assembly or C as an introduction, but these programming languages only have very specific purposes, VBA can be used for everyday problems in companies and at home. Furthermore, the entry barriers are much higher with the mentioned programming languages and the syntax is much easier to understand with VBA. Other universities such as Wisconsin-Platteville University have recognized the advantages of VBA and use it for programming and

data acquisition, for example (Evensen 2014).

- Applicable for everyday problems

VBA can be used for everyday problems. Each value of a column in Excel must be divided by three? No problem at all. Of course, you could create an auxiliary column and overwrite the original column, but where would the programming fun be in that? The effect of the VBA code is also directly visible in Excel and Office in general, which is particularly rewarding.

- Nearly object oriented

Although VBA is primarily an event-driven, object-orientated programming paradigm, it also supports procedural and structured programming. Classes and objects can be created in VBA, which is typical of object-orientated programming. The only thing VBA lacks to become a fully-fledged OOP language is one of the four pillars of OOP, inheritance (Kasture 2019). However, since classes and objects can be created in VBA, basic OOP paradigms can be taught.

CONCLUSION

VBA is very well-suited as an introduction to the world of programming. The simple syntax, easy accessibility and relevance in companies not only make the scripting language very easy to get started with, but also offer real added value. Many universities use Assembler or C as a starting point, but these programming languages only have very specific purposes, VBA can be used for everyday problems. For these and other reasons, VBA is, in the author's opinion, a very suitable first programming language. Some universities have also recognized this and are using VBA in their teaching.

REFERENCES

BARLAND, I., 2019. *Why C and C++ are bad*. 25 April. [viewed 10 July 2025]. Available from: https://sites.radford.edu/~ibarland/Manifestoes/whyC++isBad.shtml

CARBONNELLE, P., 2024. *PYPL popularity of programming language index*. January. [viewed 10 July 2025]. Available from: https://pypl.github.io/PYPL.html

EMPOWER; NIELSEN, 2020. *Die große Office-Software Studie: Wie Unternehmen mit Office arbeiten*. [viewed 10 July 2025]. Available from: https://www.empowersuite.com/hubfs/Marketing/Downloads/Office%20Studie%202020/Die%20gro%C3%9Fe%20Office%20Studie_empower%20GmbH.pdf

EVENSEN, H., 2014. A versatile platform for programming and data acquisition: Excel and Visual Basic for Applications. In: *2014 ASEE Annual Conference & Exposition Proceedings*, pp. 24.125.1–24.125.12. [viewed 10 July 2025]. Available from: https://doi.org/10.18260/1-2--20017

GUPTA, D., 2004. What is a good first programming language? *XRDS: Crossroads, The ACM Magazine for Students*, vol. 10, no. 4, p. 7. [viewed 10 July 2025]. Available from: https://doi.org/10.1145/1027313.1027320

HAMILTON, T., 2023. Is Excel VBA still worth learning in 2024? *Training Hamilton*, 7 August. [viewed 10 July 2025]. Available from: https://www.traininghamilton.com/is-excel-vba-still-worth-learning/

HILL, J., 2022. *VBA-Makros in Office: Microsoft bringt Makros zurück – vorübergehend*. 12 July. [viewed 10 July 2025]. Available from: https://www.computerwoche.de/a/microsoft-bringt-makros-zurueck-voruebergehend,3553723

KASTURE, D., 2019. Pillars of object oriented system. *International Journal for Research in Applied Science and Engineering Technology*, vol. 7, no. 12, pp. 589–591. [viewed 10 July 2025]. Available from: https://doi.org/10.22214/ijraset.2019.12096

KLEINZ, T., 2022. VBA-Makros: Microsoft Office öffnet die Büchse der Pandora wieder. *Der Spiegel*, 11 July. [viewed 10 July 2025]. Available from: https://www.spiegel.de/netzwelt/apps/vba-makros-microsoft-office-oeffnet-die-buechse-der-pandora-wieder-a-753af73c-c848-416b-9fc1-67f7fa322bd7

WEXELBLAT, R. L., 1980. The consequences of one's first programming language. In: *Proceedings of the 3rd ACM SIGSMALL Symposium and the First SIGPC Symposium on Small Systems (SIGSMALL '80)*. Palo Alto, California, United States: ACM Press, pp. 52–55. [viewed 10 July 2025]. Available from: https://doi.org/10.1145/800088.802823

VBA КАТО ПЪРВИ ТЕКСТОВО БАЗИРАН ПРОГРАМЕН ЕЗИК

Резюме: *Програмирането е важен актив в днешния свят. Всички говорят за изкуствен интелект, откакто се появиха LLM като ChatGPT. Първият език за програмиране, който идва на ум в този контекст, е Python. Но защо VBA е по-подходящият първи език за програмиране, дори пред Python, е обяснено в тази статия.*

В компаниите интегрираният скриптов език VBA често се използва за цифрова автоматизация на процесите на продуктите на Microsoft. Това се дължи на огромната му достъпност (всеки продукт на Office вече разполага със съответния IDE, VBE), но и на лесния за научаване синтаксис, тъй като VBA се базира на BASIC. Благодарение на практическата си приложимост в компаниите, високата достъпност и ниската бариера за навлизане VBA е идеалният първи език за програмиране или скриптове за нови програмисти според автора. MS Excel разполага и с макрорекордер, който може да се използва за преобразуване на действия директно в код. Тъй като промените са видими веднага, ефектът от ученето е огромен.
Ключови думи: *VBA; скриптов език; обучение по програмиране; MS Office; език за програмиране*

Херберт Бергер, докторант
ORCID 0009-0003-1965-3853
Университет по библиотекознание и информационни технологии
София, България
E-mail: h.berger@unibit.bg

ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ
PUBLIC COMMUNICATIONS AND INFORMATION SCIENCES

BARRIERS AND OPPORTUNITIES IN ACCESSING DIGITAL HEALTH INFORMATION

Nadine Zacharias
University of Library Studies and Information Technologies
https://doi.org/10.70300/XVTM7599

Abstract: *Digital information services open new opportunities for health communication, yet their use remains uneven. While many benefit from quick and low-threshold access to knowledge, others face significant barriers. Barriers arise above all from unequal digital skills, limited trust in online sources, structural inequalities in access and the challenge of information overload. Opportunities, in contrast, lie in promoting health literacy, supporting prevention and self-management, enabling personalization through digital tools and facilitating more informed health-related decisions. The findings are discussed in the context of the Health Belief Model (HBM), the Theory of Planned Behavior (TPB) and the concept of the digital divide. These models show how individual attitudes, social norms and structural conditions interact in shaping digital health behavior. Ethical concerns regarding data protection, algorithmic influence and misinformation underline the need for transparency and user-centered design. In practice, strategies must address three levels: strengthening competences at the individual level, ensuring trustworthy systems at the systemic level and reducing inequalities at the societal level. Only by combining these perspectives can digital health communication fulfill its potential and contribute to inclusive improvements in health literacy.*
Keywords: *digital health communication; digital health information; barriers and opportunities; digital health literacy; digital divide*

INTRODUCTION

Digital technologies have already changed health communication. More and more people are using apps or social networks to research information on health topics (Nölke et al. 2015). This development opens up opportunities. Information is available more quickly, can be tailored more individually and can thus contribute to strengthening health literacy (Sørensen et al. 2012). At the same time, studies show clear differences in the use of digital services. The digital divide illustrates that not all population groups benefit equally from digital technology. Unequal technical access, varying digital skills or a lack of trust in digital sources mean that vulnerable groups such as older people or those with low levels of education remain disadvantaged (Friemel 2016). These areas of tension between opportunities and barriers are crucial to the question of whether digital health communication can also realize its potential. The aim of this publication is therefore to systematically evaluate the scientific literature and to answer various key questions: On the one hand, it examines the barriers that hinder access to digital health information. On the other hand, it investigates the opportunities that digital information services offer in terms of health literacy. The results should provide recommendations for action in research and practice.

RESEARCH METHODOLOGY

The research method used in this publication is a literature analysis. Its aim is to collate existing studies, evaluate them critically and highlight the most relevant barriers and opportunities in accessing digital health information, as well as gaps for further research. The search was conducted in established scientific databases and complemented by journals from health communication, public health and information science. Inclusion was limited to peer-reviewed studies in English or German that addressed barriers or opportunities for digital health information. Both theoretical and empirical contributions were considered, provided they examined digital health communication from the perspective of the general population or specific user groups. The selected literature

was analyzed using qualitative content analysis, distinguishing between barriers and opportunities. Particular attention was given to recurring patterns, group-specific differences and implications for research and practice.

RESULTS

The literature analysis shows that access to digital health information can be both hindered by various barriers and promoted by numerous opportunities. With regard to the barriers, it is clear that technological innovations do not automatically benefit all population groups equally. A key obstacle is unequal access to devices and stable internet connections, which particularly affects older people and socially disadvantaged groups (Van Dijk 2005). In addition, many users have insufficient digital health literacy. Studies show that older people in particular have difficulty searching for digital information, evaluating it critically and translating it into health-related action (Norman and Skinner 2006; Dratva, Schaeffer and Zeeb 2024). A lack of trust in digital sources is also a significant problem. Doubts about the reliability of websites or concerns about data protection cause many users to avoid digital offerings despite their availability (Wang et al. 2019). The abundance of digital information exacerbates this problem. Further data show that many people find it difficult to distinguish between reputable and unreliable content. This often leads to uncertainty and misinformation (Swire-Thompson and Lazer 2020).

Building on these findings, recent studies also emphasize the role of information overload and the spread of health-related misinformation on social media. Particularly during the COVID-19 pandemic, misleading or contradictory health messages spread rapidly across platforms, creating confusion and sometimes health-endangering behaviors (Cinelli et al. 2020; Roozenbeek et al. 2020). Moreover, structural inequalities continue to shape digital health communication: people with limited education, low income or migration background often encounter additional cultural and linguistic barriers, which limit the accessibility and relevance of digital health content (Kontos et al. 2014; Chesser et al. 2016).

At the same time, digital information services open up a wide range of opportunities. Particularly noteworthy is the low-threshold access to health knowledge. This makes it possible to retrieve information quickly and independently of location and to strengthen health literacy across the population (Sørensen et al. 2012). In addition, digital applications support preventive measures and self-management processes by actively involving patients in shaping their health behavior (Kreps and Neuhauser 2010). Further potential lies in the possibility of personalisation: apps and AI-supported systems can tailor information to individual needs and offer targeted support (Meskó et al. 2017). In addition, the literature shows that digital tools also promote doctor-patient communication by facilitating the exchange of information and supporting joint decision-making processes (Zulman et al. 2011).

Recent analyses confirm these findings, highlighting how interactive and personalized applications enhance motivation and self-efficacy in health management. For example, gamified mobile health apps or wearable technologies can promote healthy behavior if they are user-friendly and embedded in broader care processes (Baumel et al. 2019; Kelders et al. 2020). Furthermore, digital infrastructures such as electronic health records or telemedicine platforms provide opportunities to improve continuity of care and strengthen patient empowerment. These potentials can only be realized if issues of data protection and usability are adequately addressed (Quinn et al. 2019). The analysis shows that digital health information has outstanding potential for promoting health literacy. Structural and individual barriers remain that prevent these opportunities from reaching the population evenly. The challenge for research and practice is to specifically reduce existing barriers and shape the positive possibilities of digital communication in such a way that vulnerable groups can also benefit.

CONCLUSIONS/DISCUSSION

The analysis shows that access to digital health information is both restricted by barriers and enhanced by opportunities. These findings can be classified in detail in the context of theoretical

models. HBM explains why perceived risks, benefits and barriers are crucial for the use of digital services (Becker 1974; Rosenstock 1974; Glanz, Rimer and Viswanath 2015). Low eHealth literacy or mistrust of sources act as perceived barriers here and reduce the probability of actively using digital information. On the other hand, opportunities like personalized applications or easily accessible information reinforce the perceived benefits (Seale et al., 2020). TPB emphasises the importance of attitudes, social norms and perceived control (Ajzen, 1991). Trust in digital health sources and the ability to use digital tools influence perceived behavioral control. Studies confirm that the acceptance of health apps depends significantly on social support and digital literacy (Tomczyk et al. 2021). Opportunities such as promoting communication between doctors and patients focus precisely on this aspect, as they increase users' perceived ability to act accordingly.

The digital divide concept demonstrates that the aforementioned barriers are not only personal but also deeply ingrained in society. Disadvantaged groups often experience systematic exclusion due to differences in access to technology, digital skills and the outcomes they achieve (Van Dijk 2005; Friemel 2016). At the same time, the opportunities show that, if designed appropriately, digital health services have the potential to reduce existing inequalities by being developed in a way that is accessible, trustworthy and target group-oriented.

Building on these models, recent research emphasizes that digital health literacy must be understood as both an individual competence and a systemic responsibility. Only by tailoring digital infrastructures and communication strategies to the needs of diverse user groups can they fully unfold their impact. This procedure includes transparent data governance, culturally sensitive communication and participatory design processes that actively involve users in the development of digital tools (Bernaerts et al. 2024). In this sense HBM and TPB remain relevant for explaining individual decisions, while the concept of the digital divide highlights the structural conditions that shape these decisions. Another important dimension concerns the ethical implications of digital health communication. Studies point out that algorithms and platform logics can amplify misinformation or prioritize commercial content over evidence-based health knowledge (Cinelli et al. 2020). Addressing these challenges requires not only technical solutions but also institutional responsibility and policy frameworks that ensure fairness, transparency and accountability in digital communication environments (Fitzpatrick 2023).

From a practical perspective the findings suggest that strategies to promote digital health literacy must be conceived on several interconnected levels. At the individual level it is necessary to strengthen competencies through targeted education, training programs and low-threshold access to digital resources. On the systemic level, user-centered design, transparent handling of data and the establishment of reliable quality standards are essential to ensure trustworthiness and long-term acceptance. Finally, at the societal level, reducing structural inequalities must be addressed through inclusive infrastructures and targeted support for vulnerable groups. Digital health communication does not reinforce existing disparities but contributes to social participation and equity.

Overall, HBM and TPB provide important aspects for the individual determinants of information behavior, while the concept of the digital divide highlights structural conditions. Only by combining these perspectives is it possible to realistically assess why the opportunities and barriers of digital health communication are often closely intertwined. This means practically that strategies to promote digital health literacy must take into account psychological factors such as attitudes and trust, as well as social differences and structural access conditions.

Digital health information has great potential to strengthen health literacy, but its use is still limited by significant barriers. These include unequal access to technology, insufficient digital skills, a lack of trust in information sources and the problem of information overload. At the same time, there are clear opportunities: digital services enable easy and flexible access to knowledge, support prevention and self-management and allow for personalized information. They can also improve communication and decision-making in healthcare. A comprehensive understanding of digital health communication requires the integration of these perspectives. HBM and TPB emphasize individual attitudes, intentions and perceived control, while the concept of the digital divide addresses structural inequalities. Both dimensions are decisive for participation and use.

Consequently, psychological and social factors must be examined together if digital health services are to be developed in an effective and equitable way.

In practice, developing digital services with specific target groups in mind and strengthening trust through transparency. The promotion of digital health literacy should be systematically embedded in education and prevention programs. For research, future studies should pursue more hybrid approaches that take into account both psychological explanatory models and structural inequalities. Only in this way can an integrative framework model be developed that meets the complex requirements of inclusive digital health communication.

REFERENCES

AJZEN, I., 1991. The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*, 50(2), pp. 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

BAUMEL, A.; MENDELSON, T.; FOGEL, V.; MANDELBAUM, S.; REINHARDT, W., 2019. Objective user engagement with mental health apps: Systematic search and panel-based usage analysis. *Journal of Medical Internet Research*, 21(9), e14567. https://doi.org/10.2196/14567

BECKER, M. H., 1974. The Health Belief Model and Sick Role Behaviour. *Health Education Monographs*, 2(4), pp. 409–419. https://doi.org/10.1177/109019817400200407

BERNAERTS, S.; VAN DER MERWE, C.; VISSERS, M.; VANHEULE, S.; DE JAEGHER, H., 2024. User involvement in digital mental health: approaches, potential and the need for guidelines. *Frontiers in Digital Health*, 6, 1440660. https://doi.org/10.3389/fdgth.2024.1440660

CINELLI, M.; QUATTROCIOCCHI, W.; GALEAZZI, A.; VALENSISE, C. M.; BRUGNOLI, E.; SCHMIDT, A. L.; ZOLA, P.; ZOLLO, F.; SCALA, A., 2020. The COVID-19 social media infodemic. *Scientific Reports*, 10, 16598. https://doi.org/10.1038/s41598-020-73510-5

DRATVA, J.; SCHAEFFER, D.; ZEEB, H., 2024. Digital health literacy among the population in Germany: Current status, concepts and challenges. *Bundesgesundheitsblatt – Gesundheitsforschung – Gesundheitsschutz*, 67(3), pp. 277–284. https://doi.org/10.1007/s00103-024-03841-5

FITZPATRICK, P. J., 2023. Improving health literacy using the power of digital communications to achieve better health outcomes for patients and practitioners. *Frontiers in Digital Health*, 5, 1264780. https://doi.org/10.3389/fdgth.2023.1264780

FRIEMEL, T. N., 2016. The digital divide has grown old: Determinants of a digital divide among seniors. *New Media & Society*, 18(2), pp. 313–331. https://doi.org/10.1177/1461444814538648

GLANZ, K.; RIMER, B. K.; VISWANATH, K., 2015. *Health Behaviour: Theory, Research, and Practice.* 5th edn. New York: John Wiley & Sons (Jossey-Bass Public Health).

KELDERS, S. M.; KIP, H.; GREEFF, J., 2020. Psychological theories and electronic health interventions: A scoping review. *Journal of Medical Internet Research*, 22(5), e16127. https://doi.org/10.2196/16127

KONTOS, E.; BLAKE, K. D.; CHOU, W.-Y.S.; PRESTIN, A., 2014. Predictors of eHealth usage: Insights on the digital divide from the Health Information National Trends Survey 2012. *Journal of Medical Internet Research*, 16(7), e172. https://doi.org/10.2196/jmir.3117

KREPS, G. L.; NEUHAUSER, L., 2010. New directions in eHealth communication: Opportunities and challenges. *Patient Education and Counselling*, 78(3), pp. 329–336. https://doi.org/10.1016/j.pec.2010.01.013

MESKÓ, B.; DROBNI, Z.; BÉNYEI, É.; GYÖRFFY, Z.; GYÖRFFY, D., 2017. Digital health is a cultural transformation of traditional healthcare. *mHealth*, 3, p. 38. https://doi.org/10.21037/mhealth.2017.08.07

NÖLKE, L.; HARTZ, T.; KRINGS, L.; MÜLLER, E.; SCHAEFFER, D., 2015. Sociodemographic and health-(care-) related characteristics of online health information seekers: a cross-sectional German study. *BMC Public Health*, 15, p. 31. https://doi.org/10.1186/s12889-015-1423-0

NORMAN, C. D.; SKINNER, H. A., 2006. eHealth Literacy: Essential Skills for Consumer Health in a Networked World. *Journal of Medical Internet Research*, 8(2), e506. https://doi.org/10.2196/jmir.8.2.e9

ROSENSTOCK, I. M., 1974. Historical Origins of the Health Belief Model. *Health Education Monographs*, 2(4), pp. 328–335. https://doi.org/10.1177/109019817400200403

ROOZENBEEK, J.; SCHMIDT, A. L.; LERGETPORER, P.; GEYER, R.; VAN DER LINDEN, S., 2020. Susceptibility to misinformation about COVID-19 around the world. *Royal Society Open Science*, 7(10), 201199. https://doi.org/10.1098/rsos.201199

SEALE, H.; HEYMANN, D.; COOPER, B.; MACINTYRE, C. R., 2020. COVID-19 is rapidly changing: Examining public perceptions and behaviours in response to this evolving pandemic. *PLOS ONE*, 15(6), e0235112. https://doi.org/10.1371/journal.pone.0235112

SØRENSEN, K.; VAN DEN BROUCKE, S.; FULLAM, J.; DOYLE, G.; PELIKAN, J.; SLONSKA, Z.; BRAND, H., 2012. Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health*, 12, p. 80. https://doi.org/10.1186/1471-2458-12-80

SWIRE-THOMPSON, B.; LAZER, D., 2020. Public Health and Online Misinformation: Challenges and Recommen-

dations. *Annual Review of Public Health*, 41, pp. 433–451. https://doi.org/10.1146/annurev-publhealth-040119-094127
TOMCZYK, S.; WESOLY, E.; SCHMIDT, J.; KOWALSKI, C.; RUMPF, H.-J.; SCHULTE, B., 2021. Utilising Health Behaviour Change and Technology Acceptance Models to Predict the Adoption of COVID-19 Contact Tracing Apps: Cross-sectional Survey Study. *Journal of Medical Internet Research*, 23(5), e25447. https://doi.org/10.2196/25447
VAN DIJK, J., 2005. *The Deepening Divide: Inequality in the Information Society.* Thousand Oaks, CA: SAGE Publications. https://doi.org/10.4135/9781452229812
WANG, Y.; MCKEE, M.; TORRES, J. V.; MATHUR, A.; FLINT, M., 2019. Systematic Literature Review on the Spread of Health-related Misinformation on Social Media. *Social Science & Medicine*, 240, 112552. https://doi.org/10.1016/j.socscimed.2019.112552
ZULMAN, D. M.; NAHAPETYAN, L.; SHACHAR, C.; REED, M. E.; KRAVITZ, R. L., 2011. Patient interest in sharing personal health record information. *Annals of Internal Medicine*, 155(12), pp. 805–810. https://doi.org/10.7326/0003-4819-155-12-201112200-00002

ПРЕЧКИ И ВЪЗМОЖНОСТИ ПРИ ДОСТЪПА ДО ЦИФРОВА ЗДРАВНА ИНФОРМАЦИЯ

Резюме: *Цифровите информационни услуги откриват нови възможности за комуникация в областта на здравеопазването, но тяхното използване остава неравномерно. Докато мнозина се възползват от бърз и лесен достъп до знания, други се сблъскват със значителни пречки. Пречките възникват преди всичко от неравномерните цифрови умения, ограниченото доверие в онлайн източниците, структурните неравенства в достъпа и предизвикателството, свързано с пренасищането с информация. Възможностите, от друга страна, се крият в насърчаването на здравната грамотност, подкрепата за превенция и самоуправление, позволяването на персонализация чрез цифрови инструменти и улесняването на по-информирани решения, свързани със здравето. Резултатите се обсъждат в контекста на модела на здравните вярвания (HBM), теорията за планираното поведение (TPB) и концепцията за цифровото разделение. Тези модели показват как индивидуалните нагласи, социалните норми и структурните условия взаимодействат при формирането на цифровото поведение в областта на здравеопазването. Етичните съображения относно защитата на данните, алгоритмичното влияние и дезинформацията подчертават необходимостта от прозрачност и дизайн, ориентиран към потребителя. На практика стратегиите трябва да се отнасят до три нива: укрепване на компетенциите на индивидуално ниво, осигуряване на надеждни системи на системно ниво и намаляване на неравенствата на обществено ниво. Само чрез комбиниране на тези перспективи цифровата комуникация в областта на здравеопазването може да реализира своя потенциал и да допринесе за всеобщо подобряване на здравната грамотност.*

Ключови думи: *цифрова комуникация в областта на здравеопазването; цифрова информация за здравеопазването; пречки и възможности; цифрова грамотност в областта на здравеопазването*

Надин Захариас, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: nadine_zacharias@gmx.de

ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ
PUBLIC COMMUNICATIONS AND INFORMATION SCIENCES

ORGANIZATION AND MANAGEMENT OF INFORMATION ON THE CAPACITY UTILIZATION OF HOSPITAL BEDS ON DIFFERENT WEEKDAYS

Dennis Komossa
University of Library Studies and Information Technologies
https://doi.org/10.70300/BOQR2265

Abstract: *The study analyses the organisation and management of information on inpatient bed utilisation by weekday at two hospitals in Essen. It aims to identify day- and time-dependent occupancy patterns to support action-oriented management of admissions, discharges, capacity and staffing, especially from Monday to Friday. The analysis is based on retrospective data from over 610,000 patients (2023–2024), using documented occupancy days and length-of-stay timestamps differentiated by department and weekday. Results show significantly higher occupancy on weekdays, with peaks from Tuesday to Thursday, and a clear decline at weekends. A daily peak between 7 a.m. and 2 p.m. is linked to overlaps between admission and discharge processes. During these periods, targeted information and communication structures are essential to reduce the risk of breakdowns. Blocked beds further influence practical occupancy. A weak but significant correlation is found between reason for admission and day of admission. Overall, the study highlights the importance of time- and day-specific capacity planning and information processes for evidence-based hospital management.*
Keywords: *information management; hospital management; hospital organization; hospital information process; capacity utilization*

INTRODUCTION

Hospitals are medical institutions in the healthcare system in which illnesses, suffering, or physical injuries of persons are treated through medical, nursing, and therapeutic services (§ 2 para. 1 KHG). These treatment services are offered 24 hours a day, 7 days a week, year-round, in hospitals, and are provided as needed. This means that capacities must be maintained during this time, even though utilization is subject to strong demand fluctuations. In particular, the treatment period can be classified into two categories. On the one hand, there are emergency patients, who are unknown in advance and not plannable. On the other hand, there are elective patients, i.e., selected and plannable patients who visit the hospital at a previously determined time of treatment (cf. Ostwald/Neumeyer 2023, 87). Treatments can be classified as fully inpatient, partially inpatient, or outpatient services. In fully inpatient services, patients remain in the hospital for at least one night and necessarily use the existing hospital beds. The use of beds is not necessary for partially inpatient services, in which patients receive treatment services only during the day and spend the night in their personal environment at home, or for outpatient services, in which the treatment services relate to a stay of several hours (cf. Behrends/Vollmöller 2020, 60).

Hospitals in Germany are nowadays service companies (cf. Goepfert 2013, 32). The gradual economization in German hospitals has taken hold since the 1980s. The economization process is based on reforms to hospital and health policy to introduce an economic way of thinking into German health expenditures through market-oriented health economists (cf. Flintrop 2014, A1930). In Germany, health expenditures in 2022 amounted to 497.7 billion euros, which corresponds to an average of 5,939 euros per inhabitant. Overall, this corresponds to 12.8% of Germany's gross domestic product (cf. Destatis 2024). By gross domestic product (GDP), Germany has the highest healthcare expenditure among the 27 EU member states. The average in the European Union is 10.4% of the respective gross domestic product. Luxembourg has the lowest share at 5.6% (cf. Destatis 2025).

Hospital financing in Germany has been based since 1972 on a dual system of reimbursement

for operating and investment costs (§ 17b para. 1 SGB V). Reimbursement of operating costs for both fully and partially inpatient treatment, as well as for the use of infrastructure, has, since several reforms in 2004, been financed through case-based lump-sum payments (cf. Klauber/Geraedts 2020, 191). With the help of these case-based lump-sums, a nationwide standardized remuneration is implemented, which is adjusted only once a year by a new case-based lump-sum catalogue and the remunerative base rate (cf. Behrends/Vollmöller 2020, 13). Investment costs for construction and medical-technical facilities are financed by the respective federal states in Germany. In recent years, due to tight budgetary resources, the federal states have not fully complied with this obligation. This, in turn, means that hospitals must finance the necessary investments through equity or borrowed funds, which are co-financed by operating cost reimbursement revenues (cf. Graumann/Schmidt-Graumann 2016, 52). Economization and the dual financing system necessitate the optimal use of personnel and infrastructure capacities. One indicator for the optimal use of personnel and infrastructural capacity in the hospital is high bed occupancy (cf. Hentze/Kehres 2010: 316). The study aims to examine the capacity utilization of inpatient bed occupancy across weekdays in relation to the hospital's information and communication processes. From this, discrepancies and patterns should be identified to conclude typical bed occupancy and potentially available capacity. Based on these discrepancies and patterns, communication and information processes can be adjusted to mitigate the risk of communication breakdowns during occupancy peaks. The study results can serve as a basis for strategic information and decisions, for example, in patient management or staff planning.

RESEARCH METHODOLOGY

The study on the influence of weekdays on the capacity utilization of inpatient bed occupancy in the information and communication process was conducted at both sites of the Alfried Krupp Hospital in Essen. The analysis is based on retrospective data from 18 medical departments collected between January 2012 and July 2024. The Alfried Krupp Hospital has a long institutional history. The origins date back to 1870, when the Krupp company built a hospital with around 100 beds for its employees. In subsequent decades, the facility was continuously expanded to a capacity of 1,200 beds and equipped with state-of-the-art medical technology of its time. From 1920 onward, it was opened to the general population. During the Second World War, the original site was relocated due to heavy artillery shelling, although permanent operation at the alternative site could not be maintained (cf. Brüggemeier 1990). In 1963, Alfried Krupp von Bohlen und Halbach initiated the construction of a new hospital, which commenced operations in 1980 with 560 beds under the name "Alfried Krupp Hospital" (cf. Wörner 1974, pp. 840–842). As part of a structural realignment, the Evangelical Hospital Lutherhaus Essen was integrated into the Alfried Krupp Hospital in January 2008. Since then, the two sites have operated under the names "Alfried Krupp Hospital Rüttenscheid" and "Alfried Krupp Hospital Steele" (cf. Hesse 2008).

Based on systematic data collection and statistical analysis of this large dataset, a quantitative research method is employed. The aim is to achieve a representative and realistic result using the extensive database (cf. Genau 2019). The application of the quantitative research method is particularly suitable because relevant capacity data are available at the individual, hospital-specific level. In addition, there is a lack of scientific literature and empirical studies on capacity management in German hospitals following the global COVID-19 pandemic, underscoring the need for independent data collection. Thus, the period 2023 to 2024 is selected from the available data for the capacity analysis. During this period, a total of 610,000 movement data points and timestamps from inpatients form the database. The measurement periods of patient presence and bed occupancy run from 01.01.2023 to 31.12.2024. This period comprises 731 calendar days, including 105 Mondays, 105 Tuesdays, 104 Wednesdays, 104 Thursdays, 104 Fridays, 104 Saturdays, and 105 Sundays. For the analysis of the relationship between weekdays and capacity utilization, 4,596 days are available. Of these, 657 Mondays, 657 Tuesdays, 657 Wednesdays, 656 Thursdays, 656 Fridays, 656 Saturdays, and 657 Sundays.

A central measurement instrument of the study is bed occupancy (1). It also serves as a busi-

ness management indicator for assessing economic efficiency and as an indicator of actual capacity utilization in the inpatient sector (cf. Destatis 2024).

$$Bed\ occupancy\ = \frac{Occupied\ bed\ days}{(Beds \cdot Calender\ days} \cdot 100 \quad (1)$$

The timestamps in the datasets provide, for each patient, the earliest time t_min at 00:00 a.m. and the latest time t_max at 11:59 p.m. The period between t min and t max denotes the duration of the patient's hospitalization (2). To determine bed occupancy at time t, it is checked whether t lies within the individual stay interval from t_min to t_max. If this is the case, the condition is coded as 1, indicating that the bed is occupied at that time. If time t lies outside the stay interval, the condition is coded with 0, and the bed is considered unoccupied.

$$IF(AND(t_{00:00\ a.m.}^{11:59\ p.m.} \leq t_{min}; t_{00:00\ a.m.}^{11:59\ p.m.} \geq t_{max}); 1; 0) \quad (2)$$

An established method for determining the relationship between two variables is the Pearson correlation coefficient (3). The result can take values between -1 and +1. A negative value, i.e., less than 0, indicates a negative relationship between the variables. A positive value greater than 0 suggests a positive relationship. The closer the correlation value is to 0, the weaker the relationship between the two variables (cf. Studyfix 2024).

$$r_{xy} = \frac{s_{xy}}{s_x \cdot s_y} \quad (3)$$

Compliance with the quality criteria of quantitative research – validity, reliability, and objectivity – is ensured. The legally required and standardized documentation ensures validity in accordance with § 21 para. 1 KHEntgG, which enables a valid representation of real treatment processes. Reliability results from standardized data collection, which enables high measurement accuracy and reproducibility. Statistical tools are used for analysis, including IBM SPSS Statistics and Microsoft Excel. Objectivity is also ensured, as the datasets are used unchanged and the studies are conducted using standardized mathematical procedures.

To investigate the influence of weekdays on the capacity utilization of inpatient bed occupancy in the hospital, a research question and associated research hypotheses are formulated.

Is there an influence of weekdays on patient admissions?

Null hypothesis H0 = There is no relationship between patient admissions and weekdays.

Alternative hypothesis H1 = There is a relationship between patient admissions and weekdays.

RESULTS

The bed plan shows the maximum number of beds that can be operated at both sites of the Alfried Krupp hospitals. These are n1 = 233 and n2 = 546 beds. These beds serve as the basis for occupancy calculations. For the period from 01.01.2024 to 31.12.2024, the following occupancy results:

n1 = 67,772 / (233 • 366) • 100 = 79.47
n2 = 165,608 / (546 • 366) • 100 = 82.87

Total bed occupancy thus amounts to n1 = 79.47% and n2 = 82.87%. However, this calculation uses 366 days and therefore represents an entire year, without differentiation by individual weekdays. Thus, a new calculation is necessary.

At site A, a clearly recognizable pattern in bed occupancy emerges over the course of the week. Occupancy starts at 80.00% on Monday and increases over the following days, reaching 83.08% by Wednesday. On Thursday, occupancy remains high at 83.08%; however, the decline begins from this point. On Friday, occupancy initially falls to 78.90% and continues to decrease over the weekend. On Saturday, only 73.49% is reached, and on Sunday, 73.64%. Overall, beds

are well utilized primarily on weekdays, whereas occupancy declines significantly on weekends. A typical weekly utilization pattern is also evident at site B. The week begins with an occupancy of 82.42% on Monday and rises to 87.55% by Wednesday. On Thursday, occupancy remained at 87.24%, almost unchanged from the previous day, but it had already declined slightly. Toward the weekend, the figures continue to drop. On Friday, bed occupancy is 83.40%, and on Saturday, it falls to 76.75%. On Sunday, occupancy reached the lowest level of the week at 75.33%. Thus, it is also apparent at site B that weekday occupancy is high, and that weekend occupancy declines (cf. Table 1).

Table 1. Bed occupancy by weekday

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Site A	80.00	83.51	83.80	83.08	78.90	73.49	73.64
Site B	82.42	87.53	87.55	87.24	83.40	76.75	75.33

For the analysis of bed occupancy, a more detailed examination is required, as differences in occupancy across medical departments and by time of day and weekday are to be expected. Furthermore, blocked beds should be included. The reasons for blocking beds include staffing shortages, infrastructure problems, or patient-specific measures. They thus describe situations in the hospital in which a patient's bed cannot be temporarily occupied, thereby making the resource unavailable for a period. They affect either all beds of a patient room with single-, double-, or triple-bed rooms or only parts of it, for example, the blocking of one bed in a double room (cf. DGKH 2022: 36–38). Because the specified formula refers to occupied bed days for existing patients, bed blockings are excluded from the above-mentioned occupancy. For a more detailed examination, bed blockings should be considered to more effectively present capacity utilization.

To present effective capacity utilization, bed blockings are considered in addition to the regular bed occupancy of medical departments, based on patient numbers. Because a straightforward assignment of blocked beds to specific medical departments is not possible, they are shown separately in the occupancy chart. The occupancy of individual medical departments is presented as a proportion of the site's available beds. A colored area marks each medical department, while blocked beds are shown in red. On the y-axis of the stacked area chart, occupancy is shown as a percentage ranging from 0 to 100%. The x-axis shows the time course from Monday 0:00 to Sunday 23:59 in 4-hour intervals. The area between 100% and the top occupancy line represents unused capacities.

At site A (n1), stable bed occupancy between about 70% and 85% is observed over most of the week. The three medical departments 1 (orange), 2 (grey), and 3&10 (yellow) show largely uniform occupancy, with only minor fluctuations by time of day. The uniform occupancy suggests elective, plannable patient care. From late Friday evening onward, a clear trend toward declining bed occupancy is evident. This reduction continues into Saturday and is most pronounced on Sunday. The medical departments 3&10 (yellow), 14 (green), 15 (blue), and 16 (brown) are particularly affected. The reduction in occupancy affects medical departments 1 (orange) and 2 (grey) to a lesser extent. This suggests that elective procedures and the resulting inpatient admissions are reduced, or even suspended, on weekends. Presumably, primarily emergencies, long-term patients, or patients with medically non-deferrable stays remain. Bed occupancy shows only minor fluctuations over the week – occupancy peaks at over 90% on Tuesday, Wednesday, and Thursday, at around 8 a.m. The increase in occupancy begins at 7 a.m. and steadily levels off until 2 p.m. This indicates overlap among patients during admission and discharge. The patterns shown, including the significant weekend decline, are typical of inpatient care facilities in which elective treatment services are primarily provided on weekdays. The remaining weekend occupancy reflects a concentration of acute medical and non-deferrable care needs (cf. Figure 1).

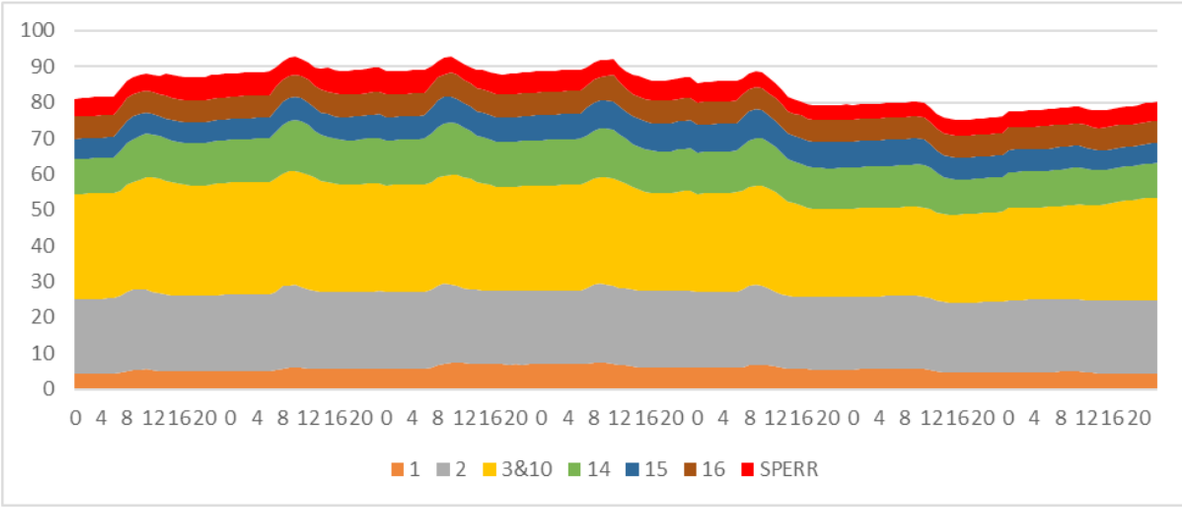

Fig. 1. Effective Bed Occupancy from 01.01. to 31.12.2024 (Site A)

At site B (n2), total occupancy over the week ranges mostly between 80% and 95%, indicating a high baseline utilization of available beds. Compared with site A (n1), significantly stronger departmental differentiation is evident, resulting in a more differentiated occupancy structure. Departments 2 (grey), 4 (yellow), 6 (green), 11 (dark blue), and 12 (dark green) account for most of the bed occupancy throughout the week. A striking pattern is observed in the cyclically recurring peaks, which reach 100% occupancy on Tuesday, Wednesday, and Thursday at around 8 a.m. The rise in occupancy begins at 7 a.m. and steadily levels off until 2 p.m. These peaks suggest time-of-day-limited resource bottlenecks arising from overlaps in patient volumes during the admission and discharge processes. From Friday evening onward, an apparent decline in total occupancy is evident. This development continues steadily throughout Saturday and reaches its low point on Sunday. In doing so, the occupancy shares decrease across almost all departments. The larger medical departments, such as 4 (yellow), 6 (green), 11 (dark blue), and 12 (dark green), are particularly affected, as their area shares decrease noticeably.

The remaining weekend baseline occupancy is primarily driven by the large inpatient departments, suggesting emergency or long-term occupancy. The complete decline of elective services over the weekend thus also becomes structurally visible.

The stacked chart illustrates a highly differentiated occupancy structure that follows a clearly rhythmed course over the week. Cyclical occupancy peaks during the week, and a significant decline toward the weekend indicates a largely elective, planned inpatient care model. Furthermore, the differentiated colored areas suggest that smaller medical departments also contribute to occupancy but are less affected by weekday fluctuations. The clear weekend structure, with reduced occupancy, indicates a classical organizational form of inpatient care facilities, with services concentrated on weekdays (Monday to Friday; cf. Figure 2).

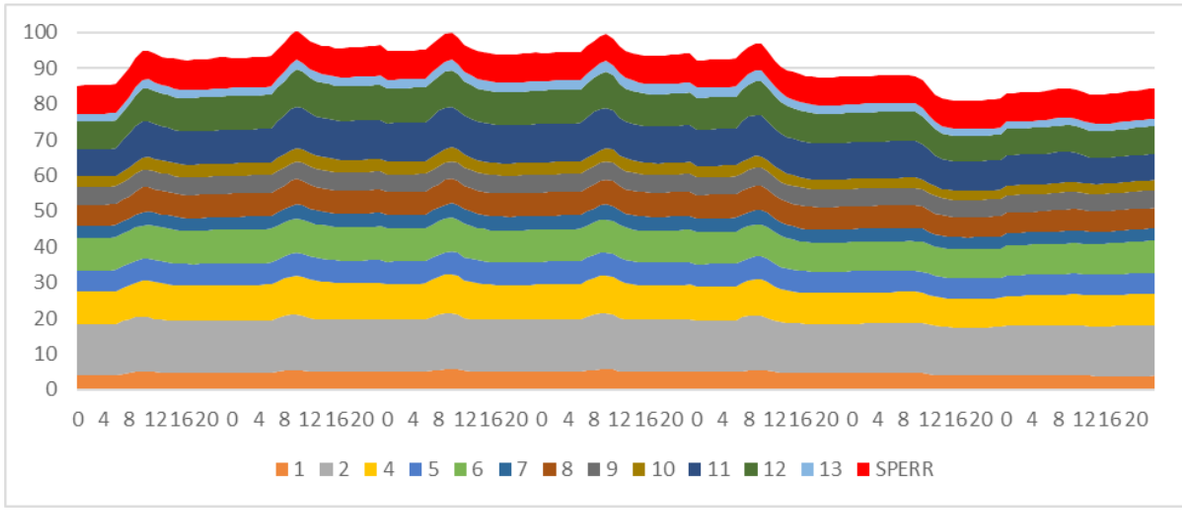

Fig. 2. Effective Bed Occupancy from 01.01. to 31.12.2024 (Site B)

The Pearson correlation coefficient is tested using n = 477,099, covering the entire available period from January 2012 to July 2024. The relationship of the independent variable "AufnGrund-Zusatz," the reason for admission, with the dependent variables "AufnWochentag," the weekday of patient admission, "AufnMonat," the month of patient admission, "AufnFerien," the vacation periods at the time of patient admission, "AufnGesetzFeiertag," the statutory holidays, as well as "AufnSonstigeTage," the other religious, festive, or cultural days at the time of patient admission, is examined.

The study results indicate a significant but weak relationship between reasons for admission and patient admission days (r = 0.165). The p-value of the two-sided significance is 0.000 and is therefore below the significance level of 1% (α = 0.01). The null hypothesis, which assumes no relationship between reason for admission and weekday, can thus be rejected. A statistically significant relationship is also observed for the number of patient admissions (p-value: 0.000). However, the correlation coefficient (0.008) is negligible. The null hypothesis is rejected because the relationship, although weak, is statistically significant. For vacation periods, there is also a significant but minimal correlation (r = 0.016, p = 0.000). Thus, the null hypothesis is also rejected based on the relationship. A similar situation applies to statutory holidays. The correlation coefficient is 0.055, indicating a weak relationship. Since the p-value is 0.000, which is below the 1% significance level (α = 0.01), the null hypothesis can be rejected. The relationship differs from other religious, festive, or cultural days. The correlation coefficient is only 0.004, indicating a near-zero association. In addition, the p-value is 0.011, whereas the significance level is 1% (α = 0.01); therefore, the null hypothesis cannot be rejected. A significant relationship cannot be demonstrated (cf. Table 2).

Table 2. Correlations between Admission Reason and Days/Months of Admission

		Admission Weekday	Admission Month	Admission During Holidays	Admission on Public Holidays	Admission on Other Days
Admission Reason	Pearson-correlation	0.165	0.008	0.016	0.055	0.004
	Significance. (2-tailed)	0.000	0.000	0.000	0.000	0.011
	n	477,099	477,099	477,099	477,099	477,099

CONCLUSIONS/DISCUSSION

The study examines inpatient bed capacity utilization across weekdays and times of day in two hospitals in Essen, providing well-founded, data-driven insights into hospital occupancy patterns.

Based on over 610,000 inpatient movement records from 2023 to 2024, a significant weekly pattern was identified: bed occupancy peaks consistently on weekdays, particularly from Tuesday to Thursday, while a marked decline occurs over the weekend. These findings suggest that elective patient admissions are carried out almost exclusively on weekdays, reflecting the structural realities of hospital organization and staff availability. Particularly noteworthy is the clustering of peak occupancy between 7 a.m. and 2 p.m., indicating overlapping admission and discharge processes. These time windows are critical for resource utilization and personnel management, and for mitigating the risk of short-term bottlenecks, as multiple processes in the hospital typically converge on a time-critical information hub, e.g., admissions, discharges, and surgical preparations. To prevent these peak loads from being perceived as overload, a targeted information and communication structure is required. What is crucial in this time window is that all involved professional groups have shared, identical information about the current situation, so that responsibilities can be defined. For this purpose, standardized information can help to avoid communication breakdowns. In this context, the timing and content of transmitted information are crucial for maintaining the quality of communication and information processing during occupancy peaks between 7 a.m. and 2 p.m. In addition, blocked beds, for example, due to staff shortages or patient-related restrictions, significantly influence effective capacity utilization. This likewise requires a separate process for communication and information. Including these beds in the analysis proves essential for a realistic assessment of hospital occupancy. Statistical analysis using the Pearson correlation coefficient further confirms a significant, albeit weak, association between the reason for admission and the weekday of admission. This correlation was identified using 477,099 patient admissions from January 2012 to July 2024.

Thus, the study not only provides a snapshot of inpatient bed utilization but also establishes a foundation for structured and evidence-based planning, control, and capacity management. Despite the robust and meaningful insights, several areas for future research emerge. Given that most patient care occurs on weekdays and that these patients are likely to be on sick leave during this period, indirect costs accrue to the German economy. These costs are not yet accounted for in the statistics, or in the fact that Germany has the highest healthcare spending among all 27 EU countries. Future studies could examine the broader economic impacts and whether utilizing available weekend capacity could lead to significant cost reductions.

Future research may also focus on linking prospective data analysis with real-time monitoring to develop simulation-based predictive models for capacity management. Moreover, extending the analysis to additional hospitals – such as supra-regional or university hospitals – would be beneficial in uncovering differences in occupancy patterns and in deriving a best-practice model. Furthermore, studies should examine the extent to which peak workloads, particularly between 7 a.m. and 2 p.m., affect patient safety and quality of care or contribute to increased workloads for healthcare personnel.

The key findings of this study lie in the visualization of time-of-day and weekday-specific capacity utilization, as well as in the integration of closed beds as a limiting factor in total utilization. These insights make a valuable contribution to evidence-based resource management in inpatient care by highlighting the importance of time- and day-based capacity planning. This enables hospitals to deploy staff – who account for the largest share of fixed costs due to their availability – more efficiently across all days and times of the week, and to plan elective procedures more strategically.

REFERENCES

BEHRENDS, B.; VOLLMÖLLER, T., 2020. *Praxishandbuch Krankenhausfinanzierung*. Berlin: Medizinisch Wissenschaftliche Verlagsgesellschaft.

BRÜGGEMEIER, F.-J., 1990. *Die Krupp'schen Krankenanstalten*. [viewed 15 September 2024]. Available from: https://www.krupp-krankenhaus.de/tradition-und-stiftung.html#history

DESTATIS, 2024. *Health expenditures rose to nearly 500 billion euros in 2022*. [viewed 30 June 2025]. Available from: https://www.destatis.de/DE/Presse/Pressemitteilungen/2024/04/PD24_167_236.html

DESTATIS, 2025. *Germany with the highest health expenditures in the EU*. [viewed 30 June 2025]. Available from: https://www.destatis.de/Europa/DE/Thema/Bevoelkerung-Arbeit-Soziales/Gesundheit/Gesundheitsausgaben.html

DGKH – DEUTSCHE GESELLSCHAFT FÜR KRANKENHAUSHYGIENE, 2022. Leitlinie der DGKH: Notwendigkeit von Einzelzimmern in Krankenhäusern. *Hygiene & Medizin*, vol. 47, no. 3.
FLINTROp, J., 2014. Krankenhäuser zwischen Medizin und Ökonomie – Die Suche nach dem richtigen Maß. *Deutsches Ärzteblatt*, no. 45, pp. A1929–A1931.
GENAU, L., 2019. *Quantitative Forschung in wissenschaftlichen Arbeiten*. [viewed 16 September 2024]. Available from: https://www.scribbr.de/methodik/quantitative-forschung/
GOEPFERT, A., 2013. *Unternehmen Krankenhaus*. Stuttgart: Thieme.
GRAUMANN, M.; SCHMIDT-GRAUMANN, A., 2016. *Rechnungslegung und Finanzierung der Krankenhäuser – Leitfaden für Rechnungslegung, Beratung und Prüfung*. Herne: NWB.
HENTZE, J.; KEHRES, E., 2010. *Krankenhaus-Controlling – Konzepte, Methoden und Erfahrungen aus der Krankenhauspraxis*. Stuttgart: Kohlhammer.
HESSE, P., 2008. 15 *Millionen und ein neuer Name fürs Lutherha*us. [viewed 15 September 2024]. Available from: https://www.nrz.de/staedte/essen/article924278/15-millionen-und-ein-neuer-name-fuers-lutherhaus.html
KLAUBER, J. and GERAEDTS, M., 2020. *Krankenhaus-Report 2020 – Finanzierung und Vergütung am Scheideweg*. Berlin: Springer.
OSTWALD, J.; NEUMEYER, H., 2023. *Krankenhaus-Report 2023: Rahmenbedingungen und Herausforderungen im Personalmanagement*. Berlin: Springer.
STUDYFLIX, 2024. *Deskriptive Statistik*. [viewed 15 November 2024]. Available from: https://studyflix.de/statistik/deskriptive-statistik-1052
WÖRNER, H. O., 1974. Neubau der Krupp Krankenanstalten in Essen. *Bauwelt*, no. 23.

ОРГАНИЗАЦИЯ И УПРАВЛЕНИЕ НА ИНФОРМАЦИЯТА ЗА ИЗПОЛЗВАНЕТО НА КАПАЦИТЕТА НА БОЛНИЧНИТЕ ЛЕГЛА В РАЗЛИЧНИ ДНИ ОТ СЕДМИЦАТА

Резюме: *Изследването анализира организацията и управлението на информацията за използването на болничните легла по дни от седмицата в две болници във федерална провинция Есен, Германия. Целта е да се идентифицират зависими от деня и времето модели на заетост, които да подпомогнат управлението на приемите, изписванията, капацитета и персонала, особено от понеделник до петък. Анализът се основава на ретроспективни данни за над 610 000 пациенти (2023–2024), като използва документирани дни на заетост и времеви данни за продължителността на престоя, разграничени по отделения и дни. Резултатите показват значително по-висока заетост през делничните дни, с пик от вторник до четвъртък, и отчетлив спад през уикендите. Дневен пик между 7:00 и 14:00 ч. е свързан с припокриване на процесите по прием и изписване. В тези периоди целенасочените информационни и комуникационни структури са ключови за намаляване на риска от сривове в комуникацията. Блокираните легла също влияят върху реалната заетост. Установена е слаба, но значима корелация между причината за прием и деня на прием. Като цяло изследването подчертава значението на планирането на капацитета според деня и времето и ролята на информационните процеси за основаното на данни болнично управление.*
Ключови думи: *управление на информацията; управление на болници; организация на болници; информационни процеси в болниците; използване на капацитета*

Денис Комоса, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: dennis_komossa@gmx.de

PUBLIC COMMUNICATIONS AND INFORMATION SCIENCES
ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ

FUNCTIONAL AND COMMUNICATIVE INTEROPERABILITY IN EUROPEAN HEALTHCARE SYSTEMS: A COMPARATIVE OVERVIEW OF HL7 FHIR, openEHR, AND OMOP IN ESTONIA, DENMARK, FINLAND, AND GERMANY

Homeira Hennig-Namvar
University of Library Studies and Information Technologies
https://doi.org/10.70300/HQVL7944

Abstract: *This study investigates the extent to which the HL7 FHIR[1], openEHR[2], and OMOP[3] medical data models contribute to operational interoperability in European clinical care networks. Using a methodical document analysis, four countries – Estonia, Denmark, Finland, and Germany – are compared according to defined analysis parameters. The results show clear differences in the degree of integration, institutional control, and IT integration. Beyond technical data transfer, the study defines conceptually functional system interoperability as an information process of communication and organisation embedded in governance structures, institutional coordination, and regulated information flows. While Estonia and Finland have hierarchically organized IT systems with a high degree of integration, Germany has decentralized structures. The study shows that the effectiveness of interoperable standards depends not only on their technical specifications but also on their regulatory, administrative, and systemic integration. This has direct relevance for the development of evidence-based, intelligent care systems within the European Health Data Space. The paper shows that operational interoperability should be viewed as a structural concept that requires multidisciplinary coordination strategies. The results can, in principle, support future interoperability projects – especially in the country-specific adaptation of electronic care platforms.*
Keywords: *EU health systems; functional interoperability; data standardisation; communication, comparative analysis*

INTRODUCTION

Digital modernisation in European healthcare is progressing, but the structured use of health information continues to be hampered by heterogeneous infrastructures, isolated sector structures, and fragmented interfaces (OECD 2023, p. 14; EHDS 2023). National divergences in data accessibility, semantic terminology, and institutional implementation not only impair service provision but also scientific research and transnational cooperation (TEHDAS 2023, p. 11)[4].

Initiatives such as the European Health Data Space (EHDS 2023) and recommendations from TEHDAS and the OECD therefore call for interchangeable data models that allow for the clearly defined, legally compliant, and technically integrable use of health-related information (OECD 2023, pp. 9–12; TEHDAS 2023, pp. 7–9)[5]. The primary focus is on functional interoperability – i.e., the ability not only to transfer data but also to validate it adequately and apply it effectively in new use cases (cf. ISO/TS 22600-1:2014, p. 6; Kapitan et al. 2025, p. 28)[6]. From the perspective of information science, operational interoperability accordingly denotes not merely a technical capability, but a communicative and organisational information process shaped by governance frameworks, institutionally structured coordination, and regulated data flows.

Considering the challenges faced by the European healthcare system, a comparative study is needed to assess the functional interoperability of current data models. This implies the following core question of the study:

To what extent do the HL7 FHIR, openEHR, and OMOP health information models contribute to the consolidation of functional interoperability within European health systems, and which technological and institutional framework factors reinforce or impede their practical implementation?

Three analytical sub-questions are examined to discuss this overarching question:

To what extent can HL7 FHIR, openEHR, and OMOP be used to achieve the technical and

syntactic interoperability necessary for functional data use in healthcare and research?

Which management and implementation strategies (e.g,. X-Road, Findata, Sundhed.dk) facilitate or block functional interoperability between academic research units and healthcare systems?

To what extent do Estonia, Denmark, and Finland differ in their practical use of functional interoperability, and what insights can be derived from this for Germany?

The sectoral division of European healthcare structures outlined in the introduction and the institutional disparities in data availability (OECD 2023, p. 14; TEHDAS 2023, p. 11) show that interoperability is not exclusively a technical issue, but rather a multifaceted conceptual problem. The following theoretical concepts define key terms, differentiate between levels of interoperability, and systematise the HL7 FHIR, openEHR, and OMOP data models used based on existing classification frameworks. In doing so, they generate a methodological connection point for comparative analysis.

Definition of interoperability

Interoperability determines the functionality of various systems to realise information flows, interpret them accurately, and reuse them for specific purposes. ISO/TS 22600-1[4] classifies technical, syntactic, and semantic-structural interoperability (ISO, 2014, pp. 2–3). Of particular importance are operational interoperability, semantic congruence, and the process-related usability of data across systems (Kapitan, Zimmermann & Stumpf, 2025, p. 28).

Functional versus semantic interoperability

According to the WHO (2016, p. 23), semantic interoperability is based on operational interoperability and aims to achieve clear, algorithmically supported interoperability of encrypted data. Benson and Grieve (2016, pp. 31–34) describe functional interoperability as the transfer of meaning between platforms, whereas semantic interoperability refers to the standardized mapping of multidimensional medical knowledge content. The IHE framework[5] provides practical guidelines for integrating both levels of interoperability within feasible application structures (IHE, 2021, pp. 10–12).

Health data architectures as mechanisms of system compatibility

FHIR, openEHR, and OMOP are considered structural models of interoperability, essential for the methodical integration of health data. The openEHR structural concept is based on a two-stage framework that maps clinical expertise onto standardized data archetypes, thus enabling semantic coherence (Beale 2002, pp. 1–3).

OMOP implements a relational data architecture based on standardized technical terminology to ensure the reproducibility of medical data analyses (Hripcsak et al., 2015, pp. 668–669). FHIR aggregates interoperable information components using REST-compliant API modules and has thus established itself as a globally recognized reference standard for ensuring interoperable health data (HL7 2021, pp. 4–5).

Institutional and legal framework conditions

Governance-related structural requirements shape the establishment of cross-system information systems. In this context, such governance-related arrangements may be interpreted as instruments of information governance that control communicative coordination, access regulation, and the responsible management of health-associated information across organisational boundaries. The European Health Data operationalises specifications for semantic standards, legally defined access options, and data portability (European Commission 2023, pp. 5–7). The OECD (2023, pp. 9–12) emphasises the importance of transparent control mechanisms and intersectoral coordination. These legislative framework requirements create the regulatory framework for the conceptual implementation of data structure models.

RESEARCH METHODOLOGY

Reference to the methodological framework

The conceptually sound terminologies, hierarchies of system interoperability, and reference frameworks define the basic conceptual framework for the methodological comparative study in Chapter 4. The decision to select HL7 FHIR, openEHR, and OMOP was based on their represent-

ativeness, degree of standardisation, and organisational consolidation within digital health initiatives.

This work is aimed at qualitative-analytical research to compare the functional interoperability of health information systems in selected European countries. A qualitative analysis methodology was chosen because it enables the contextual evaluation of complex institutional, systemic, and regulatory frameworks based on documents (WHO 2016, p. 25; OECD 2023, p. 12).

The methodology of this study aims to provide a structured answer to each of the research questions formulated in the introduction. To this end, the HL7 FHIR, openEHR, and OMOP models are evaluated comparatively. The selection is based on their documented importance for interoperable systems in Europe (Kapitan et al., 2025, p. 28; Hripcsak et al., 2015, p. 668).

The focus is on analysing the extent to which standardized procedures such as HL7 FHIR, openEHR, and OMOP can be implemented in existing national infrastructures and strengthened by overarching administrative regulatory frameworks, legally defined regulatory systems, and social acceptability. The methodological approach is structured in four successive steps: These four steps are: (1) document-based context analysis, (2) criteria-based system comparison, (3) systematic analysis of various case studies, and (4) consolidation and derivation of potential applications.

1. Document-based context analysis

A targeted compilation and subsequent evaluation of scientific literature, action plans, official reports, and technical requirements for structural interoperability models in Estonia, Denmark, Finland, and Germany. This involves the structured review, classification, and interpretation of rule-based, conceptual, and technical documents – according to the principles of exploratory document analysis (cf. WHO 2016, p. 25).

The document-based context analysis follows methodological guidelines for analysing systematic documentation of national frameworks (TEHDAS 2023, p. 8; OECD 2023, p. 11).

The selection criteria are based on topicality over the last five years and significance for scientific systems, with consideration of functional or semantic interoperability. Only sources that have been either peer-reviewed or officially published were included (WHO2016, p. 27).

Research objective and methodology

This section aims to methodically survey and evaluate the structural interoperability models in Estonia, Denmark, Finland, and Germany. The four countries examined were selected based on their heterogeneous levels of development in the field of digital networking systems (European Commission 2023, p. 6; OECD 2023, p. 13).

To this end, a document-based context analysis is carried out, which is designed in two ways: it covers both current scientific publications and government strategy and implementation documents. This methodological approach is based on the guideline-based procedure for the systematic comparative evaluation of interoperable systems developed by the WHO (2016, p. 25) and TEHDAS (2023, p. 8).

Justification of the research approach

Document-based context analysis is ideal for transnational comparative analyses in healthcare, as it incorporates both normative reference documents (e.g. legal texts, strategic plans) and standardized technical sources – such as technical interoperability models and architectural plans – into the analysis. This analytical strategy has been recognized as effective in comparable studies on eHealth system analysis (WHO 2016, p. 25; TEHDAS 2023, p. 9).

It provides a basis for illustrating the institutional, legal, and technical structures without relying on primary data. One possible methodological limitation is the lack of primary data, but this is compensated for by the structured analysis of verified official and standardized sources (OECD 2023, p. 13).

Criteria for source selection

Topicality: Publications from the past five years (2019–2025) reflecting the current state of development.

Systemic significance: The focus is on ensuring functional and semantic interoperability, primarily in the application of standards such as HL7 FHIR, openEHR, or OMOP.

Official or peer-reviewed references: official government documents, scientific research centres, global organisations (e.g., WHO OECD), European Union projects, and scientific journals.

Comparability: documents that provide statements for at least one of the countries under review.

Country selection

The countries evaluated were deliberately chosen because they represent different levels of development in the European interoperability debate:

Estonia: pioneer in technology-based healthcare (X-Road, eHealth, blockchain)

Denmark: robust patient-centred data infrastructure (Sundhed.dk)

Finland: research-friendly governance structure (Findata/Kanta)

Germany: relevant comparison due to delayed implementation despite technical potential

2. Criteria-based system comparison

The methodological approach of this study is based on an indicator-supported comparison model that systematically compares the key aspects of interoperability. I based my selection of comparison criteria on internationally recognized guiding documents. The focus was on the WHO's National eHealth Strategy Toolkit (2016), the HIMSS Interoperability Continuum Framework (2021), and the European Commission's European Health Data Space guidelines (2023). These sources provide a clear and reliable basis for a standardized and transparent method.

The interoperability frameworks in Estonia, Denmark, Finland, and Germany are analyzed on the basis of five assessment criteria.

2.1 Progress in standard application – To assess the progress of standard application, the main focus is on the extent to which international data models such as HL7 (FHIR), openEHR, and OMOP are actually used in practice. These models in particular show how far standardization has progressed in the systems analyzed (Hripcsak et al., 2015, p. 668; HL7 2021, p. 4).

2.2 Access to research information in compliance with data protection regulations – in other words, how well do institutions secure access to secondary data without violating regulatory requirements? This is precisely the focus of the assessment (TEHDAS 2023, pp. 10–13).

2.3 Management and competence structure – Management and competence structure is about more than just leadership. What matters is how organisations design leadership, coordination, and qualification so that truly interoperable control is possible (WHO2016, p. 26; OECD 2023, pp. 11–12).

2.4 Focus on patients and clear processes: How is patient-centred data used? How transparent are the data processing processes? (IHE, 2021, p. 11).

2.5 Integrative data linking between levels of care – this is crucial. This involves the analysis of cross-sector data flows and technical coupling, for example via X-Road or ePA platforms (European Commission 2023, p. 7).

3. Systematic analysis of various case studies

The case analysis uses standardized country profiles to show how Estonia, Denmark, and Finland are implementing functional interoperability. It is based on a structured comparison along the five axes of analysis defined in Chapter 4.1 (WHO 2016; OECD 2023; HIMSS, 2021).

The focus is on national, publicly accessible platforms with interoperability functions: X-Road for Estonia, Sundhed.dk for Denmark, and Findata/Kanta for Finland. The profiles are based exclusively on primary sources from the literature. These include national strategy papers such as the Estonian eHealth Strategy (2021), legal frameworks such as the Findata Act (2019), and implementation reports, for example, from Sundhed.dk (2020). A uniform evaluation grid is applied to each profile to ensure that the results remain comparable and analytically consistent. The consistency of the system profiles is systematically validated by the consistent analysis grid, even though the quantity and granularity of the underlying materials differ between countries.

4. Consolidation and derivation of applicability potential

The case studies collected are implemented relatively in order to identify nation-specific success factors and restrictions (OECD 2023, pp. 13–15; TEHDAS 2023, pp. 16–18). The intention is to conduct a methodologically sound assessment of which factors are transferable – especially for

Germany – and which systemic framework factors must be fulfilled.

These methodological frameworks open up the possibility of clarifying technical guidelines not in isolation, but implemented within organisational, legal, and social frameworks (WHO 2016, p. 31; European Commission 2023, p. 9). In this way, they contribute to the scientific debate on how interoperability can be tangibly achieved for evidence-based health research (Kapitan et al. 2025, p. 35).

The analysis framework designed can also be used and modified as an analytical tool in subsequent comparative studies on the intraoperative performance of European health systems.

RESULTS

The results follow the logic of the predefined research questions. For each question, key statements on interoperability were extracted from the analyzed country profiles and classified analytically.

Findings on the main question:

To what extent do the HL7 FHIR, openEHR, and OMOP health information models contribute to the consolidation of functional interoperability within European health systems, and which technological and institutional framework factors reinforce or impede their practical implementation?

The study shows that all three data models analyzed (HL7-FHIR, openEHR, OMOP) contribute to system interconnectivity, but to varying degrees and with different organisational anchoring. Estonia has extensive FHIR implementation in national digital health infrastructures (e.g., X-Road) (Estonian eHealth Strategy, 2021, pp. 12–15), while Finland has implemented consolidated use of OMOP for data-driven research support (Findata, 2022, pp. 6–8). Germany is making progress in pilot projects, but there is no nationwide implementation (gematik, 2023, p. 4).

1. **Results for sub-question 1:**

To what extent can HL7 FHIR, openEHR, and OMOP be used to achieve the technical and syntactic interoperability required for functional data use in healthcare and research?

Syntactic implementation of FHIR is used operationally in all four countries, albeit to varying degrees. In Estonia, API-supported communication is established in primary care (Estonian eHealth Strategy, 2021, p. 12), while in Finland, there is structural standardisation via the Kanta system (Findata 2022, pp. 6–7), and in Denmark, there are links to fragmented approaches with Sundhed.dk (Sundhed.dk 2020, p. 9). OMOP-based databases are used methodically, especially in Finland (Hripcsak et al. 2015, pp. 668–669). The infrastructural basis for application-oriented interoperability is thus in place, but only partially implemented.

2. **Results for sub-question 2:**

Which governance and implementation strategies (e.g., X-Road, Findata, Sundhed.dk) facilitate or hinder functional interoperability between academic research units and healthcare systems?

Governance and execution of the country studies illustrate that operational interoperability is strongly determined by regulatory coordination. Estonia has overarching control by the Ministry of Social Affairs (X-Road, eHealth Framework) (OECD 2023, pp. 10–11). In Finland, Findata and THL regulate central usage rights and scientific enquiries (TEHDAS 2023, p. 16). Denmark links across sectors, but in a decentralized manner (Sundhed.dk 2020, p. 12). Germany has divided competence structures, which leads to inconsistent implementation (gematik, 2023, p. 5).

3. **Results for sub-question 3:**

To what extent do Estonia, Denmark, and Finland differ in their practical application of functional interoperability, and what conclusions can be drawn from this for Germany?

Comparative analysis of Member States and implications for Germany. Estonia demonstrates advanced system integration combined with a user-friendly system architecture (European Commission 2023, pp. 5–6). Finland is characterized by science-oriented data architecture (Findata 2022, p. 7), while Denmark shows strengths in patient-oriented care and digital service platforms (Sundhed.dk 2020, pp. 11–13). Germany can learn from Estonia's administrative simplification, Finland's consistent data protection policy, and Denmark's service-oriented digital platform. The table below structures the key findings according to the evaluation criteria from section 4.2.

Table 1. Country profile comparison of operational interoperability across four EU Member States

Country	FHIR use	OMOP use	Governance structure	Patient orientation	Data integration
Estonia	Comprehensively implemented	secondary	centralized (Ministry of Social Affairs)	mittel (administrativ fokussiert)	High (X-Road)
Denmark	Fragmented	not documented	Decentralized (sectors)	High (digital services)	Medium (Sundhed.dk)
Finland	Partial	methodologically established	Centralized (Findata, THL)	Medium (research-oriented)	High (Kanta)
Germany	Pilot projects	use in individual cases	fragmented	Low	Low (partly ePA)

The results support the hypothesis that it is not only the data structure, but also its integration into coordinated governance, legal, and IT structures that determines the effectiveness of operational interoperability.

DISCUSSION

The subsequent analysis examines the results of the four reference countries against the background of the research questions defined in Chapter 2 and classifies them within the theoretical framework from Chapter 3. The aim is to identify characteristic patterns, barriers, and generalisable conditions for success for systemic interoperability.

1. Key research question on functional interoperability

The findings indicate that HL7 FHIR, openEHR, and OMOP make significant contributions to functional connectivity, but to varying degrees. The main question regarding the scope of interoperable architectures can therefore be answered as follows: FHIR is operationally integrated in Estonia, OMOP is organisationally anchored in Finland, while Germany is predominantly implementing test projects (Estonian eHealth Strategy 2021, pp. 12–15; Findata 2022, pp. 6–8; gematik, 2023, p. 4). The impact of the models depends largely on the respective system networking – i.e., the interaction between standards, governance, and digital infrastructure (Kapitan et al. 2025, p. 28).

2. Answer to sub-question 1 on technical implementation

The initial sub-question concerns technical and structural implementation. Question 1 on technical implementation can therefore be answered as follows: FHIR is integrated in a standard-compliant manner in all countries, but the degree of implementation varies (Estonian eHealth Strategy 2021, p. 12; Sundhed.dk 2020, p. 9). OMOP shows methodical research-based use in Finland (Hripcsak et al. 2015, p. 668). Operational system networking exists, but is insufficient on its own without content and operational integration.

3. Answer to sub-question 2 on governance

Control mechanisms have a direct effect on the performance of functional interoperability. The answer to sub-question 2 on administrative implementation is therefore as follows: Centrally controlled models in Estonia and Finland optimise standards-based implementation (OECD 2023, pp. 10–11; TEHDAS 2023, p. 16), whereas Germany and Denmark suffer from decentralized structures (gematik, 2023, p. 5). This confirms the WHO's call for a consistent management structure (WHO 2016, p. 26).

4. Answer to sub-question 3 on national differences and conclusions

The third sub-question deals with country-specific implementation processes. The answer to sub-question 3 is therefore as follows: Estonia impresses with its user-oriented digital infrastructure, Finland with its data-based analysis approach, and Denmark with its cross-sector integration. Germany can adapt key insights from all three countries (European Commission 2023, pp. 5–6; Findata 2022, p. 7; Sundhed.dk 2020, pp. 11–13).

5. Methodological reflection

The comparability of the units of analysis was ensured by a standardized evaluation scheme (Chap-

ter 4.2). Restrictions exist in the diversity of document categories and the variable degrees of access to government data (OECD 2023, p. 13). Nevertheless, the methodologically structured evaluation scheme provides an adaptable analytical framework for future evaluation studies (WHO 2016, p. 25).

CONCLUSION

The comparison shows that HL7 FHIR, openEHR, and OMOP tend to be capable of supporting functional interoperability – their effectiveness is highly dependent on control mechanisms, regulatory requirements, and technical anchoring (Hripcsak et al. 2015, p. 668; Kapitan et al. 2025, p. 28). With centrally controlled systems and standard-compliant system architecture, Estonia and Finland demonstrate a more advanced stage of implementation than Germany, where fragmented structures predominate (OECD 2023, pp. 10–13; Gematik 2023, pp. 4–5). The results underscore that interoperability is not purely a technical challenge, but rather an institutional and structural one. This likewise suggests that alignment of communication practices among organisational institutions and governance stakeholders is a necessary condition for transforming interoperable data operationally usable across heterogeneous systems.

OUTLOOK

The standardisation of interoperable data architectures forms the foundation for reliable AI systems in healthcare and scientific research. A coordinated interplay of technical specifications, legally compliant access concepts, and organisational coherence is indispensable for EU-wide data space policy (European Commission 2023, p. 9).

NOTES

1. HL7 FHIR: HL7 standard for clinical data exchange. Modular resources (patient, observation, etc.) via REST APIs in JSON/XML with terminology binding (SNOMED CT, LOINC). Profiles/IGs refine resources for use cases (e.g., IPS, MyHealth@EU). Goal: fast, web-based implementation with stable semantics. Limitations: version diversity, profile fragmentation, and terminology gaps per domain.
2. OPENEHR: Open specification for semantically stable electronic files. Two-level model: stable reference model + clinical archetypes/templates. Data is stored vendor-neutrally in the CDR, queries via AQL. Strengths: clear separation of technology and business logic, high semantic consistency over time. Limitations: higher modelling/integration effort for HL7/IHE workflows.
3. OMOP (Common Data Model): Standardised CDM from the OHDSI community for harmonising observational health data. Uniform schema + standard vocabularies (SNOMED, RxNorm, LOINC) enable reproducible analyses with ATLAS/HADES. ETL transforms source systems into the CDM. Strength: cross-location and cross-country comparability. Limitations: mapping effort, sometimes low granularity without extensions.
4. TEHDAS 2023: Recommendations on semantic interoperability, terminology harmonisation and coordination structures within the European Health Data Space.
2. TEHDAS and the OECD particularly emphasise the need for standardised semantic structures and integrable reference architectures within European data spaces.
5. See ISO/TS 22600 for definitions of functional interoperability and context-related variability of health data; Kapitan et al. 2025 evaluate specific application scenarios in European systems.
4. ISO/TS 22600-1 was developed by ISO/TC 215 (Health Informatics) and defines a standardised reference model for access and authorisation management in interdisciplinary networked information systems in healthcare. See ISO/TS 22600-1:2006.
6. IHE Framework: Integrating the Healthcare Enterprise (IHE) offers a standardised process model that ensures interoperability between decentralised healthcare systems. It describes processes, data structures, and communication protocols so that knowledge content can be transmitted error-free and evaluated in a standardised manner. (see IHE, 2025)

REFERENCES

BENSON, T.; GRIEVE, G., 2016. *Grundsätze der Interoperabilität im Gesundheitswesen*. 3rd ed. Berlin: Springer.
ESTONIAN MINISTRY OF SOCIAL AFFAIRS, 2021. *Estonian eHealth strategy 2021–2027*. [viewed 6 November 2025]. Available from: https://www.sm.ee/en/activities/health-policy/e-health
EUROPEAN COMMISSION 2023. *European Health Data Space – Regulation proposal and implementation strategy.* [viewed 6 November 2025]. Available from: https://health.ec.europa.eu/ehealth-digital-health-and-care/digital-health-and-care_en
FINDATA, 2019. *Act on the secondary use of health and social data (552/2019*). [viewed 6 November 2025]. Available from: https://findata.fi/en/legislation/

FINDATA, 2022. *Secondary use of health and social data in Finland*. [viewed 6 November 2025]. Available from: https://findata.fi/en
GEMATIK, 2023. *Interoperability directory in accordance with Section 355 of the German Social Code*, Book V (SGB V) – Technical specifications. [viewed 6 November 2025]. Available from: https://www.gematik.de/anwendungen/interoperabilitaet
HEALTH LEVEL SEVEN INTERNATIONAL, 2021. *FHIR release 4.* [viewed 6 November 2025]. Available from: https://hl7.org/fhir/
HIMSS, 2021. *HIMSS interoperability continuum*. [viewed 6 November 2025]. Available from: https://www.himss.org/resources/interoperability-continuum
HRIPCSAK, G.; DUKE, J. D.; SHAH, N. H.; REICH, C. G.; HUSER, V.; SCHUEMIE, M. J.; RYAN, P. B., 2015. Observational Health Data Sciences and Informatics (OHDSI): Opportunities for observational researchers. *Journal of Clinical Epidemiology*, vol. 68, no. 6, pp. 667–670. Available from: https://doi.org/10.1016/j.jclinepi.2015.01.005
IHE – INTEGRATING THE HEALTHCARE ENTERPRISE, 2021. *IHE IT Infrastructure technical framework*. [viewed 6 November 2025]. Available from: https://www.ihe.net/resources/technical_frameworks/
ISO – INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, 2014. ISO/TS 22600-1: *Health informatics — Privilege management and access control —* Part 1: Overview and policy management. Geneva: International Organization for Standardization.
KAPITAN, L.; ZIMMERMANN, A.; STUMPF, H., 2025. Functional interoperability in European health information systems: Standards, use cases, and implementation barriers. *Journal of Digital Health Standards*, vol. 12, no. 1, pp. 22–41.
OECD 2023. *Strengthening health system interoperability for better health outcomes*. Paris: Organisation for Economic Co-operation and Development. [viewed 6 November 2025]. Available from: https://www.oecd.org/health/strengthening-health-system-interoperability.htm
OPENEHR FOUNDATION, n.d. *Architecture overview*. [viewed 6 November 2025]. Available from: https://specifications.openehr.org/releases/architecture/overview.pdf
SUNDHED.DK, 2020. *Annual report.* [viewed 6 November 2025]. Available from: https://www.sundhed.dk
TEHDAS 2023. *Recommendations for the European Health Data Space*. Joint Action Towards the European Health Data Space. [viewed 6 November 2025]. Available from: https://tehdas.eu/results/recommendations/
WHO – WORLD HEALTH ORGANIZATION, 2016. *National eHealth strategy toolkit*. Geneva: World Health Organization. [viewed 6 November 2025]. Available from: https://apps.who.int/iris/handle/10665/252529

ФУНКЦИОНАЛНА И КОМУНИКАТИВНА ИНТЕРОПЕРАТИВНОСТ В ЕВРОПЕЙСКИТЕ ЗДРАВНИ СИСТЕМИ: СРАВНИТЕЛЕН ОБЗОР НА HL7 FHIR, openEHR И OMOP В ЕСТОНИЯ, ДАНИЯ, ФИНЛАНДИЯ И ГЕРМАНИЯ

Резюме: *Настоящото проучване разглежда степента, в която медицинските модели за данни HL7 FHIR, openEHR и OMOP допринасят за оперативната съвместимост в европейските мрежи за клинични грижи. Чрез методичен анализ на документи се сравняват четири държави – Естония, Дания, Финландия и Германия, според определени параметри за анализ. Резултатите показват ясни разлики в степента на интеграция, институционален контрол и ИТ интеграция. Освен техническия трансфер на данни, проучването дефинира концептуално функционалната оперативна съвместимост на системите като информационен процес на комуникация и организация, вграден в управленски структури, институционална координация и регулирани информационни потоци. Докато Естония и Финландия имат йерархично организирани ИТ системи с висока степен на интеграция, Германия има децентрализирани структури. Проучването показва, че ефективността на оперативно съвместимите стандарти зависи не само от техническите им спецификации, но и от тяхната регулаторна, административна и системна интеграция. Резултатите могат по принцип да подкрепят бъдещи проекти за оперативна съвместимост – особено при адаптирането на електронните платформи за грижи*

Ключови думи: *здравни системи на ЕС; функционална интероперативност; стандартизация на данните; комуникация; сравнителен анализ*

Хомейра Хениг-Намвар, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: homeira.namvar@gmail.com

ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ
PUBLIC COMMUNICATIONS AND INFORMATION SCIENCES

THE DIGITAL TAX ADVISOR: NEW PROFESSIONAL ROLES IN THE AGE OF ARTIFICIAL INTELLIGENCE – IMPLICATIONS FOR COMMUNICATION AND INFORMATION MANAGEMENT

Sophie Volberg
University of Library Studies and Information Technologies
https://doi.org/10.70300/FMUU9773

Abstract: *Digitization is fundamentally changing the profession of tax consultants. Artificial intelligence (AI), automated processes and digital communication tools are increasingly shaping daily work, customer relationships and professional identity. This article examines how the role of tax advisors is developing in response to these developments and what new requirements are emerging, especially with regard to digital communication structures, information management and knowledge-based decision-making processes. Based on a qualitative analysis, the study identifies key trends such as the automation of standardized tasks, the growing importance of strategic advice, the shift towards digital communication channels and the reorganization of professional information flows between tax advisors and clients. In addition, the article outlines new hybrid roles such as data analyst and digital transformation consultant. Finally, it highlights the need for reforms in education and lifelong learning to ensure that the profession remains future-ready until 2035. The results show that digitalization is not only accelerating processes, but also fundamentally changing customer expectations. Therefore, tax advisors must not only build technological skills, but also develop their communication skills.*
Keywords: *Artificial Intelligence; Information Processes; Digitalization; Tax advice; Information Management*

INTRODUCTION

The profession of tax consulting is at a turning point. Digitization and technological innovations are changing not only the tools used, but also the entire identity of this traditional profession. While face-to-face consultations, manual document processing and paper-based workflows used to dominate everyday life, cloud services, AI-supported software and automated interfaces are becoming increasingly important today (May 2025). These developments not only influence workflows, but also how knowledge is used, communicated and transferred.

This is changing the structures of professional communication processes and the flow of knowledge within law firms in particular. Tax consulting is increasingly developing into an information-intensive service.

At the same time, expectations for efficiency, transparency and speed are increasing. Customers want timely feedback, digital access to documents and future-oriented advice on business decisions. As a result, tax advisors are experiencing a profound change in roles that require new skills and structures (Fischer 2025).

The aim of this article is to systematically analyze the most important changes in the professional role of tax advisors in the context of digital transformation. The study is based on literature review, case studies and industry observations and leads to critical reflection and a forward-looking perspective for 2035.

RESEARCH METHODOLOGY

A qualitative approach was chosen to adequately absorb the complexity of the digital transformation in tax consulting. The methodology includes:

- Literature review: Relevant publications from tax and business journals, monographs and studies from 2020 to 2024 were systematically analyzed.

• Case study analysis: Three exemplary tax consulting firms from different regions of Germany were examined to illustrate practical implementation strategies.

• Secondary sources and expert opinions: Statements by professional associations (e.g. Federal Tax Chamber), publications by software providers and industry reports complemented the analysis.

This study does not claim to be complete, but tries to offer a practice-oriented and well-founded presentation of central developments.

In addition, the focus of the analysis was on aspects that are particularly relevant for communication and information processes in tax consulting. These include the organization of digital information flows and the use of communication platforms.

RESULTS

The changing professional role

The analysis clearly shows that digitization is not a gradual but a disruptive process that is fundamentally changing the profession of tax advisors. This transformation affects not only workflows and technologies, but also the identity and daily tasks of tax advisors. Far from just automating tasks, digitalization brings new expectations, roles, and challenges that require a broader shift in skills and thinking.

Automation of standard processes

Routine tasks that used to require manual work – such as data entry, classification, invoice verification, and tax form creation – are increasingly being automated by AI-powered systems and robotic process automation (RPA) (Mehnert 2025). This automation results in faster turnaround times, higher accuracy, and fewer human errors. AI-driven document recognition tools, for example, can automatically extract relevant information from receipts or contracts, not only drastically reducing the time it takes to collect data (Dersch 2024), but also reorganizing information management within the firm.

However, this does not mean that the role of the tax advisor is decreasing; rather, it opens up the possibility of concentrating on complex problem solving and strategic advice. Importantly, tax advisors must also learn to monitor and validate automated results to ensure compliance and correctness, as AI is not infallible (Mayr 2025).

Increased focus on consulting

As routine processes become automated, accountants are increasingly expected to provide high-value, strategic advice. Clients turn to their advisors earlier in business planning and expect support on complex topics such as investment strategies, international tax planning, digital business models and succession planning. Consulting thus becomes a communicative process in which not only specialist knowledge, but also mediation skills and understanding of organizational information needs are decisive.

For example, a start-up seeking venture capital needs advice not only on tax-efficient structuring, but also on legal compliance across multiple jurisdictions. Similarly, established businesses expanding into e-commerce need guidance on VAT obligations and digital compliance. This change positions tax advisors as proactive partners in business development and not just as reactive service providers.

Digital communication culture

The traditional model of face-to-face meetings and paper correspondence is evolving into a digitally mediated communication culture, in which information exchange and document management are increasingly organized via digital communication and information systems. Tax advisors are increasingly using client portals, secure messaging apps, video conferencing, and cloud platforms to maintain ongoing communication. This provides customers with real-time access to documents, progress reports, and interactive consultations.

Digital communication improves convenience and transparency, but also requires new skills in dealing with virtual customer relationships. Tax advisors must ensure data security in digital channels, maintain a personal relationship despite physical distance and regulate different communication preferences of clients. For example, older customers may prefer phone

calls, while younger business owners expect instant messaging (Zunke 2023).

Technological competence as a key competence

A fundamental change is the emergence of technological competence as a core competence for tax consultants. Beyond tax expertise, advisors need to understand digital tools, evaluate software options, and manage cybersecurity risks. These include familiarity with cloud accounting platforms, AI-powered tax engines, data analytics dashboards, and compliance software (May 2025).

In addition, consultants often act as internal technology managers in their companies – choosing appropriate IT infrastructures, overseeing software integrations, and ensuring data protection. They also structure information processes and ensure that tax-relevant information is processed securely and accessible. They can also guide customers through digital transformation initiatives, helping them choose tools, migrate data, and train employees.

This technological proficiency requires continuous learning and adaptability as software ecosystems evolve rapidly.

Digital Tools and AI: New Foundations

The provision of tax advisory services today is highly dependent on advanced technologies that shape workflows, data management and client interaction (Figure 1):

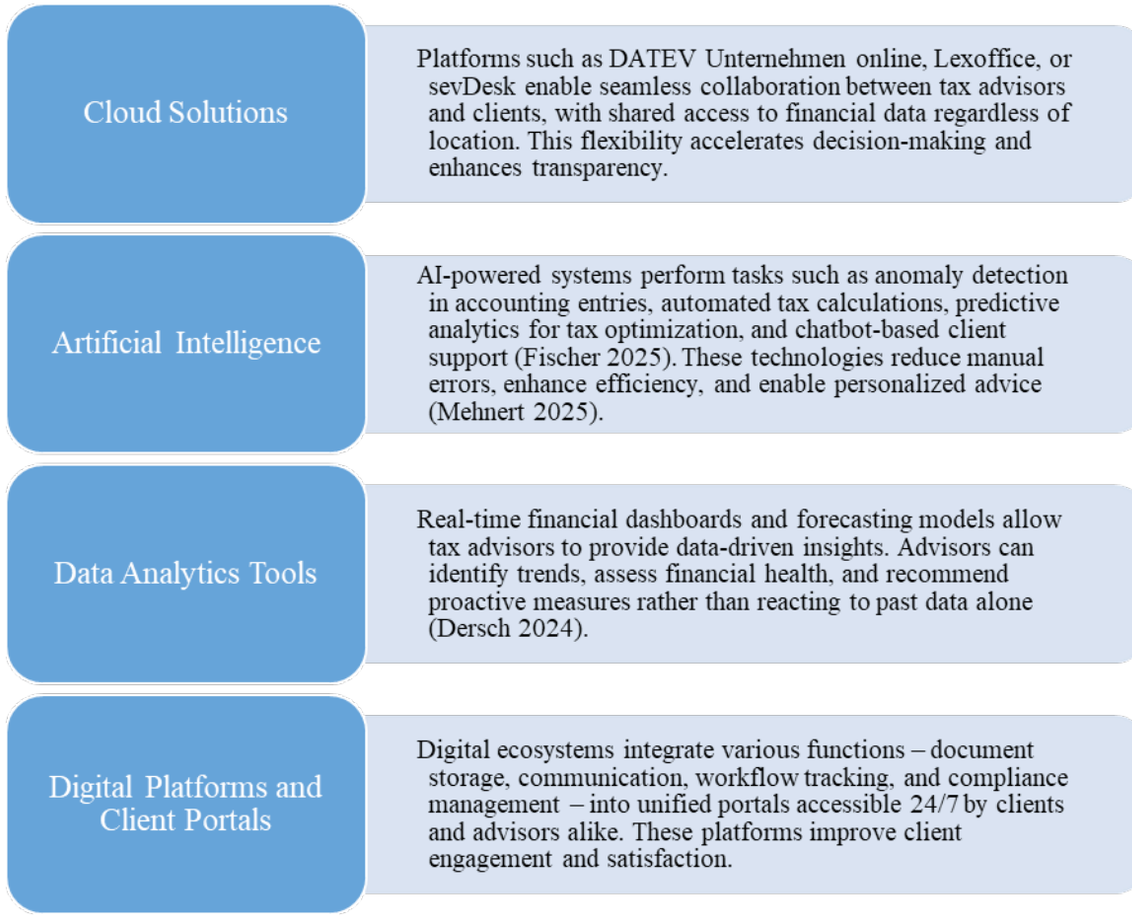

Fig. 1. Advanced technologies for tax advisory services

These technological foundations increase efficiency, reduce costs and improve service quality. However, they also require new organizational practices in the areas of data governance, IT support, and user training.

New roles: The digital tax advisor

Digitalization is creating hybrid roles that combine traditional tax knowledge with new technical and interpersonal skills:

- Data Analyst: Tax advisors analyze large data sets to uncover optimization opportunities,

compliance risks, and strategic insights. For example, advanced analytics can reveal output patterns or potential audit triggers that support customer advice.

• Digital Transformation Consultant: Consultants help clients adopt digital accounting systems, automate internal processes, and comply with new digital tax regulations (e.g., real-time reporting requirements) (Elter 2025).

• Trusted digital partner: Trust remains fundamental even in a digital environment. Advisors act as ethical gatekeepers, ensuring that AI tools and data use comply with legal and moral standards and protect customers' interests.

• Interface managers: Consultants coordinate the interactions between different software systems – ERP, CRM, cloud storage, tax engines – to create seamless workflows. This integration role requires technical competence and project management skills.

These evolving roles underscore the need for interdisciplinary expertise, including IT literacy, legal knowledge, and communication skills. Empathy, cultural awareness, and client-centered approaches are essential to maintaining strong customer relationships in the face of technological change. These new roles have one thing in common: they are strongly communication- and information-oriented. The knowledge of the tax advisor is not only reflected in access to information, but also in understandable communication.

New requirements for education and training

Tackling these challenges requires comprehensive reforms in education and lifelong learning:

• Curriculum integration: Digital skills, including data analytics, cybersecurity, AI fundamentals, and digital ethics, should be core elements in accountant certification programs and professional exams.

• Training: Rapid technological change requires flexible, ongoing learning formats such as webinars, microlearning, and blended training programs that can be adapted to the working hours of professionals.

• Interdisciplinary education: Collaboration between law schools, economics faculties, and IT departments can create comprehensive programs that prepare future consultants for complex digital environments (Zunke 2023).

• Business-led development: Tax firms need to foster learning cultures by investing in internal training, mentoring, and innovation labs that encourage experimentation with new tools and methodologies.

Such educational transformation is critical to ensuring that counselors remain competitive and can provide modern services.

Discussion and Outlook: Challenges and the Tax Advisor in 2035

The digital transformation of the tax consulting profession not only brings with it a wealth of new opportunities, but also a number of risks and tensions that must be actively addressed. A central concern is the possible replacement of skilled workers with technology. Although artificial intelligence is capable of automating routine tasks with high efficiency, it cannot replicate the nuanced judgment, empathy, and strategic thinking that accountants bring to complex client situations. Rather than making the profession obsolete, these technological advancements shift its focus to more valuable, consultancy-oriented activities (Mehnert 2025).

Another challenge is the increasing technological dependence on tax practices. A heavy reliance on proprietary software solutions can limit operational flexibility and increase long-term costs. In order to maintain professional autonomy and protect the interests of customers, it is essential to advocate for open standards, interoperability and data sovereignty. This ensures that accountants remain in control of their technological environments and remain independent in their professional decisions.

Ethical responsibility is also becoming increasingly important in the age of AI. Decisions made or proposed by algorithmic systems can significantly influence clients' outcomes and raise serious questions about accountability and transparency. Clearly defined legal frameworks and ethical guidelines are necessary to set the boundaries of responsibility and protect

both clients and advisors from unintended consequences of automated processes.

Another problem concerns the unequal implementation of digital technologies across the industry. Larger firms with greater financial and human resources are better positioned to adopt and integrate digital tools, while smaller or rural practices may struggle to keep up. This discrepancy risks creating a digital divide that affects the consistency and quality of tax advisory services across geographies and company sizes.

Tackling these multifaceted challenges requires a coordinated response from all stakeholders in the profession, including regulators, educational institutions, professional associations and individual practitioners. Only through a joint effort can the transformation be shaped in a way that fosters innovation while preserving the integrity and accessibility of the profession.

Looking ahead to 2035, the role of tax advisors is likely to be more interdisciplinary, strategic, and technologically integrated than ever before. In addition to helping clients meet compliance requirements, tax professionals take on broader roles in areas such as corporate governance, sustainability reporting, and digital business transformation. Collaboration across disciplines – with IT experts, legal experts, financial analysts and data scientists – will become an essential part of the comprehensive, future-oriented advice.

Technological competence will be a core competence. Tools such as AI, machine learning, and real-time data analysis are used as naturally and frequently as spreadsheet programs are today. In parallel, service delivery models will evolve to meet different customer needs and digital maturity levels. Hybrid consulting approaches that combine personalized communications with digital self-service tools are becoming the norm.

In this changing environment, accountants will also act as interpreters between complex technologies and the people who use them. They will translate regulatory frameworks and technical systems into understandable, actionable guidelines tailored to clients' specific situations. This expanded role requires not only technical expertise, but also clear communication, empathy, and ethical awareness.

Overall, this outlook envisages a profession that is more diverse and demanding, but also more effective and rewarding. By embracing digital transformation responsibly and customer-centrically, accountants can increase the value they provide, build trust, and create a forward-thinking, ethical, and transparent business environment.

The transformation of tax consulting itself and the professional field is an example of how digital technologies are changing information processes, professional communication and decision-making structures.

CONCLUSION

The digital transformation is fundamentally changing the profession of tax advisors and ushering in a new era that closely combines technological innovation with professional communication and effective information management. Routine and repetitive tasks – such as data entry, document classification, and standard reporting – are increasingly being taken over by AI-powered tools, allowing tax professionals to shift their focus to value-added services. However, this change is not only of a technical nature; It signals a fundamental transformation of customers' professional identity, skills and expectations.

The tax advisor of the future must be a multidimensional expert: legal expert, data analyst, business strategist and digital communicator. This expanded role is challenging, but it also offers great opportunities for personal development, increased customer impact, and increased job satisfaction. Those who use digital tools not only optimize internal processes, but also become more proactive, enabling customers to make informed, strategic decisions in real time.

However, this transformation also brings significant challenges. Tax professionals have to deal with issues such as data security, technological dependencies, regulatory uncertainty, and ethical responsibility – especially when relying on opaque AI systems. The industry must respond to this by establishing clear governance structures and promoting interdisciplinary cooperation. Equally important is the development of a robust educational framework that in-

cludes digital literacy, agile thinking, and continuous professional development (Zunke 2023).

At the same time, digitization is changing the internal organization of law firms. Information processes are being formalized, standardized and more system-supported, which brings with it new requirements for the management of knowledge, data and communication.

In addition, tax advisors are engaged to take a more active role in the public discourse on automation, regulation and transparency. As trusted professionals, they can bridge the gap between innovation and social responsibility and guide companies towards sustainable and legally sound digital practices. The adaptability of the profession depends not only on individual competence, but also on institutional readiness and a future-oriented professional culture.

Successful transformation depends on proactive leadership within companies, support from professional associations, and a regulatory environment that enables innovation while maintaining professional standards. In the coming years, it will be crucial to foster a culture of experimentation, openness and resilience in the face of change.

Ultimately, the digital transformation does not reduce the relevance of the tax advisor – it redefines him. When approached strategically, the profession can become more dynamic, diverse, and indispensable than ever before. Tax advisors have the potential to become key players in shaping a digital, transparent and responsive business environment that benefits both companies and society as a whole.

REFERENCES

DERSCH, A., 2024. Die Rolle von KI in der modernen Steuerberatung. *Haufe Online*. [viewed 30 June 2025]. Available from: https://www.haufe.de/steuern/taxulting/die-rolle-von-ki-in-der-modernen-steuerberatung_598848_627032.html

ELTER, C., 2025. Sprinterin trifft Langstreckenläufer. *Datev*, no. 05.25, pp. 18–20.

FISCHER, H., 2025. Quantensprung in die Cloud. *Datev*, no. 05.25, pp. 10–17.

MAYR, R., 2025. Interpretation, Beratung und strategische Begleitung. *Datev*, no. 05.25, pp. 8–9.

MEHNERT, D., 2025. KI in der Steuerberatung. *DStR Deutsches Steuerrecht*, no. 16–17, pp. 922–928.

ZUNKE, K., 2023. Welchen Nutzen hat die KI für Steuerberater? *Haufe Online*. [viewed 30 June 2025]. Available from: https://www.haufe.de/steuern/taxulting/chatgpt-welchen-nutzen-hat-die-ki-fuer-steuerberater_598848_593218.html

ЦИФРОВИЯТ ДАНЪЧЕН КОНСУЛТАНТ: НОВИ ПРОФЕСИОНАЛНИ РОЛИ В ЕРАТА НА ИЗКУСТВЕНИЯ ИНТЕЛЕКТ – ПОСЛЕДИЦИ ЗА КОМУНИКАЦИЯТА И УПРАВЛЕНИЕТО НА ИНФОРМАЦИЯТА

Резюме: *Дигитализацията променя фундаментално професията на данъчните консултанти. Изкуственият интелект (AI), автоматизираните процеси и инструментите за дигитална комуникация все повече оформят ежедневната работа, взаимоотношенията с клиентите и професионалната идентичност. В тази статия се разглежда как се развива ролята на данъчните консултанти в отговор на тези промени и какви нови изисквания възникват, особено по отношение на структурите за дигитална комуникация, управлението на информацията и процесите на вземане на решения, основани на знания. Въз основа на качествен анализ проучването идентифицира ключови тенденции, като автоматизацията на стандартизирани задачи, нарастващото значение на стратегическите съвети, преминаването към цифрови комуникационни канали и реорганизирането на професионалните информационни потоци между данъчните консултанти и клиентите. Освен това статията очертава нови хибридни роли, като анализатор на данни и консултант по цифрова трансформация. Накрая, тя подчертава необходимостта от реформи в образованието и ученето през целия живот, за да се гарантира, че професията ще остане готова за бъдещето до 2035 г. Резултатите показват, че дигитализацията не само ускорява процесите, но и променя фундаментално очакванията на клиентите. Следователно данъчните консултанти трябва не само да развиват технологични умения, но и да усъвършенстват комуникационните си умения.*

Ключови думи: *изкуствен интелект; автоматизация; дигитализация; данъчно консултиране; професионална роля*

Софи Фолберг, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: sophievolberg@web.de

ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ
PUBLIC COMMUNICATIONS AND INFORMATION SCIENCES

EFFECTIVELY DEVELOPMENT OF MIDDLE MANAGEMENT TEAMS: TEAM DEVELOPMENT AS A STRATEGIC PROCESS FOR ORGANIZATIONAL VALUE CREATION

Angelika Westerwelle
University of Library Studies and Information Technologies
https://doi.org/10.70300/DCUQ9712

Abstract: *Management teams are a core component of modern organizations. However, their contribution to value creation does not depend solely on the professional excellence of individual managers, but on how effectively they collaborate - both in terms of achieving their own objectives and aligning with overarching organizational goals. The key question, therefore, is not whether a management team must function as a "team" in the traditional sense, but rather how much teamwork is actually required in this context-and in what form it best contributes to strategy execution. This cannot be resolved through a one-off workshop or offsite event. Instead, it requires an ongoing development process in which goals, roles, and work methods are regularly defined, reviewed, and adjusted. A useful reference framework is the Input-Mediator-Output-Input (IMOI) model (Ilgen et al. 2005), which illustrates how individual and organizational preconditions (inputs) are transformed into measurable outcomes (outputs) via team processes such as communication, role clarity, and shared norms. These outcomes, in turn, feed into subsequent development cycles as new inputs. This underscores a central point, especially for Middle Management Teams: their effectiveness does not emerge from isolated interventions, but from a systematic interplay of needs, interventions, and outcomes over time.*
Keywords: *management team; organizational development; team development; team coaching; IMOI model*

INTRODUCTION

Management teams are a key instrument for implementing corporate strategies. They bring together different perspectives, coordinate business areas, and are responsible for strategic decisions (Bang et al. 2021, pp. 13f; Wageman et al. 2010, p. 477; Lindinger et al. 2013, p. 112). However, their success does not depend solely on the excellence of individual managers, but on whether they succeed in integrating their contributions in such a way that they jointly create added value for the organization (Bang et al. 2017; Wageman et al. 2008, p. 161). The individual success of managers does not necessarily lead to collective effectiveness. This is particularly true for Middle Management Teams, which serve as a critical interface between strategic decision-making and operational execution (Floyd & Wooldridge 1997, pp. 465–485; Castañer & Yu 2017, pp. 13–32; Walter 2016, p. 11). Their ability to align vertically with top leadership and horizontally across functions is essential to organizational effectiveness (Groth 2008, p. 11; Walter 2016, p. 82 f.)

In this context, the question arises as to how Middle Management Teams can structure their collaboration in such a way that they achieve the greatest possible impact with the most efficient use of resources, thereby making a sustainable contribution to strategy implementation.

However, effective collaboration does not come about solely through designation or selective measures, but through consciously designed processes that clarify roles, structures, and working methods (Katzenbach & Smith 2004; Dyer 1995, p. 85). Team development should therefore not be understood as a one-time event, such as a workshop or offsite. Rather, it is a continuous, long-term process that addresses the specific challenges of the team and requires ongoing reflection, review, and adjustment of its working methods (Comelli 2003, pp. 169–189; Salas et al. 2004, p. 48.2-48.3; Bang et al. 2021, pp. 153–158).

This article examines the thesis that the development of Middle Management Teams is more effective when it is understood as a continuous process rather than relying on isolated individual measures.

RESEARCH METHODOLOGY

This paper presents a systematic literature review of foundational and contemporary studies on team development and organizational effectiveness (Salas et al. 2004; Klein et al. 2009; McEwan et al. 2017; Bang et al. 2021). It also includes key research on Top and Middle Management Teams (Wageman et al. 2008) and organizational development (Hackman 2002; Hawkins 2011; West 2012).

Relevant sources were identified through international academic databases and snowball sampling. The review focused on peer-reviewed articles, established theoretical works, and especially literature from the past two decades.

As no primary data was collected, this article offers a conceptual synthesis, critically examining existing research and applying it to the specific question of management team development.

RESULTS

Team Development as Part of Personnel and Organizational Development

In the literature, team development is predominantly described as part of personnel and organizational development: a targeted, long-term process that strengthens cooperation and effectiveness (Comelli 2003, pp. 169–189; Neuberger 1994, pp. 12–14). Unlike isolated measures, it involves interventions that address structures, processes, and social relationships and focus on the team as a whole (Stumpf & Thomas 2003, pp. XIII–XIV).

More recent work emphasizes that team development is only effective if it is linked to organizational goals and framework conditions (Mathieu et al. 2008; Rico et al. 2011) and understood as a structured learning and change process that is closely linked to the strategic management of the organization (Kozlowski & Ilgen 2006).

Reasons and Goals of Team Development

Team development is typically initiated when new demands arise or difficulties become apparent within the team - for example, in newly formed groups, unclear roles and goals, communication problems, conflicts, or when performance potential is not being fully realized (Dyer 1995, p. 79; Comelli 2003, p. 169–189; Kauffeld 2008, pp. 29–41). Such symptoms often point to underlying causes such as a lack of clear objectives, unclear definition of roles, or insufficient communication structures (Dyer 1995, p. 80; Hackman 2002, p. IX).

The objectives of team development measures are accordingly diverse. They range from establishing binding structures and rules to improving cooperation and relationships to promoting social skills and the team's ability to reflect (Comelli 1994, pp. 61–84; Dyer 1995, pp. 90–93). At its core, team development aims to enable teams to continuously reflect on their working methods, increase their effectiveness, and at the same time support the motivation and personal development of their members (Stumpf et al. 2003, p. XIV; West 2012, p. 61).

The Process of Team Development

Team development should not be understood as a one-time event. Short-term formats such as offsites or outdoor training courses can create cohesion in the short term, but they have little lasting effect in everyday work (Dyer 1995, p. 85; Salas et al. 2004, p. 48.4). Effective collaboration is more likely to emerge from a longer-term process characterized by clear steps and a close connection to the strategic challenges of the organization (Comelli 2003, pp. 169–189; Bang et al. 2021, p. 154).

Typically, this process comprises several phases: clarifying the mandate and expectations, conducting a thorough diagnosis of the initial situation, developing and implementing appropriate measures, and subsequently reflecting on and evaluating the outcomes (Dyer 1995, pp. 90–91; Comelli 2003, pp. 169–189; Kauffeld 2011, p. 151–152). Evaluation and feedback loops are not the end but rather part of a continuous learning cycle in which the team makes ongoing adjustments (Marks et al. 2001; Bang et al. 2021, p. 86).

Diagnosis is of central importance, as it provides the basis for ensuring that interventions truly fit the team and its situation. Development needs - and corresponding goals - may arise at different levels: cultural (values, norms, identity), organizational (vision, strategy, goals), structural/

procedural (processes, interfaces, roles, rules, decision-making processes), or individual (trust, psychological safety) (Comelli 2003, pp. 169–189; Hackman 2002, p. 22; West 2012, p. 61; Kozlowski & Ilgen 2006; Edmondson 1999; Bang et al. 2021; Schein 2010; West 2012; Schiersmann & Thiel 2014). Moreover, such needs rarely occur in isolation. In practice, issues often emerge as a mix across levels, or become visible on one level while originating on another - for example, interpersonal conflicts that stem from unclear structural or organizational conditions (Hackman 2002, p. 22; West 2012, p. 61; Hawkins 2011, p. 18). As Hawkins (2011, p. 18), drawing on Oshry, emphasizes, teams often concentrate too heavily on personal issues, even though many difficulties are manifestations of collective structures and processes.

In practice, however, this phase is often shortened or omitted altogether for cost reasons, even though it is precisely this phase that determines the effectiveness of the entire development process. Research shows that team development is particularly effective when it begins with a careful needs analysis and is continuously adapted (Dyer 1995:86f, 2003:186ff, Salas et al. 2004:48.6). If these steps are skipped, there is a considerable risk that team development will fail to achieve the intended outcomes and will be perceived by participants as ineffective (Kauffeld & Lehmann-Willenbrock 2011, p. 217).

Special Characteristics of Management Team Development

Developing management teams presents distinct challenges. Unlike operational teams, which are united by shared tasks and interdependence, management teams consist of highly autonomous executives with diverging departmental priorities. They often hold strong personal convictions and may be resistant to correction - even from the team leader (Wageman et al. 2008, p. 161). In Middle Management Teams, this complexity is further amplified. Members are often positioned between hierarchical expectations from above and operational demands from below. They must not only interpret and translate strategy, but also coordinate across silos – often without formal authority over peers (Groth, 2008, p. 11; Walter, 2016, p. 82 f.)

These dynamics align with Upper Echelons Theory, which posits that organizational outcomes are shaped by the values, experiences, and cognitive frameworks of senior executives (Hambrick et al. 1984). In this view, top managers do not merely implement strategy – they shape it through their own lenses. As such, management teams differ fundamentally from traditional work teams in both structure and behavior. More recent work confirms that top teams operate within complex power structures, and their collective effectiveness depends not just on technical ability, but on how they interact, align, and make sense of strategic contexts (Hambrick et al. 1984).

Given these dynamics, individual development interventions such as coaching may improve personal competencies but rarely translate into improved team performance. What is essential are collective development processes that clarify roles, establish decision-making routines, and foster shared responsibility (Hackman 2002, p. 179; Burke et al. 2006; Salas et al. 2005). Management team development thus requires more than a series of individual measures; it demands a systemic, team-level approach.

The literature reflects a lack of consistency in how terms like team development, team coaching, team training, and teambuilding are used. While some authors treat these terms interchangeably, others draw clear distinctions (Comelli 2003; Shuffler et al. 2011; Hawkins 2011, p. 54–59). For the purposes of this discussion, team development is defined as a structured, long-term process that integrates various interventions and supports sustained collaboration and strategic alignment. While coaching, training, or teambuilding may contribute to this process, they cannot replace its systemic character – particularly in the context of leadership teams.

Research shows that such processes are most effective when closely aligned with an organization's strategic challenges and current issues (Bang et al. 2021, pp. 153–158). Eight core principles emerge from the literature: strategic relevance, leadership engagement, evidence-based learning, individualized contribution, structural support, ongoing feedback, professional coaching, and sufficient time for new routines to take hold. These findings reinforce that management teams do not improve through symbolic events but through the integration of strategy work and learning processes.

Crucially, management teams must first clarify their role and mandate: What issues must they address collectively - complex strategic topics or operational decisions? Only then can the required degree and structure of teamwork be defined (Critchley et al. 1984, p. 163; Bang et al. 2021, p. 161).

Despite these unique dynamics, core elements of effective teamwork still apply: a shared focus, supportive structures, an enabling environment, and targeted development interventions (Hackman 2002, p. 242). High performing management teams do not emerge by chance, but through intentionally designed collaboration (Comelli 1994, pp. 61–84). They grow through collective designed processes that must be consciously facilitated over time (Comelli 2003). Recent research confirms that lasting effectiveness requires alignment between team development and organizational strategy, with management teams making a visible contribution to strategic implementation (Rico et al. 2011; Mathieu et al. 2017).

The Effectiveness of Team Development

The literature remains divided on the effectiveness of team development in improving performance. Critics argue that many interventions emphasize social cohesion, yet produce limited and short-lived effects (Salas et al. 2004, p. 48.4; West 2012, p. 88). However, meta-analyses demonstrate that targeted interventions can yield measurable benefits. Clarifying goals and roles, in particular, is a proven success factor that enhances team performance over time (Klein et al. 2009). Recent reviews confirm that evidence-based training improves both behavior and outcomes, whether in laboratory or organizational settings (Salas et al. 2012; McEwan et al. 2017).

Effectiveness is highest when interventions address multiple levels – individual competence, team processes, and organizational structures (Rico et al. 2011). Multidimensional approaches that combine task, procedural, and social aspects, and engage members in experiential learning, are especially effective (Shuffler et al. 2011). Sustainable impact requires alignment with actual needs, structural integration, and support from top management. Without these, team development risks being perceived as ineffective or irrelevant (Shuffler et al. 2018; Thompson 2018, p. 19).

Critics also point to the ineffectiveness of standardized, “one size fits all” programs – particularly for management teams (Hawkins 2011, pp. 54ff.; Comelli 2003). Popular formats such as off sites or outdoor events may promote short-term cohesion but fall short if they neglect work routines and decision-making processes. Meta-analyses confirm that customized, evidence-based interventions significantly outperform generic formats (Lacerenza et al. 2018).

Most empirical studies focus on operational teams or controlled environments. Their applicability to management teams remains insufficiently explored. In this context, standardized formats are particularly limited, as the challenges often involve role clarity, decision-making, and strategic responsibility rather than daily collaboration (Wageman et al. 2008, p. 161; Bang et al. 2021, p. 161). For management teams, team development is effective only when it is context-sensitive, strategically embedded, and conceived as an ongoing process.

Models and the Measurability of Team Development

Team development cannot be viewed in isolation from organizational goals. A valuable framework is the updated Input–Mediator–Output–Input (IMOI) model by Ilgen et al. (2005), which has also been applied to management teams (Bang et al. 2021, p. 5). It illustrates how team processes are shaped by individual and organizational inputs and how mediators – such as communication, role clarity, and norms - translate these into measurable outcomes. These outputs, in turn, feed back into new development cycles.

For management teams, relevant inputs include strategic mission, departmental agendas, team composition, and available resources. In the context of Middle Management Teams, these inputs also reflect cross-functional mandates, hybrid leadership responsibilities, and varying degrees of autonomy, making tailored team development especially important (Floyd et al. 2000).

Mediators such as communication quality, conflict resolution, trust, and psychological safety influence outputs like decision quality, implementation speed, or employee satisfaction (Kozlowski & Ilgen 2006; Mathieu et al. 2017). These outcomes then shape subsequent development phases.

The IMOI model thus offers not only a theoretical lens but also a practical framework for eval-

uating team development. Assessment can involve both qualitative methods (e.g., reflection, observation) and quantitative instruments (e.g., standardized process or climate scales). Meta-analyses confirm that team development is most effective when evaluation is embedded throughout the process - not just at its conclusion (Klein et al. 2009; Shuffler et al. 2018). This enables development efforts to remain adaptive, evidence-based, and aligned with strategic goals.

In sum, management team development is a multidimensional and ongoing process that spans cultural, organizational, structural, and individual domains. Its effectiveness depends on deliberate design, strategic alignment, and systematic evaluation - setting it apart from one-off trainings or symbolic team-building events. As such, it must be seen as a central element of long-term organizational development.

Building on the foundational IMOI model, the present paper proposes an extended framework that tailors its structure to the specific dynamics of management teams (Fig. 1). This adapted model retains the core IMOI logic – inputs, mediators, emergent states, and outputs – but incorporates leadership-specific factors such as strategic alignment, team composition, and organizational support as critical inputs.

Team interaction processes-ranging from goal clarity and communication to conflict management and feedback culture-serve as mediators that convert these contextual inputs into measurable outcomes. Emergent states such as team-based trust, shared understanding, commitment, and a functional team culture dynamically evolve and reinforce team functioning. Outputs include not only task performance and implementation strength but also learning integration, strategic contribution, and long-term resilience.

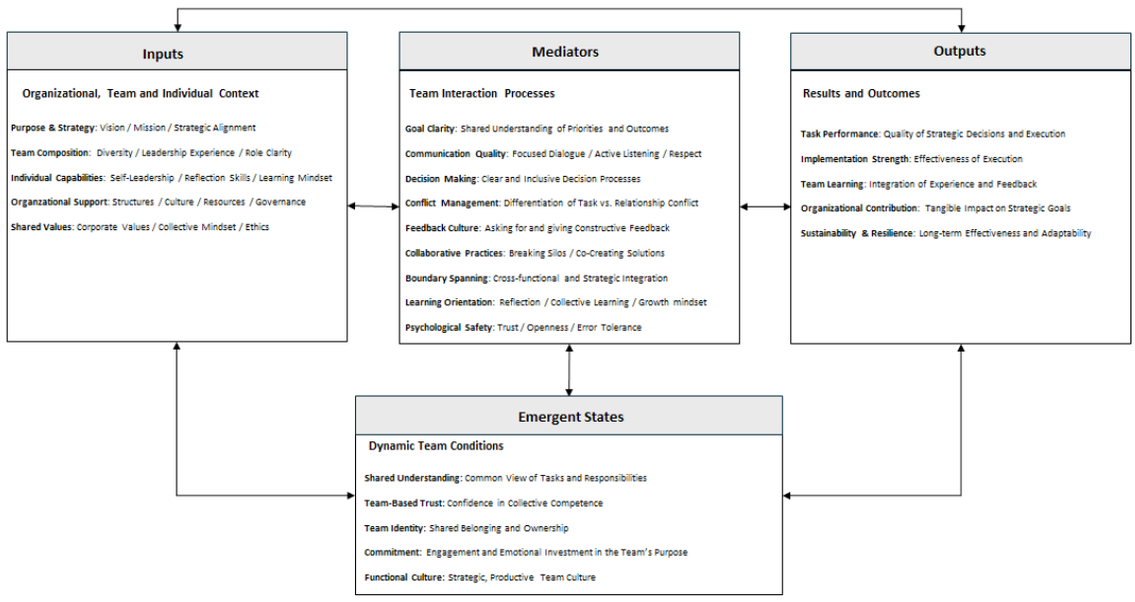

Fig. 1. Extended IMOI Framework for Management Teams - based on Ilgen et al. (2005) and Bang & Midelfart (2021), adapted by the author.

This customized version of the IMOI model offers a practical lens to design, guide, and evaluate management team development efforts. It emphasizes that collaboration at the executive level requires more than alignment on content – it depends on how interaction patterns, cultural norms, and individual capacities combine to support strategic execution. As such, it reinforces the argument that team development must be systemic, ongoing, and embedded in the broader logic of organizational effectiveness.

CONCLUSION

The literature review confirms that team development is a key element of both personnel and organizational development. It should not be seen as a one-time intervention, but a continuous

process requiring tailored measures and structural integration. This is particularly true for management teams, whose members do not naturally function as a team and must actively shape their collaboration. In Middle Management Teams, the challenge is compounded by their dual role as both strategy implementers and local leaders. They operate in dynamic contexts that require adaptive collaboration and strong horizontal alignment.

Effective development of management teams depends on close alignment with the organization's strategic goals and current challenges. Interventions must be needs-based, structurally supported, endorsed by top management, and embedded into existing decision-making processes.

Beyond fostering psychological safety or cohesion, team development must be guided in clear standards and systematically evaluated. The Input–Mediator–Output–Input (IMOI) model offers a valuable framework for identifying key levers and tracking measurable progress over time.

Looking ahead, a better balance between standardization and customization will be essential. A shared foundation enables comparability and evaluation, while flexibility ensures responsiveness to each team's unique context. Only when both dimensions are combined can team development drive collaboration, strategic alignment, and long-term organizational resilience.

REFERENCES

BANG, H.; MIDELFART, T. N., 2017. What characterizes effective management teams? A research-based approach. *Consulting Psychology Journal: Practice and Research*, vol. 69, no. 4, pp. 334–359. Available from: https://doi.org/10.1037/cpb0000098

BANG, H.; MIDELFART, T. N., 2021. *Effective management teams and organizational behavior: A research-based model for team development*. New York; London: Routledge.

BURKE, C. S.; STAGL, K. C.; SALAS, E.; PIERCE, L.; KENDALL, D., 2006. Understanding team adaptation: A conceptual analysis and model. *Journal of Applied Psychology*, vol. 91, no. 6, pp. 1189–1207. Available from: https://doi.org/10.1037/0021-9010.91.6.1189

CASTAÑER, X.; YU, H., 2017. The role of middle and top managers in the strategy process. In: FLOYD, S. W.; WOOLDRIDGE, B., eds. *Handbook of middle management strategy process research*, pp. 13–32. Cheltenham: Edward Elgar Publishing. Available from: https://doi.org/10.4337/9781783473250

COMELLI, G., 1994. Teamentwicklung – Training von "family groups". In: HOFMANN, L.; REGNET, E., eds. *Innovative Weiterbildungskonzepte: Trends, Inhalte und Methoden der Personalentwicklung in Unternehmen*, pp. 61–84. Göttingen: Hogrefe.

COMELLI, G., 2003. Anlässe und Ziele von Teamentwicklungsprozessen. In: STUMPF, S.; THOMAS, A., eds. *Teamarbeit und Teamentwicklung*, pp. 169–189. Göttingen: Hogrefe.

CRITCHLEY, B.; CASEY, D., 1984. Second thoughts on team building. *Management Education and Development*, vol. 15, no. 2, pp. 163–175. Available from: https://doi.org/10.1177/135050768401500210

DYER, W. G., 1995. *Team building: Current issues and new alternatives*. 3rd ed. Reading, MA: Addison-Wesley.

EDMONDSON, A., 1999. Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, vol. 44, no. 2, pp. 350–383. Available from: https://doi.org/10.2307/2666999

FLOYD, S. W.; LANE, P. J., 2000. Strategizing throughout the organization: Managing role conflict in strategic renewal. *Academy of Management Review*, vol. 25, no. 1, pp. 154–177. Available from: https://doi.org/10.2307/259268

FLOYD, S. W.; WOOLDRIDGE, B., 1997. Middle management's strategic influence and organizational performance. *Journal of Management Studies*, vol. 34, no. 3, pp. 465–485. Available from: https://doi.org/10.1111/1467-6486.00059

FLOYD, S. W.; WOOLDRIDGE, B., 2017. *Handbook of middle management strategy process research*. Cheltenham; Northampton: Edward Elgar Publishing.

GROTH, A., 2008. *Führungsstark in alle Richtungen: 360-Grad-Leadership für das mittlere Management*. Frankfurt; New York: Campus.

HAMBRICK, D. C.; MASON, P. A., 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, vol. 9, no. 2, pp. 193–206. Available from: https://doi.org/10.5465/amr.1984.4277628

HACKMAN, J. R., 2002. *Leading teams: Setting the stage for great performances*. Boston, MA: Harvard Business School Press.

HAWKINS, P., 2021. *Leadership team coaching: Developing collective transformational leadership*. London: Kogan Page.

ILGEN, D. R.; HOLLENBECK, J. R.; JOHNSON, M.; JUNDT, D., 2005. Teams in organizations: From input-process-output models to IMOI models. *Annual Review of Psychology*, vol. 56, no. 1, pp. 517–543. Available from: https://doi.org/10.1146/annurev.psych.56.091103.070250

KAUFFELD, S., 2011. *Arbeits-, Organisations- und Personalpsychologie für Bachelor*. Heidelberg: Springer.

KAUFFELD, S.; LEHMANN-WILLENBROCK, N., 2008. Teamdiagnose und Teamentwicklung. In: *Gabler eBooks*, pp. 29–41. Available from: https://doi.org/10.1007/978-3-8349-9779-1_4

KATZENBACH, J. R.; SMITH, D. K., 2004. The discipline of teams. In: *Harvard Business Review on teams that succeed*, pp. 1–16. Boston, MA: Harvard Business School Press.
KLEIN, C.; DIASGRANADOS, D.; SALAS, E.; HUY, L.; BURKE, C. S.; LYONS, R.; GOODWIN, G. F., 2009. Does team building work? *Small Group Research*, vol. 40, no. 2, pp. 181–222. Available from: https://doi.org/10.1177/1046496408328821
KOZLOWSKI, S. W. J.; ILGEN, D., 2006. Enhancing the effectiveness of work groups and teams. *Psychological Science in the Public Interest*, vol. 7, no. 3, pp. 77–124. Available from: https://doi.org/10.1111/j.1529-1006.2006.00030.x
LACERENZA, C. N.; MARLOW, S. L.; TANNENBAUM, S. I.; SALAS, E., 2018. Team development interventions: Evidence-based approaches for improving teamwork. *American Psychologist*, vol. 73, no. 4, pp. 517–531. Available from: https://doi.org/10.1037/amp0000295
LINDINGER, C.; ZEISEL, N., 2013. *Spitzenleistung durch leadership: Die Bausteine ergebnis- und mitarbeiterorientierter Führung*. Wiesbaden: Springer Gabler.
MARKS, M.; MATHIEU, J. E.; ZACCARO, S. J., 2001. A temporally based framework and taxonomy of team processes. *Academy of Management Review*, vol. 26, no. 3, pp. 356–376. Available from: https://doi.org/10.2307/259182
MATHIEU, J.; MAYNARD, M. T.; RAPP, T.; GILSON, L., 2008. Team effectiveness 1997–2007: A review of recent advancements and a glimpse into the future. *Journal of Management*, vol. 34, no. 3, pp. 410–476. Available from: https://doi.org/10.1177/0149206308316061
MATHIEU, J. E.; HOLLENBECK, J. R.; VAN KNIPPENBERG, D.; ILGEN, D. R., 2017. A century of work teams in the Journal of Applied Psychology. *Journal of Applied Psychology*, vol. 102, no. 3, pp. 452–467. Available from: https://doi.org/10.1037/apl0000128
McEWAN, D.; RUISSEN, G. R.; EYS, M. A.; ZUMBO, B. D.; BEAUCHAMP, M. R., 2017. The effectiveness of teamwork training on teamwork behaviors and team performance: A systematic review and meta-analysis of controlled interventions. *PLoS ONE*, vol. 12, no. 1, p. e0169604. Available from: https://doi.org/10.1371/journal.pone.0169604
NEUBERGER, O., 1994. *Personalentwicklung*. 2nd ed. Stuttgart: Ferdinand Enke.
RICO, R.; DE LA HERA, C. M. A.; TABERNERO, C., 2011. Work team effectiveness: A review of research over the last decade (1999–2009). *Journal of Work and Organizational Psychology*, vol. 15, no. 1, pp. 57–79.
SALAS, E.; PRIEST, H. A.; DeROUIN, R. E., 2004. Team building. In: STANTON, N.; HEDGE, A.; BROOKHUIS, K.; SALAS, E.; HENDRICK, H., eds. *Handbook of human factors and ergonomics methods*, pp. 48-1–48-5. Boca Raton, FL: CRC Press.
SALAS, E.; STAGL, K.; BURKE, S., 2005. 25 years of team effectiveness in organizations: Research themes and emerging needs. Available from: https://doi.org/10.1002/0470013311.ch2
SALAS, E.; TANNENBAUM, S. I.; KRAIGER, K.; SMITH-JENTSCH, K. A., 2012. The science of training and development in organizations: What matters in practice. *Psychological Science in the Public Interest*, vol. 13, no. 2, pp. 74–101. Available from: https://doi.org/10.1177/1529100612436661
SCHEIN, E. H., 2010. *Organizational culture and leadership*. 4th ed. San Francisco, CA: Jossey-Bass.
SCHIERSMANN, C.; THIEL, H.-U., 2018. *Organisationsentwicklung: Prinzipien und Strategien von Veränderungsprozessen*. 5th ed. Heidelberg: Springer.
SHUFFLER, M. L.; DIAZGRANADOS, D.; SALAS, E., 2011. There's a science for that: Team development interventions in organizations. *Current Directions in Psychological Science*, vol. 20, no. 6, pp. 365–372. Available from: https://doi.org/10.1177/0963721411422054
SHUFFLER, M. L.; DIAZGRANADOS, D.; TRAVIS, M.; SALAS, E., 2018. Developing, sustaining, and maximizing team effectiveness: An integrative, dynamic perspective of team development interventions. *Academy of Management Annals*, vol. 12, no. 2, pp. 688–724. Available from: https://doi.org/10.5465/annals.2016.0045
STUMPF, S.; THOMAS, A., 2003. *Teamarbeit und Teamentwicklung*. Göttingen: Hogrefe.
THOMPSON, L. L., 2018. *Making the team: A guide for managers*. 6th ed. New York, NY: Pearson.
WAGEMAN, R.; HACKMAN, J. R., 2010. What makes teams of leaders leadable? In: NOHRIA, N.; KHURANA, R., eds. *Handbook of leadership theory and practice*. Boston, MA: Harvard Business Press.
WAGEMAN, R.; NUNES, D. A.; BURRUSS, J. A.; HACKMAN, J. R., 2008. *Senior leadership teams: What it takes to make them great*. Boston, MA: Harvard Business School Press.
WALTER, A. D., 2016. *Mittleres Management – Schlüssel zum Unternehmenserfolg*. Wiesbaden: Springer Gabler.
WEST, M. A., 2012. *Effective teamwork: Practical lessons from organizational research*. 3rd ed. Chichester, UK: John Wiley & Sons.

ЕФЕКТИВНО РАЗВИТИЕ НА МЕНИДЖЪРСКИ ЕКИПИ: РАЗВИТИЕТО НА ЕКИПА КАТО СТРАТЕГИЧЕСКИ ПРОЦЕС ЗА СЪЗДАВАНЕ НА ОРГАНИЗАЦИОННА СТОЙНОСТ

Резюме: *Управленските екипи са съществена част от съвременните организации. Техният принос към компанията обаче не зависи само от професионалната компетентност на отделните*

мениджъри, а и от това как те организират своята съвместна работа – както по отношение на собствените си цели, така и по отношение на интегрирането им в по-висшите цели на компанията. Следователно основният въпрос е не толкова дали един мениджърски екип трябва да бъде „екип“ в класическия смисъл, а по-скоро колко екипна работа е необходима в този контекст и под каква форма тя допринася за реализацията на стратегията. Отговорът на тези въпроси не може да бъде даден в рамките на еднократен уъркшоп или извън офиса. По-скоро той изисква непрекъснат процес на развитие, в който целите, ролите и начините на работа се дефинират, проверяват и адаптират редовно. Полезен референтен модел в това отношение е моделът Input–Mediator–Output–Input (IMOI) (Ilgen et al. 2005), който илюстрира как индивидуалните и организационните предпоставки (входни данни) чрез екипни процеси като комуникация, изясняване на ролите или норми водят до измерими резултати (изходни данни), които от своя страна се връщат като входни данни в нови цикли на развитие. Особено за мениджърските екипи става ясно, че тяхната ефективност не се дължи на единични мерки, а на систематичното съчетаване на нужди, интервенции и ефекти във времето.

Ключови думи: *мениджърски екип; организационно развитие; развитие на екипа; екипен коучинг; IMOI модел*

Ангелика Вестервеле, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: angelika@gfcconsulting.de

ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ
PUBLIC COMMUNICATIONS AND INFORMATION SCIENCES

COMMUNICATION PROCESSES FOR THE EVALUATION OF THERAPEUTIC STRATEGIES FOR MCT8 DEFICIENCY: A PATIENT-CENTERED PERSPECTIVE

Dominika Schiebl
University of Library Studies and Information Technologies
https://doi.org/10.70300/YHDS7422

Abstract: *The aim of this article is to identify patient-relevant therapeutic targets in the context of the serious rare disease MCT8 deficiency and to evaluate the effectiveness of existing treatment approaches based on clinical and patient-reported parameters. Using a systematic literature search and an exploratory survey of 21 international patient representatives, key treatment goals and satisfaction with the current care situation were recorded. The study quality was analyzed using the GRADE criteria. Quality of life, gross motor function, gastrointestinal health, cognitive development and immune stability were named as priority treatment goals. The desire for improved sleep was mentioned most frequently. Satisfaction with the current therapies was moderate in all areas. The results emphasize the need to systematically integrate patient-relevant objectives – especially quality of life – into clinical research on MCT8 deficiency and care. The development and application of standardized PRO instruments is recommended for future studies in order to improve the care situation of those affected.*
Keywords: *MCT8 deficiency; rare disease; patient-relevant outcomes; communication processes*

INTRODUCTION

Communication processes are essential for interdisciplinary collaboration in modern healthcare. Information systems (IS) support the collection, management and analysis of complex clinical data, enabling knowledge creation and decision-making. They consist of technological, human and organizational components and are particularly important in rare diseases, where case numbers are small, data are scarce and multiple actors are involved (Gelinas & Dull 2008).

MCT8 deficiency (Allan-Herndon-Dudley syndrome, ORPHA:59; OMIM:300523) is extremely rare, with around 320 documented cases worldwide (Schwartz 2017). It is caused by mutations in the SLC16A2 gene, encoding the MCT8 transporter, which regulates T3/T4 transport into cells and across the blood-brain barrier (Allan et al. 1944; Dumitrescu et al. 2004; Friesema et al. 2004; Schwartz et al. 2005). The condition combines severe neurocognitive developmental delay with peripheral thyrotoxicosis (Groeneweg et al. 2020).

As affected individuals cannot self-report, relatives are key informants, linking clinic, research and daily life. Patient-reported outcomes (PROs) allow care to be tailored to actual needs rather than biochemical markers alone.

No causal therapy exists (Neubauer & Schiebl 2019). The only approved drug is TRIAC/Emcitate (EMA 2025) for thyrotoxicosis. Supportive measures address motor limitations, spasticity, feeding difficulties, communication deficits or sleep disorders (e.g. physiotherapy, mobility aids, tube feeding, speech therapy, dietary therapy, symptomatic medication). While these interventions may help daily coping, their effectiveness is rarely evaluated systematically.

This study systematically analyses evidence-based therapeutic approaches for their clinical efficacy and relevance to PROs, alongside an exploratory survey of patient representatives to identify treatment goals and satisfaction. The aim is to improve patient-centered, interdisciplinary treatment concepts, supported by digital IS and participatory communication.

RESEARCH METHODOLOGY

Literature review

A systematic search (MEDLINE/PubMed, Google Scholar, ClinicalTrials.gov) using terms

[(SLC16A2) OR (MCT8) OR (AHDS)] AND [(therapy) OR (intervention) OR (treatment)] identified 2,590 studies. Inclusion: peer-reviewed human studies on MCT8 deficiency treatments (case reports/series, clinical trials, cohort studies); exclusion: preclinical studies, obsolete harmful therapies.

The results were critically evaluated with regard to methodological quality. After screening 11 relevant studies remained. The evidence quality of the treatment studies was classified according to the GRADE criteria (Schünemann & Reinap 2023) into the following categories: high (the true effect is close to its estimate), moderate (the true effect is probably close to its estimate), low (the true effect may differ substantially from the estimate), and very low (very little confidence in the estimate).

Explorative survey

In cooperation with MCT8-Forschung e.V., a questionnaire was developed and completed by 21 international patient representatives. Recruitment was voluntary; data were pseudonymized. The questionnaire, in German/English/Polish, assessed therapy goals and satisfaction. Responses were analysed descriptively and integrated with literature findings.

RESULTS

The 11 included studies comprised:

- TRIAC: phase II trial (Groeneweg et al. 2019, n=46), retrospective cohort (Van Geest et al. 2021, n=67), case series (Gazek et al. 2023, n=4), case report (Ünsal & Hayran 2023, n=1).
- DITPA: case series (Verge et al. 2012, n=4).
- Levothyroxine (LT4) + propylthiouracil (PTU): case reports (Visser et al. 2012, n=1; Wémeau et al. 2008, n=1).
- Liothyronine (LT3): case report (Zung et al. 2011, n=1).
- Prenatal LT4: case report (Refetoff et al. 2020, n=1).
- Levodopa/carbidopa ± botulinum toxin A: case series (Remerand et al. 2019, n=3; Tonduti et al. 2012, n=2).

Evidence quality ranged from low to moderate due to small sample sizes and methodological heterogeneity.

Effectiveness of different treatment strategies

Biochemical effects: TRIAC, LT4+PTU, DITPA, prenatal LT4 all reduced FT3 (and usually FT4) with concomitant TSH decreases. TRIAC and prenatal LT4 often reached reference ranges or clinically relevant reductions. Side effects were mild to moderate (GI symptoms, CK elevations, occasional infections), mostly dose-dependent. Levodopa/carbidopa and botulinum toxin had no effect on thyroid parameters.

Weight stabilization: Improvements most marked under TRIAC; prenatal LT4 also led to modest gains.

Neurological development: Isolated reports (TRIAC, prenatal LT4) noted motor milestone gains (head control, sitting) and improved myelination; quantitative improvements were generally small or absent.

Extrapyramidal symptoms: Partial, symptomatic relief with levodopa/carbidopa or botulinum toxin; effects not sustained.

Overall: good biochemical efficacy in several therapies (especially TRIAC), but limited and inconsistent neurological/motor benefits. PROs were rarely assessed.

Supportive interventions

Physiotherapy, occupational therapy, speech/feeding therapy, assisted communication, mobility aids, nutritional support (incl. tube feeding), and symptom-targeted drugs (e.g. for dystonia, seizures, spasticity, sleep) are widely used (Sarret et al. 2020; Refetoff & Dumitrescu 2007; Van Geest et al. 2021). Evidence is largely anecdotal; systematic PRO-based evaluation is lacking.

Patient survey

Cohort**:** 21 male patients with SLC16A2 mutation; median age 6.1 years (22 months–12 years). 75% had severe, 25% mild variants. All showed severe developmental delay; few achieved

basic motor skills (e.g. 17% head control, 8% walking). None could speak.

Therapy goals:

- Quality of life: better sleep (4.06), more enjoyment (3.94), fewer hospital stays (3.43), reduced environmental sensitivity (3.44)
- Gross motor function: better body control (3.90), progress in sitting/walking (3.85)
- Gastrointestinal health: less constipation/diarrhoea (3.53), less painful burping (3.21)
- Cognition: mental development (3.57)
- Immune stability: fewer infections (3.28)

Therapy goals are presented on Fig. 1 below.

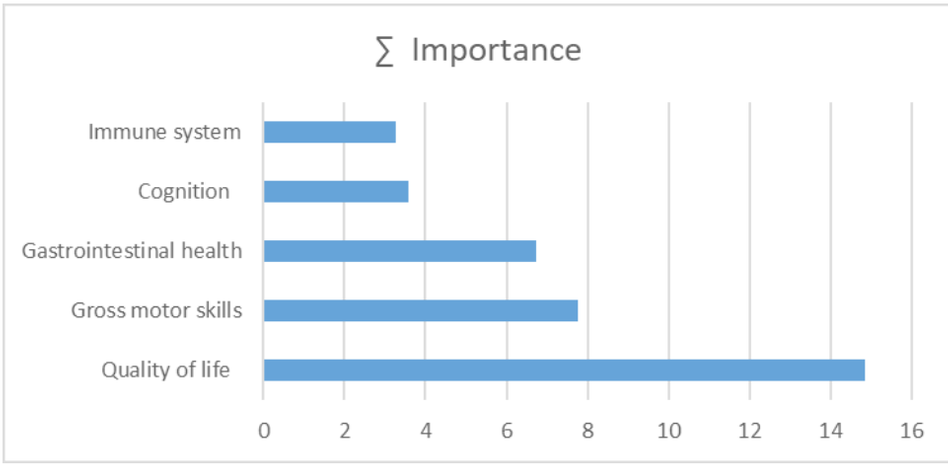

Fig. 1. Patient-relevant therapeutic goals ranked by aggregated importance (scale 1–5)

Satisfaction:

Scores were moderate (scale 1–5), mostly 2.1–2.6. Largest gaps between importance and satisfaction were in motor development and GI health; sleep improvement also lagged behind expectations. Figure 2 below compares therapy areas and therapy satisfaction.

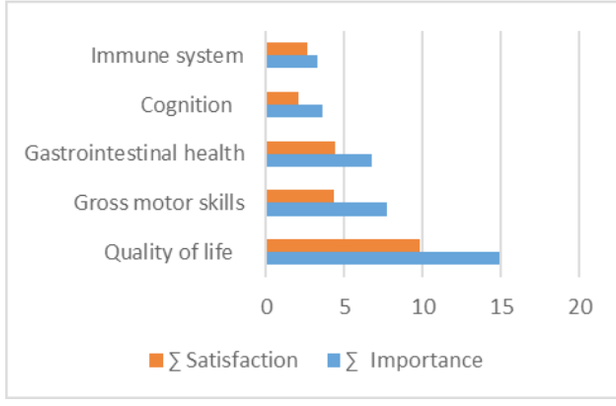

Fig. 2. Patient-relevant therapy areas and therapy satisfaction

DISCUSSION

The results underline the need for symptom-oriented, interdisciplinary care for MCT8 deficiency that is consistently oriented towards patient-relevant objectives (PROs). The parental prioritization of quality of life, motor development, gastrointestinal health and cognitive development makes it clear that existing treatment strategies have so far only inadequately addressed these needs. While individual treatment approaches such as TRIAC for peripheral thyrotoxicosis or physiotherapeutic measures can show selective effects, there is an overall lack of standardized, systematically evaluated treatment options.

The results of the systematic literature search make it clear that patient-relevant endpoints

such as pain reduction, quality of life or development have hardly been considered in the studies published to date. The focus was predominantly on biochemical parameters. There was no systematic PRO-based evaluation of the suitability for everyday use and effect of the therapies. This gap makes patient-centered therapy development more difficult, as affected children are unable to provide information on subjectively experienced therapy goals due to their pronounced communication and developmental disorders. The parents‘ perspectives as primary caregivers therefore provide an indispensable supplement to the pure evaluation of clinical parameters.

Although supportive measures such as mobility and communication aids, specific nutritional therapies or symptomatic medication are used in practice, they often remain unstructured and without evidence-based validation. A more PRO-oriented evaluation of such interventions is necessary. Digital information systems can help to record and evaluate relevant findings from practice and research across all sectors and make them accessible to all stakeholders. In the context of rare diseases in particular, ethically sound research that guarantees transparency, participation and the involvement of those affected is also required. Taking their perspectives into account is not only methodologically sensible, but also ethically necessary in order to further develop the care situation in a fair and needs-based manner.

CONCLUSION

The results of this study underline the high relevance of a symptom-oriented, interdisciplinary therapeutic approach to MCT8 deficiency, which is consistently oriented towards the goals prioritized by patient representatives (PROs). The data collected show that quality of life, motor development, alleviation of gastrointestinal complaints and cognitive support are at the center of parental therapy expectations. Although some therapeutic measures – such as TRIAC for peripheral thyrotoxicosis or physiotherapy to promote mobility – show positive effects in individual cases, it is clear that the existing therapy options do not yet adequately cover the complex and multiple needs of people with MCT8 deficiency.

The role of communication processes and information systems is playing an increasingly central role here: structured digital information systems are crucial, particularly in the case of a rare disease such as MCT8 deficiency, with sufferers spread around the world, multiple specialist disciplines involved and limited clinical data. They enable patient knowledge to be systematically recorded, treatment data to be aggregated and evaluated on a multicenter basis and research findings to be efficiently passed on. The use of interoperable IS solutions can significantly improve the standardized collection of PROs, their analysis and the targeted exchange between science, practice and self-help organizations. Consistent integration of PROs into such systems also offers the opportunity to bring clinical research and care closer to the real needs of those affected. In order to meet the complex challenges of rare diseases such as MCT8 deficiency, future therapy and care concepts must not only be evidence-based, but also ethically reflected. The active involvement of those affected and their relatives is key to making research participatory, transparent and fair.

Particularly in the context of rare diseases, it is essential in the digital age to design communication processes as bidirectional knowledge flows. The systematic involvement of patient representatives – for example through targeted surveys – makes a decisive contribution to aligning evidence-based research and clinical care with real needs and thus improving them in the long term.

Acknowledgements: The author would like to thank all the patients, caregivers, and investigators involved in research into MCT8 deficiency. This study was supported by an investigator-initiated research grant from Rare Thyroid Therapeutics International AB. The sponsor had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

REFERENCES

ALLAN, W.; HERNDON, C. N.; DUDLEY, 1944. Some examples of the inheritance of mental deficiency: apparently sex-linked idiocy and microcephaly. *American Journal of Mental Deficiency,* 48325–334.

DUMITRESCU, A. M.; LIAO, X.-H.; BEST, T. B.; BROCKMANN, K; REFETOFF, S., 2004. A Novel Syndrome Combining Thyroid and Neurological Abnormalities Is Associated with Mutations in a Monocarboxylate Transporter Gene. *The American Journal of Human Genetics*, 74(1), pp. 168–175, https://doi.org/10.1086/380999
EMA, 2025. *Emcitate – European Commission decision*, April 20, 2025, https://www.ema.europa.eu/en/medicines/human/EPAR/emcitate
FRIESEMA, E. C.; GRUETERS, A.; BIEBERMANN, H.; KRUDE, H.; VON MOERS, A.; REESER, M.; BARRETT, T. G.; MANCILLA, E. E.; SVENSSON, J.; KESTER, M. H.; KUIPER, G. G.; BALKASSMI, S.; UITTERLINDEN, A. G.; KOEHRLE, J.; RODIEN, P.; HALESTRAP, A. P.; VISSER, T. J., 2004. Association between mutations in a thyroid hormone transporter and severe X-linked psychomotor retardation. *The Lancet*, 364(9443), pp. 1435–1437, https://doi.org/10.1016/s0140-6736(04)17226-7
GAZEK, N.; FELLER, A. L.; VAIANI, E.; DI PALMA, I.; SAVRANSKY, A.; RAMÍREZ, P.; MARINO, R.; GARRIDO, N. P.; LAZZATI, J. M.; HERZOVICH, V.; DUJOVNE, N., 2023. Treatment with TRIAC in pediatric patients with MCT8. *Archivos Argentinos De Pediatria*, 121(6), https://doi.org/10.5546/aap.2022-02968.eng
GELINAS, U. J.; DULL, R. B., 2008, *Accounting Information Systems*.
GROENEWEG, S.; PEETERS, R. P.; MORAN, C.; STOUPA, A.; AURIOL, F.; TONDUTI, D.; DICA, A.; PAONE, L.; ROZENKOVA, K.; MALIKOVA, J.; VAN DER WALT, A.; DE COO, I. F. M.; MCGOWAN, A.; LYONS, G.; AARSEN, F. K.; BARCA, D.; VAN BEYNUM, I. M.; VAN DER KNOOP, M. M.; JANSEN, J.; MANSHANDE, M.; LUNSING, R. J.; NOWAK, S.; UIL, C. A. D.; ZILLIKENS, M. C.; VISSER, F. E.; VRIJMOETH, P.; DE WIT, M. C. Y.; WOLF, N. I.; ZANDSTRA, A.; AMBEGAONKAR, G.; SINGH, Y.; DE RIJKE, Y. B.; MEDICI, M.; BERTINI, E. S.; DEPOORTER, S.; LEBL, J.; CAPPA, M.; DE MEIRLEIR, L.; KRUDE, H.; CRAIU, D.; ZIBORDI, F.; PETIT, I. O.; POLAK, M.; CHATTERJEE, K.; VISSER, T. J.; VISSER, W. E., 2019. Effectiveness and safety of the tri-iodothyronine analogue Triac in children and adults with MCT8 deficiency: an international, single-arm, open-label, phase 2 trial. *The Lancet Diabetes & Endocrinology*, 7(9), pp. 695–706, https://doi.org/10.1016/s2213-8587(19)30155-x
GROENEWEG, S.; VAN GEEST, F. S.; ABACI, A.; ALCANTUD, A.; AMBEGAONKAR, G. P.; ARMOUR, C. M.; BAKHTIANI, P.; BARCA, D.; BERTINI, E. S.; VAN BEYNUM, I. M.; BRUNETTI-PIERRI, N.; BUGIANI, M.; CAPPA, M.; CAPPUCCIO, G.; CASTELLOTTI, B.; CASTIGLIONI, C.; CHATTERJEE, K.; DE COO, I. F. M.; COUTANT, R.; CRAIU, D.; CROCK, P.; DEGOEDE, C.; DEMIR, K.; DICA, A.; DIMITRI, P.; DOLCETTA-CAPUZZO, A.; DREMMEN, M. H. G.; DUBEY, R.; ENDERLI, A.; FAIRCHILD, J.; GALLICHAN, J.; GEORGE, B.; GEVERS, E. F.; HACKENBERG, A.; HALÁSZ, Z.; HEINRICH, B.; HUYNH, T.; KŁOSOWSKA, A.; VAN DER KNAAP, M. S.; VAN DER KNOOP, M. M.; KONRAD, D.; KOOLEN, D. A.; KRUDE, H.; LAWSON-YUEN, A.; LEBL, J.; LINDER-LUCHT, M.; LOREA, C. F.; LOURENÇO, C. M.; LUNSING, R. J.; LYONS, G.; MALIKOVA, J.; MANCILLA, E. E.; MCGOWAN, A.; MERICQ, V.; LORA, F. M.; MORAN, C.; MÜLLER, K. E.; OLIVER-PETIT, I.; PAONE, L.; PAUL, P. G.; POLAK, M.; PORTA, F.; POSWAR, F. O.; REINAUER, C.; ROZENKOVA, K.; MENEVSE, T. S.; SIMM, P.; SIMON, A.; SINGH, Y.; SPADA, M.; VAN DER SPEK, J.; STALS, M. A. M.; STOUPA, A.; SUBRAMANIAN, G. M.; TONDUTI, D.; TURAN, S.; UIL, C. A. D.; VANDERNIET, J.; VAN DER WALT, A.; WÉMEAU, J.-L.; WIERZBA, J.; DE WIT, M.-C.Y.; WOLF, N. I.; WURM, M.; ZIBORDI, F.; ZUNG, A.; ZWAVELING-SOONAWALA, N.; VISSER, W. E., 2020. Disease characteristics of MCT8 deficiency: an international, retrospective, multicentre cohort study. *The Lancet Diabetes & Endocrinology*, 8(7): pp. 594–605, https://doi.org/10.1016/s2213-8587(20)30153-4
MCT8-Forschung e.V. 2019, *MCT8 FORSCHUNG VEREIN*, https://www.mct8-research.com/
NEUBAUER, B. A.; SCHIEBL, D., 2019, *Interview with Prof. Dr. med. Bernd Neubauer and Dominika Schiebl on the topic: MCT8 / AHDS and the objectives of the MCT8 Research Foundation*, January 28, 2024, https://www.mct8-research.com/en/interviews.html.
REFETOFF, S.; DUMITRESCU, A. M., 2007. Syndromes of reduced sensitivity to thyroid hormone: genetic defects in hormone receptors, cell transporters and deiodination. *Best Practice & Research Clinical Endocrinology & Metabolism*, 21(2), pp. 277–305, https://doi.org/10.1016/j.beem.2007.03.005
REFETOFF, S.; PAPPA, T.; WILLIAMS, M. K.; MATHEUS, M. G.; LIAO, X.-H.; HANSEN, K.; NICOL, L.; PIERCE, M.; BLASCO, P. A.; JENSEN, M. W.; BERNAL, J.; WEISS, R. E.; DUMITRESCU, A. M.; LAFRANCHI, S., 2020. Prenatal treatment of thyroid hormone cell membrane transport defect caused by MCT8 gene mutation. *Thyroid*, 31(5), pp. 713–720, https://doi.org/10.1089/thy.2020.0306
REMERAND, G.; BOESPFLUG-TANGUY, O.; TONDUTI, D.; TOURAINE, R.; RODRIGUEZ, D.; CURIE, A.; PERRETON, N.; PORTES, V. D.; SARRET, C., 2019. Expanding the phenotypic spectrum of Allan–Herndon–Dudley syndrome in patients with SLC16A2 mutations. *Developmental Medicine & Child Neurology*, 61(12), pp. 1439–1447, https://doi.org/10.1111/dmcn.14332
SARRET, C.; PETIT, I. O.; TONDUTI, D., 2020. *Allan-Herndon-Dudley Syndrome*, https://www.ncbi.nlm.nih.gov/books/NBK26373/
SCHÜNEMANN, H. J.; REINAP, M., 2023. GRADE: A transparent approach for Evidence-Based recommendations and decisions in health. *Sustainable development goals series*, pp. 541–548, https://doi.org/10.1007/978-3-031-33851-9_84
SCHWARTZ, C., 2017. *Orphanet: Allan Herndon Dudley Syndrom*, January 6, 2024, https://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=DE&Expert=59

SCHWARTZ, C. E.; MAY, M. M.; CARPENTER, N. J.; ROGERS, R. C.; MARTIN, J.; BIALER, M. G.; WARD, J.; SANABRIA, J.; MARSA, S.; LEWIS, J. A.; ECHEVERRI, R.; LUBS, H. A.; VOELLER, K.; SIMENSEN, R. J.; STEVENSON, R. E., 2005. Allan-Herndon-Dudley syndrome and the monocarboxylate Transporter 8 (MCT8) gene. *The American Journal of Human Genetics*, 77(1), pp. 41–53, https://doi.org/10.1086/431313

TONDUTI, D.; VANDERVER, A.; BERARDINELLI, A.; SCHMIDT, J. L.; COLLINS, C. D.; NOVARA, F.; DI GENNI, A.; MITA, A.; TRIULZI, F.; BRUNSTROM-HERNANDEZ, J. E.; ZUFFARDI, O.; BALOTTIN, U.; ORCESI, S., 2012. MCT8 deficiency: extrapyramidal symptoms and delayed myelination as prominent features. *Journal of Child Neurology*, 28(6), pp. 795–800, https://doi.org/10.1177/0883073812450944

ÜNSAL, Y.; HAYRAN, G., 2023. Impact of Early Intervention with Triiodothyroacetic Acid on Peripheral and Neurodevelopmental Findings in a Boy with MCT8 Deficiency. *Journal of Clinical Research in Pediatric Endocrinology*, https://doi.org/10.4274/jcrpe.galenos.2023.2023-10-1

VAN GEEST, F. S; GROENEWEG, S.; VAN DEN AKKER, E. L. T.; BACOS, I.; BARCA, D.; VAN DEN BERG, S. A. A.; BERTINI, E.; BRUNNER, D.; BRUNETTI-PIERRI, N.; CAPPA, M.; CAPPUCCIO, G.; CHATTERJEE, K.; CHESOVER, A. D.; CHRISTIAN, P.; COUTANT, R.; CRAIU, D.; CROCK, P.; DEWEY, C.; DICA, A.; DIMITRI, P.; DUBEY, R.; ENDERLI, A.; FAIRCHILD, J.; GALLICHAN, J.; GARIBALDI, L. R.; GEORGE, B.; HACKENBERG, A.; HEINRICH, B.; HUYNH, T.; KŁOSOWSKA, A.; LAWSON-YUEN, A.; LINDER-LUCHT, M.; LYONS, G.; LORA, F. M.; MORAN, C.; MÜLLER, K. E.; PAONE, L.; PAUL, P. G.; POLAK, M.; PORTA, F.; REINAUER, C.; DE RIJKE, Y. B.; SECKOLD, R.; MENEVŞE, T. S.; SIMM, P.; SIMON, A.; SPADA, M.; STOUPA, A.; SZEIFERT, L.; TONDUTI, D.; VAN TOOR, H.; TURAN, S.; VANDERNIET, J.; DE WAART, M.; VAN DER WAL, R.; VAN DER WALT, A.; VAN WERMESKERKEN, A.-M.; WIERZBA, J.; ZIBORDI, F.; ZUNG, A.; PEETERS, R. P.; VISSER, W. E., 2021. Long-Term efficacy of T3 analogue Triac in children and adults with MCT8 deficiency: a Real-Life Retrospective cohort study. *The Journal of Clinical Endocrinology & Metabolism*, 107(3), pp. e1136–e1147, https://doi.org/10.1210/clinem/dgab750

VERGE, C. F.; KONRAD, D.; COHEN, M.; DI COSMO, C.; DUMITRESCU, A. M.; MARCINKOWSKI, T.; HAMEED, S.; HAMILTON, J.; WEISS, R. E.; REFETOFF, S., 2012. Diiodothyropropionic acid (DITPA) in the treatment of MCT8 deficiency. *The Journal of Clinical Endocrinology & Metabolism*, 97(12), pp. 4515–4523, https://doi.org/10.1210/jc.2012-2556

VISSER, W. E.; VRIJMOETH, P.; VISSER, F. E.; ARTS, W. F. M.; VAN TOOR, H.; VISSER, T. J., 2012. Identification, functional analysis, prevalence and treatment of monocarboxylate transporter 8 (MCT8) mutations in a cohort of adult patients with mental retardation. *Clinical Endocrinology*, 78(2), pp. 310–315, https://doi.org/10.1111/cen.12023

WÉMEAU, J. L.; PIGEYRE, M.; PROUST-LEMOINE, E.; D'HERBOMEZ, M.; GOTTRAND, F.; JANSEN, J.; VISSER, T. J.; LADSOUS, M., 2008. Beneficial Effects of Propylthiouracil plusl-Thyroxine Treatment in a Patient with a Mutation inMCT8. *The Journal of Clinical Endocrinology & Metabolism*, 93(6), pp. 2084–2088, https://doi.org/10.1210/jc.2007-2719

ZUNG, A.; VISSER, T. J.; UITTERLINDEN, A. G.; RIVADENEIRA, F.; FRIESEMA, E. C. H., 2011. A child with a deletion in the monocarboxylate transporter 8 gene: 7-year follow-up and effects of thyroid hormone treatment. *European Journal of Endocrinology*, 165(5), pp. 823–830, https://doi.org/10.1530/eje-11-0358

КОМУНИКАЦИОННИ ПРОЦЕСИ ЗА ОЦЕНКА НА ТЕРАПЕВТИЧНИ СТРАТЕГИИ ПРИ ДЕФИЦИТ НА MCT8: ОРИЕНТИРАНА КЪМ ПАЦИЕНТА ПЕРСПЕКТИВА

Резюме: *Целта на тази статия е да се идентифицират терапевтичните цели, които са от значение за пациентите, в контекста на тежкото рядко заболяване дефицит на MCT8, и да се оцени ефективността на съществуващите подходи за лечение въз основа на клинични и съобщени от пациентите параметри. Чрез систематично проучване на литературата и експлоративно проучване сред 21 международни представители на пациенти бяха определени основните терапевтични цели и удовлетвореността от настоящото състояние на грижите. Качеството на проучването беше анализирано въз основа на критериите GRADE. Качеството на живот, грубата моторика, стомашно-чревното здраве, когнитивното развитие и имунната стабилност бяха определени като приоритетни терапевтични цели. Най-често споменаваното желание беше за по-добър сън. Удовлетвореността от настоящите терапии беше умерена във всички области. Резултатите подчертават необходимостта от систематично интегриране на целите, които са важни за пациентите, особено качеството на живот, в клиничните изследвания на дефицит на MCT8 и грижите за пациентите. За бъдещи проучвания се препоръчват разработването и прилагането на стандартизирани инструменти за измерване на резултатите, докладвани от пациентите (PRO), с цел подобряване на грижите за засегнатите лица.*

Ключови думи: *дефицит на MCT8; рядко заболяване; значими за пациента резултати; комуникационни процеси*

Доминика Шийбл, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: dominika@schiebl.net

ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ
PUBLIC COMMUNICATIONS AND INFORMATION SCIENCES

THE CHALLENGE OF CHANGE PROCESSES IN ORGANISATIONS: HOW CAN LEADERS CONTRIBUTE TO SUCCESSFUL IMPLEMENTATION?

Judith Marx
University of Library Studies and Information Technologies
https://doi.org/10.70300/GHMR9271

Abstract: *Organisations are forced to continuously adapt to their organisational environment, which regularly takes place within the framework of change processes. Leaders play a key role in this process. The article is based on a literature review of books, journals and online articles and refers to a study on this topic. It examines the terminology used in change management and three existing scientific models on this topic. The focus is on the willingness to change and the emotional component of the people affected by change. It explores in depth the question of why announcements of planned changes by leaders often trigger negative feelings and, as a result, resistance among employees. Therefore, the psychological mechanisms associated with change are analysed and the role of leaders in dealing constructively with the psychological thought and behaviour patterns of their employees is examined. It can be concluded that change management can only be successful if employees are allowed to express their fears, concerns and reservations to their leaders and these are taken into account.*
Keywords: *organizations; change management; leadership; emotions; resistance*

INTRODUCTION

The current decade has been marked by some radical changes and upheavals: the COVID-19 pandemic is a key event in this regard, bringing about fundamental changes for people within an extremely short period of time (Held/Geißler 2020, p. 22). This has also led to serious disruptions for people in their roles as employees and leaders (Bruch/Berenbold 2020, p. 44). In view of today's VUCA world, which is characterised by rapid change (Glatz/Graf-Götz 2018, pp. 101–104; Mattes 2022), effective change management is more important than ever (hr works 2025). This makes it all the more alarming that only 4% of those surveyed in the Change Fitness Study 2020/2021 currently rate their organisation as 'change-fit' (Mutaree 2022). The fact that, according to this study, around three quarters of all change projects fail also confirms the need for change capability in organisations (hr works 2025).

In order for changes to be successfully implemented and sustained, leaders in particular must gain a theoretical awareness of these important organisational processes. In doing so, it is important to attach great importance to the psychological dimensions of change processes.

RESEARCH METHODOLOGY

This publication is based on a literature review that first deals with terminology related to change management and classifies it according to its historical development. It then analyses and distinguishes between existing models of change management. Based on this analysis, the psychological dimensions relevant to change processes are identified and the role of leaders in dealing with these dimensions appropriately is examined. This literature review includes books, journals, online articles and a study on the topic of change management.

RESULTS

Terminology: Organisational development, change management and transformation management

Even though the term change management is used today as an umbrella term for all change processes, from a chronological perspective, organisational development should be mentioned first.

The term organisational development, which originated in the 1970s, is based on a humanistic

view of humanity: People were no longer seen as merely subordinate parts of work or production processes, but rather as essential resources that contribute significantly to the success or failure of such processes. The idea behind organisational development was to involve people in the processes of the working world, i.e. organisational development is based on a democratic understanding. In other words, work and its processes should no longer be determined over people's heads, but with their heads (Glatz/Graf-Götz 2018, pp. 304–305, 312–313; Walde 2014, p. 27).

This paradigm shift, which now places people at the centre of work processes, ties in with the humanistic approaches that developed in the late 1950s and early 1960s, which were founded by researchers such as Abraham Harold Maslow, Frederick Herzberg and Clayton P. Alderfer (Bartscher/Nissen 2017, p. 85; Glatz/Graf-Götz 2018, pp. 32–33).

Based on this newly developed view of humanity and self-image, it was essential for the founders of organisational development that people be 'taken along' and involved in change processes so that the respective organisational members could ultimately identify with the decisions made during the change processes (French/Bell 1994; Glatz/Graf-Götz 2018, p. 305).

Since participation plays a major role in organisational development processes and the social needs of people must be harmoniously aligned with the goals of the organisation, these are inevitably long-term processes (Glatz/Graf-Götz 2018, p. 313; Walde 2014, p. 27).

Recognising that organisational development processes require such a long period of time and the resulting desire to shorten or streamline change processes, the concept of change management developed in the 1990s, which – as mentioned at the beginning – now functions as an umbrella term or synonym for all change processes.

In contrast to organisational development, where changes can arise and grow organically in line with the humanistic and idealistic approach, change management processes take a much more objective and goal-oriented approach (Vahs 2003, p. 252; Walde 2014, p. 18).

It is not absolutely necessary for everyone in the organisation to be mentally involved in the change processes; rather, it is sufficient for change management processes if the attitudes and behaviours of certain key individuals, who act as multipliers, change. A key feature of change management processes is their top-down orientation (Glatz/Graf-Götz 2018, p. 312; Walde 2014, p. 20–21).

The term transformation management, which emerged in 2010, aims to combine the aforementioned problem-solving capabilities of change management with development-oriented and systemic approaches. A key feature here is radical change that goes to the root of the problem (Glatz/Graf-Götz 2018, pp. 313–314; Scharmer 2016).

Furthermore, transformation management anticipates potential future crises and prepares in advance for impending imbalances so that, when the unfavourable situation actually arises, the organisation is more resilient and therefore better able to respond. Unlike change management processes, the organisation no longer reacts exclusively to disharmonious situations, but acts in advance, thus moving from a previously passive or wait-and-see role to an active role. Transformation management involves strong participatory elements and initiates learning and reflection processes that raise the level of awareness of those involved (Glatz/Graf-Götz 2018, pp. 313–314).

In summary, it can be said that all three terms relating to change management still exist, although, as explained above, they originated in different historical eras or movements and therefore have different focuses.

Kurt Lewin's model of change

To ensure that change processes can proceed in a meaningful and orderly manner, models have been created that can be used to describe and systematise the respective phases.

Kurt Lewin is considered the 'founding father of organisational development' (Glatz/Graf-Götz 2018, p. 302) and, in the 1940s, created a model within the framework of pioneering theory (Walde 2014, p. 14) that describes change in three phases. These are: unfreezing, moving and freezing (Glatz/Graf-Götz 2018, p. 302).

In the first phase of unfreezing, it is first established that the existing situation no longer meets people's expectations. This means that an awareness of change is created and it is clear that the sta-

tus quo should be abolished or changed. In line with the English term unfreezing, the current equilibrium must be "thawed". The aim here is to pool and mobilise the forces of those who recognise the need for change. The habits and behaviours that exist at this point are now being questioned.

After this initial phase comes the moving phase. As the term implies, this phase is about the people involved gradually moving towards a new equilibrium. This is a kind of 'trial phase' in which new behaviours are tested and various solutions are tried out in smaller projects. Lewin pursues the humane goal of involving those affected in the planning process through conversations, analyses and discussions and, if necessary, providing them with psychological support. With these newly implemented and practised behaviours, steps are now taken to achieve the new equilibrium. In other words, the changes are implemented and the previous status quo is abandoned.

The final phase is freezing, i.e. the new equilibrium is "frozen". As this metaphorical image suggests, the aim now is to stabilise the changes implemented in the second phase and thus make them a permanent part of the organisation. In other words, this phase is intended to guarantee the long-term nature of the changes that have been made, so that old and familiar behaviour patterns are not fallen back into, which would undo the success of the changes that have been made. The aim here is to sustainably implement and establish the new behaviour from the moving phase (Glatz/Graf-Götz 2018, pp. 302–303; Lewin 1947, Walde 2014, pp. 65–67).

The model developed by Lewin is of a rather trivial nature, used to illustrate social changes in organisations and societies. Incidentally, it assumes that the process of change within a group is much more efficient than when only a single individual is involved, due to group dynamics (Walde 2014, p. 22–23). By dividing the process into just three phases, the model is quite clear and easy to apply; however, it seems less suitable for more complex change processes, such as those involved in transformation management.

John Kotter's model of the change process

Building on the model described above, John Kotter created his 8-step model of organisational change, in which he further differentiated the three phases of Kurt Lewin's model. According to Kotter, it is essential for the success of change that all eight steps are intensively followed in the order specified (Kotter 1996, pp. 23–24).

First of all, it should be noted that the first three phases of Kotter's model correspond to the first phase of Lewin's model, unfreezing. The next three phases correspond to the second phase of Lewin's model, moving, and the last two phases correspond to the third phase of Lewin's model, freezing.

In the following description, the eight phases of Kotter's model are subdivided into three different phases in accordance with the previously described phases of Lewin's model, which form the headings for the following three and two phases, respectively.

Phase 1: Creating a climate for change

Kotter believes it is necessary to create a sense of urgency and importance in the first phase. This means that, in addition to objectively highlighting the problem or the reason why the company needs to change, people must also be addressed on an emotional level, which Kotter believes is essential in order to motivate them to take action.

The second phase is about building a powerful (leadership) coalition. This is based on Kotter's idea that individuals alone are weak and that the probability of achieving change is significantly higher when several people are involved.

According to Kotter, the third phase is about creating a vision, i.e. a picture of what the future role of a company should look like. This vision should be developed jointly by the people involved in the change process and the organisation's management. For Kotter, creating a vision is essential in order to motivate people to embrace change and give them a perspective on what the future holds for them and the organisation (Kotter 1996, pp. 35–83).

Phase 2: Inspire and empower the organisation

In the fourth phase, the vision created in phase three must now be communicated to the people. This means that everyone in the organisation should know where the change is heading, why it is being made and – very importantly – what the members of the organisation will ultimately

gain from it. It is therefore necessary to communicate the benefits that the change will bring to the organisation.

The fifth phase is about empowering the broad base for change, i.e. giving it strength and making it powerful. This means that the framework conditions must now be created to actually implement the change.

The sixth phase is about making the initial successes that have been achieved so far visible, i.e. highlighting the so-called quick wins: After a certain period of time, the members of the organisation should see that progress has been made and that the work done so far is paying off, so that this has a positive effect on their motivation for further work. The successes can be made visible, for example, through communication platforms or homepages (Kotter 1996, p. 85–130).

Phase 3: Implementing and maintaining changes

In the seventh phase, the measures that have been adopted are now to be implemented. This is done by publishing the new requirements in a manner that is binding for everyone. This could be, for example, a new internal agreement that has been developed and is now published via email or on the organisation's intranet. It should be clear to everyone that the new requirements or regulations are now in force.

The eighth and final phase is about ensuring that the new measures are firmly established. In line with the final phase of freezing in Lewin's model, the aim is to ensure that what has been newly created remains in place and is firmly established in the organisation (Kotter 1996, pp. 131–158).

The model of 'transformation from within' according to Janes et al.

The first phase of this model involves clarifying why and how a transformation is necessary in the first place, i.e. identifying the need for transformation and pinpointing problems. To this end, interviews are conducted with the organisation's employees and leaders. It is important that all situations and perspectives of the people in the organisation are taken into account so that a comprehensive insight into the mental and emotional views of the people affected is guaranteed. The need for change is then derived from this.

The top priority in this model is therefore that all those involved work together and that no individual perspectives are left out. According to Janes et al., it is completely unrealistic to suggest a single reason or cause for an action as the basis for change projects. Rather, it is necessary for all individuals to be able to identify with the transformation and thus feel committed to its success (Janes et al. 2001, p. 16, 61–71).

The first phase of the 'transformation from within' corresponds to the first phase of Kotter's model described above, in which a sense of urgency is created.

The second phase of the model is about establishing a clear vision, i.e. a desired image of the future. It is therefore a matter of the organisation answering the question of what a future target state should look like. For the transformation, goals and criteria for success are identified, to which the members should commit themselves. The transformation project is mapped out in various sub-projects and a project organisation. This shows that greater importance is attached to the topic of project organisation (Janes et al. 2001, pp. 71–79). The degree of openness/closedness of the processes should also be agreed upon in this phase (Janes et al. 2001, p. 16).

The second phase is comparable to phases three and four of Kotter's model, in which he also deals with the vision that needs to be developed and communicated.

In the third phase, the transformation projects created previously are implemented. For a successful transformation, it is important that the project teams are constantly adapted and reviewed. The responsibilities between the different actors are divided accordingly. During the implementation of the transformation in this phase, it is important that the transformation process is continuously evaluated for its effectiveness. This gives the organisation the opportunity to intervene and take appropriate countermeasures at any time if developments arise that run counter to the goals and vision (Janes et al. 2001, p. 79 – 117).

This phase is comparable to the second phase in Kotter's model, in which a (leadership) coalition is formed.

The fourth phase deals with the changes that are initiated through projects. This phase is about

anchoring the changes that have been made in the organisation for the long term, i.e. ensuring that they are implemented permanently. It is also important that the consultants participate actively and do not withdraw, which Janes et al. consider to be very fundamental. In this phase, particular attention should be paid to resistance, which should be addressed in dialogue. The aim here is not simply to resolve resistance, but rather to use it as an opportunity to incorporate critical considerations into the changes (Janes et al. 2001, pp. 117–130).

This fourth phase is comparable to phases five, six and seven of Kotter's model, in which implementation in line with the vision takes place, successes are communicated and developments are built upon.

The fifth and final phase of the 'transformation from within' involves a comprehensive evaluation of the transformation itself: the results and effects of the transformation are identified and the outcomes achieved are evaluated. It is important that this final phase also defines follow-up projects that build organically on the changes already made and preserves the newly acquired knowledge. In addition, the changes achieved and the success achieved so far should be built upon (Janes et al. 2001, pp. 130–143).

This phase is congruent with the eighth phase of Kotter's model, in which the sustainability of change is postulated.

Comparative overview of Kotter's model and the model developed by Janes et al.

First of all, it should be noted that the model of 'transformation from within' described above is not based on Kotter's model and does not follow the same chronological sequence of phases. Rather, Kotter's basic ideas are very clearly reflected in the model developed by Janes et al. As described above, Kotter's model focuses heavily on the emotional level: he calls on those involved in change processes to create a sense of urgency and to empower employees on a broad basis to participate in the implementation of change. Kotter's call is based on the view that change can only be successfully implemented if people are not only addressed cognitively, but if change processes are also emotionally grounded. He therefore links these two areas – the cognitive and emotional levels – in order to achieve the greatest possible mobilisation of the people involved in change processes.

Kotters' fundamental idea that people need to understand and also grasp emotionally why the transformation should take place is retained in the model developed by Janes et al., meaning that addressing the emotional level is common to both models. The difference in the 'transformation from within' model, however, is that it takes the perspective of management consulting; the authors are also external consultants (Janes et al. 2001, p. XIII) who accompany the transformation process in this capacity. This position results in a different perspective than is the case with Kotter's model.

The psychological dimension of change processes and the role of the leader

'Change is what people fear most' (Stuttgarter Zeitung 2012) – this quote from Russian writer Fyodor Dostoyevsky aptly describes how humans are, on the one hand, naturally averse to change and, on the other hand, often very fearful of change. In this respect, this observation corresponds with the deficits identified in the Change Fitness Study 2020/2021 with regard to the implementation of change processes and provides insight into the reasons for this (Mutaree 2022).

As an outward sign of these basic psychological attitudes, leaders in particular are inevitably confronted with people's resistance to change of any kind during change processes. To make matters worse, the reasons for and necessity of change processes are often not communicated clearly and in a way that is relevant to the target audience. Managed employees then only perceive that something is supposed to change for them, but they are often uncertain about what this change will ultimately mean for them. The announced change triggers the fear described in the above quote, as those affected assume, in a kind of pessimistic attitude, that the desired change will be to their disadvantage. In other situations, however, it can be observed that although the people affected have understood what the goal of the change is, they harbour a certain mistrust of these change plans because they do not know whether their leader is actually telling them the truth or whether this is a whitewashing of what is actually a negative consequence for them (Glatz/Graf-Götz 2018, pp. 292–293).

This resistance to organisational change can manifest itself in the form of vague rejection, barely comprehensible concerns or, for example, employees withdrawing from their leaders or displaying demonstratively passive behaviour towards them (Doppler/Lauterburg 2002, p. 323).

There is consensus in the literature and academia that resistance to change processes is always present. Of course, it must be taken into account that the intensity and severity of the resistance described may vary greatly from person to person. Not everyone reacts to change with the same defensive attitude as everyone else. The experiences of the individuals concerned certainly also play a role in the pessimistic attitude described above. If an employee has had negative experiences in the past with communication and the implementation of change processes, these are likely to shape their future attitude. Based on this experience, resistance to new announcements of change would certainly be greater in a person who has already had negative experiences than in someone who has not yet had such experiences.

The fact that change generally causes resistance and that not every member of an organisation supports these changes from the outset is evident from the fact that roles within an organisation are very heterogeneous and that hierarchies are understood to be an essential structural feature (Kühl 2020, p. 8). This in turn means that members of organisations have very different expectations, as expressed in the following statement:

'Simply because organisational members are in contact with different segments of the environment and occupy different positions within the organisation, they develop different, often conflicting perspectives' (Kühl 2020, p. 128).

When implementing change processes, it is therefore necessary for leaders to develop an awareness that people can develop varying degrees of resistance. Leaders must take this into account and integrate it into the planning of change processes from the outset (Walde 2014, p. 33).

The following sentence clearly illustrates that simply ignoring resistance or responding to it with repressive behaviour is unlikely to be successful:

'If it is not possible to identify the causes of resistance or respond to them appropriately, in particular by involving those who are resisting, the project is doomed to failure' (Walde 2014, p. 33).

In other words, according to the physical principle that pressure causes counterpressure, such pressure exerted by leaders on employees also results in them resisting even more and attempting to boycott and sabotage the change processes imposed on them. That means, such a repressive and ignorant approach to the resistance of the employees being managed creates a negative reciprocity in such a way that the existing resistance is further intensified and is used exclusively for further oppositional action and not – as actually desired by the leader – for constructive cooperation in the very processes that have been initiated.

Emotions often form the basis of this resistance. These can be rooted in the personality of those affected, for example because they have an anxious basic structure and therefore view all changes with great scepticism and defensiveness, or because they have already had negative experiences with change processes in the past.

With the first stage in Kotter's model, which creates a sense of urgency and importance, leaders can therefore address precisely this emotional level and give those affected by change processes the opportunity to deal with their own feelings and to articulate them. It is therefore legitimate and even expressly desirable to verbalise concerns and controversial views and not to 'silence' or taboo them, as expressed in the following sentence: 'Whenever smart and well-intentioned people avoid confronting obstacles, they disempower employees and undermine change' (Kotter 1996, p. 11). According to Kotter, employees are weakened and the chances of change are undermined if leaders – with good intentions – avoid confronting obstacles, i.e. resistance.

For such an open approach to resistance, Kotter also considers it essential that leaders practise honest and credible communication in order to reach people on a mental and emotional level (Kotter 1996, p. 9).

The failure of change management processes is not seen as being caused by resistance or as the original problem, but rather by feelings or, more precisely, by a failure to take them into account (Janes et al. 2001, p. 14).

CONCLUSION

In summary, it can be said that change processes are subject to a structural sequence that takes place in the stages and phases described in the models presented by Lewin, Kotter and Janes et al. It should be noted that it is essential for leaders to address the emotional level in change processes in order to achieve a willingness to change among employees. It is also important that employees are given an idea of what the future will look like for them after the change has been implemented, i.e. that they are presented with a vision that motivates them. From a psychological point of view, it is also essential that leaders take all feelings associated with change processes, particularly those expressed as worries or fears, seriously and respond to them in a way that resonates with their employees. Only if these negative emotions are taken into account by leaders from the outset is it possible to minimise or even eliminate resistance to change. Successful change management can ultimately be achieved if the changes initiated in line with the models developed by Lewin, Kotter and Janes et al. are implemented permanently and thus sustainably anchored in the organisational unit of the respective leader.

REFERENCES

BARTSCHER, Th.; NISSEN, R., 2017. *Personalmanagement: Grundlagen, Handlungsfelder, Praxis*. 2. Auflage. Hallbergmoos: Pearson Deutschland GmbH.

BRUCH, H.; BERENBOLD, S., 2020. New work, jetzt! Neun Schritte für eine echte Transformation. *Personalmagazin*, vol. 22, no. 10, pp. 44–47.

DOPPLER, K.; LAUTERBURG, Ch., 2002. *Change management: Den Unternehmenswandel gestalten*. 10. Auflage. Frankfurt am Main: Campus.

FRENCH, W. L.; BELL, C. H., 1994. *Organisationsentwicklung*. 4. Auflage. Stuttgart: UTB.

GLATZ, H.; GRAF-GÖTZ, F., 2018. *Handbuch Organisation gestalten: Für Praktiker aus Profit- und Non-Profit-Unternehmen, Trainer und Berater*. 3. Auflage. Weinheim; Basel: Beltz.

HELD, F.; GEISSLER, J., 2020. Zeit für Reflexion: Veränderungsimpulse jenseits von Routinen. *Organisationsentwicklung*, vol. 39, no. 3, pp. 21–28.

HR WORKS, 2025. *Definition und Methoden change management*. [viewed 30 October 2025]. Available from: https://www.hrworks.de/lexikon/change-management/

JANES, A.; PRAMMER, K.; SCHULTE-DERNE, M., 2001. *Transformations-Management: Organisationen von innen verändern*. Wien: Springer.

KOTTER, J. P., 1996. *Leading change*. Boston: Harvard Business School Press.

KÜHL, S., 2020. *Organisationen: Eine sehr kurze Einführung*. 2. Auflage. Wiesbaden: Springer VS.

LEWIN, K., 1947. Frontiers in group dynamics I: Concept, method and reality in social science, social equilibria and social change. *Human Relations*, vol. 1, no. 1, pp. 5–41.

MATTES, R. M., 2022. *Gesunde Führung in der VUCA-Welt: Leadership in Transformation*. 2. Auflage. Freiburg: Haufe.

MUTAREE, 2022. *Change-Fitness-Studie 2020/2021*. [viewed 30 October 2025]. Available from: https://mutaree.com/services/change-fitness-studie-2020-2021/

SCHARMER, C. O., 2016. *Theory U: Leading from the future as it emerges*. 2nd ed. Oakland: Berrett-Koehler.

STUTTGARTER ZEITUNG, 2012. *Change communication: Wie sag ich's den Mitarbeitern?* [viewed 30 October 2025]. Available from: https://www.stuttgarter-zeitung.de/inhalt.change-communication-wie-sag-ich-s-den-mitarbeitern.fc30f898-8a76-47cd-8e52-e9f62851092d.html

VAHS, D., 2003. *Organisation: Einführung in die Organisationstheorie und -praxis*. 4. Auflage. Stuttgart: Schäffer-Poeschel.

WALDE, A., 2014. *Von der Organisationsentwicklung zum change management*. Hamburg: Igel Verlag.

ПРЕДИЗВИКАТЕЛСТВОТО НА ПРОЦЕСИТЕ НА ПРОМЯНА В ОРГАНИЗАЦИИТЕ: КАК МОГАТ ЛИДЕРИТЕ ДА ДОПРИНЕСАТ ЗА УСПЕШНОТО ИМ ПРИЛАГАНЕ?

Резюме: *Организациите са принудени да се адаптират непрекъснато към своята организационна среда, което редовно се случва в рамките на процесите на промяна. Лидерите играят ключова роля в този процес. Статията се основава на преглед на литературата от книги, списания и онлайн статии и се позовава на проучване по тази тема. Тя разглежда терминологията, използвана в управлението на промените, и три съществуващи научни модела по тази тема. Акцентът*

е върху готовността за промяна и емоционалния елемент на хората, засегнати от промяната. Тя разглежда в дълбочина въпроса защо обявяването на планирани промени от лидерите често предизвиква негативни чувства и в резултат на това – съпротива сред служителите. Затова се анализират психологическите механизми, свързани с промяната, и се разглежда ролята на лидерите в конструктивното справяне с психологическите модели на мислене и поведение на техните служители. Може да се заключи, че управлението на промяната може да бъде успешно само ако на служителите се даде възможност да изразят своите страхове, опасения и резерви пред своите лидери, и те бъдат взети под внимание.
Ключови думи: *организации; управление на промените; лидерство; емоции; съпротива*

Юдит Маркс, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: judithma@web.de

ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ
PUBLIC COMMUNICATIONS AND INFORMATION SCIENCES

DIGITAL HEALTH COMMUNICATION AND HEALTH LITERACY: THEORETICAL MODELS AND INTEGRATIVE CONSIDERATIONS

Nadine Zacharias
University of Library Studies and Information Technologies
https://doi.org/10.70300/IFND2608

Abstract: *Digital media have become a central component of health communication. They influence users' information behavior and offer new opportunities to increase health literacy. At the same time risks arise, including misinformation and growing inequalities in access to health information. This publication presents theoretical models that explain user behavior in digital health contexts and highlight their limitations. The focus is on the Health Belief Model (HBM), the Theory of Planned Behavior (TPB) and the concept of the digital divide. While HBM and TPB analyse individual perceptions, attitudes and intentions, the digital divide addresses structural barriers. Recent research shows that digital health communication must also consider ethical, technological and trust-related dimensions. The rise of algorithmically mediated environments has introduced new challenges regarding transparency, fairness and accountability (Stark et al. 2023; World Health Organization 2023). These developments have led to the notion of an algorithmic health divide, extending traditional understandings of inequality by including disparities in algorithmic literacy and data governance (Okan et al. 2024). Trust and ethical data handling have therefore become key determinants of users' engagement. Combining psychological, structural and ethical perspectives offers a foundation for inclusive, trustworthy and evidence-based digital health communication that strengthens health literacy and equity.*
Keywords: *digital health communication; health literacy; digital health literacy; Health Belief Model; Theory of Planned Behavior*

INTRODUCTION

Digitalization has fundamentally changed health communication. Digital channels increasingly determine how people search for, evaluate and apply health-related information. This development opens up opportunities for low-threshold access and personalized support but also brings challenges: information overload, the viral spread of misinformation and the reinforcement of social inequalities in access to health information (Cinelli et al. 2020; Deursen and Helsper 2015). At the heart of these developments is health literacy, understood as the ability to acquire, understand, critically evaluate and apply information to make decisions (Sørensen et al. 2012). With increasing digitalization, the broader concept of digital health literacy is gaining in importance. This term describes the ability to navigate digital information environments safely and critically (Norman and Skinner 2006). Recent studies indicate that older people and socially disadvantaged groups in particular have low digital health literacy and may therefore be excluded from using digital services (Dratva et al. 2024).

Digitalization has led to the emergence of new communicative environments that are no longer exclusively human-mediated. Automated systems, algorithms and artificial intelligence now play an active role in shaping how health information is filtered, prioritised and displayed. These technologies have introduced an additional layer of complexity: while they can personalise and accelerate access to relevant content, they also raise new ethical questions about transparency, data use and accountability (World Health Organization 2023). Consequently, the issue of trust has become a core determinant of digital health communication, influencing how individuals assess information credibility and decide whether to act upon it (Stark et al. 2023). A theoretical foundation is necessary to better understand these challenges. Classic approaches such as HBM and TPB offer

useful frameworks for explaining individual behavior. They take into account perceptions of risk, attitudes, social norms and perceived behavioral control. Yet these models have traditionally focused on individual cognition and motivation, often overlooking broader structural or ethical contexts. The concept of the digital divide fills this gap by systematically explaining barriers such as lack of access, limited digital skills or low motivation (Van Dijk 2005). Recent scholarship extends this idea toward an algorithmic health divide, which captures new forms of inequality emerging from opaque data-driven systems and differences in algorithmic literacy (Okan et al. 2024).

Comparing these theoretical models and evaluating their relevance for digital health communication should contribute to establishing a coherent research field that connects behavioral, social and ethical perspectives. This is equally important for communication science and public health. By integrating classical behavioral theories with current concepts such as digital trust, algorithmic transparency and participatory design, research can develop a more comprehensive understanding of digital health literacy and its implications for equity and empowerment. Only such an integrative approach can ensure that digital health communication is effective, evidence-based and socially inclusive.

RESEARCH METHODOLOGY

The research methodology applied in this publication is primarily based on a structured literature analysis. The objective was to systematically identify and evaluate theoretical models relevant to digital health communication and to assess their applicability for the promotion of health literacy. The analysis was not limited to a single discipline but deliberately combined perspectives from communication science, public health, psychology and information science in order to capture the multidimensional character of the research problem (Snyder 2019).

A systematic search was conducted in recognized databases such as PubMed, Scopus and Web of Science. In addition, key reports by international organizations were integrated to incorporate policy-relevant insights. Inclusion criteria were peer-reviewed publications that explicitly address theoretical models or digital health literacy. Data were analyzed using a comparative approach. Each study was coded with respect to its theoretical basis, methodological design, target group and reported outcomes. Constructs such as perceived risk, attitudes, usability and structural inequalities were systematically compared across frameworks. To increase reliability, the evaluation followed elements of qualitative synthesis as outlined by Noblit and Hare (1988), while quantitative results from population surveys were integrated descriptively. Quality assurance was ensured by applying established standards. Only studies that reported transparent methods and adhered to recognized ethical guidelines were included. For quality appraisal, checklists such as the Mixed Methods Appraisal Tool (MMAT) were considered where applicable (Hong et al. 2018). This was particularly relevant for studies involving vulnerable groups such as older adults or individuals with low digital literacy.

The results of the literature analysis were synthesized in a way that highlights complementarities and limitations of the different frameworks. By triangulating evidence from theoretical, empirical and policy-related sources, the methodology provides a robust foundation for the integrative perspective proposed in this article.

RESULTS

Context, media logic and individual competence strongly influence the dialogical process of health communication. Health literacy in particular is considered a decisive factor: it describes the ability to identify, understand, critically evaluate and apply health-related information to decision-making (Sørensen et al. 2012). With digitalization, the focus has shifted to digital health literacy. In addition to traditional information processing this also includes the ability to use digital media safely, critically and responsibly (Norman and Skinner 2006).

Recent studies show significant deficits in the population: large sections of the population have only low digital health literacy in Germany, which limits their participation in digital services (Dratva et al. 2024). Similar findings have been reported internationally, with comparative surveys

highlighting substantial gaps between younger, digitally literate groups and older or socioeconomically disadvantaged populations (Levin-Zamir and Bertschi 2018; Dadaczynski et al. 2021). HBM explains health-related behavior based on factors such as susceptibility, severity, perceived benefits, barriers, incentives and self-efficacy (Becker 1974; Rosenstock 1974; Glanz et al. 2015). In the digital context, its significance can be seen, for example in applications or internet portals that support protective behavior by means of personalised risk information and can reduce barriers through targeted communication (Seale et al. 2020). The model has also been applied to the evaluation of digital vaccination reminders and COVID-19 exposure notification systems, where perceptions of susceptibility and severity significantly shaped uptake (Shmueli 2021). TPB explains behavior through intentions that are shaped by attitudes, social norms and perceived control (Ajzen 1991). Its relevance is evident in digital health communication as trust, social pressure and digital literacy have a greater influence on the use of tools than mere technical access (Tomczyk et al. 2021). Recent extensions of TPB further integrate affective attitudes and perceived credibility of digital platforms, showing that misinformation or lack of transparency reduces intention to use eHealth solutions (Çelik 2023). The concept of the digital divide shows that technological innovations remain unevenly distributed and are reflected not only in access but also in skills, usage and outcomes (Van Dijk, 2005; Scheerder et al. 2017).

In the health sector in particular, vulnerable groups such as older people or those with low levels of education are disadvantaged and use digital information less frequently and less critically (Friemel, 2016). More recent scholarship emphasizes the notion of a health data divide, highlighting inequities not only in information access but also in participation in digital health data ecosystems, such as electronic health records and patient portals (Veinot et al. 2018).

The models complement each other. The HBM explains individual risk perception and motivation, the TPB highlights social influences and perceived control. The digital divide reveals structural barriers. An integrative view of these approaches allows both micro psychological determinants (attitudes, intentions, self-efficacy) and macro-structural conditions (access, competence, social inequality) to be taken into account. This establishes a theoretical framework for the practical development of target group-oriented and inclusive digital health communication. In this context, approaches such as the Unified Theory of Acceptance and Use of Technology (UTAUT) and Technology Acceptance Model (TAM) have also proven valuable in explaining adoption behavior, particularly when combined with health-specific frameworks (Venkatesh et al. 2012; Marangunić and Granić 2015).

A comparative analysis of the three theoretical approaches shows that each model has specific strengths, but that only when combined do they provide a comprehensive picture of digital health communication. The HBM is suitable for explaining individual risk perceptions and willingness to act in a digital context. Studies show that digital tools such as vaccination apps or online risk tests are effective when they highlight individual susceptibility and the severity of diseases (Jones et al. 2015; Seale et al. 2020). At the same time, it is clear that perceived barriers such as a lack of trust in data and information security limit their use. The TPB emphasizes the role of social norms and perceived behavioral control. Empirical findings on the use of digital health apps show that acceptance depends less on access and more on trust, social pressure and one's own digital competence (Ajzen and Schmidt, 2020; Tomczyk et al. 2021). The TPB thus explains why certain groups do not use digital health services despite the technical possibilities available. The digital divide approach extends psychological models to include structural dimensions. The analysis shows that differences in access and competence lead to systematic disadvantages for vulnerable groups. These differences have a direct impact on health literacy and can exacerbate health inequalities (Friemel, 2016; Scheerder et al. 2017). The study illustrates that HBM and TPB offer important lessons at the individual level. The impact of digital, complex health communication can only be fully understood when the digital divide is taken into account. In addition, more recent integrative research highlights that intersectional factors such as gender, migration background and regional disparities play an increasingly important role in shaping both access to and use of digital health services (Robinson et al. 2015).

Addressing these factors is essential if digital health strategies are to reduce rather than reinforce inequalities. Beyond these theoretical perspectives, recent research highlights the increasing importance of digital health engagement as a multidimensional construct that bridges psychological, social and structural determinants. Empirical analyses confirm that digital health literacy acts as a mediating variable between socio-economic background and the effective use of eHealth services (Nguyen et al. 2023). In this sense digital competence not only facilitates access but also enhances perceived behavioral control, a central element in the TPB (Ajzen 1991). Studies further show that individuals with higher trust in institutions and stronger perceptions of data transparency demonstrate greater willingness to share health information digitally (Stark et al. 2023). At the same time new conceptual frameworks propose that trust and engagement are dynamic processes rather than stable attributes. The Digital Health Engagement Framework identifies interaction quality, perceived fairness and adaptive feedback mechanisms as crucial drivers of sustainable participation (Baumgart et al. 2023). These findings support the assumption that psychological models such as HBM and TPB must be complemented by feedback-oriented and ethically grounded approaches in order to capture the iterative nature of digital health behavior. Moreover, the results of comparative cross-country surveys reveal growing inequalities in algorithmic health communication. While algorithmic recommendation systems can increase perceived relevance, they also risk reinforcing pre-existing social divides when transparency and user agency are insufficient (Okan et al. 2024; Veinot et al. 2018). The inclusion of algorithmic fairness and explainability as structural dimensions therefore extends the original concept of the digital divide toward what has been termed an algorithmic health divide. This notion integrates questions of accessibility, autonomy and justice into the analysis of digital health communication.

Several studies emphasize that participatory design and co-creation improve both usability and perceived empowerment, especially among older adults or groups with limited digital literacy (Toloza et al. 2024; Bernaerts et al. 2024). Participation thus emerges as a cross-cutting dimension that connects psychological motivation with structural inclusion. These insights demonstrate that effective and equitable digital health communication requires the systematic integration of behavioral, structural and ethical perspectives within one coherent analytical framework.

CONCLUSIONS/DISCUSSION

This analysis has shown that theoretical models make an indispensable contribution to understanding digital health communication. HBM explains how individual risk perception, benefit assessment and self-efficacy influence behavior in digital contexts. TPB supplements this perspective with social norms and perceived behavioral control, which are crucial for the acceptance of digital health applications. Only by considering the concept of the digital divide does it become clear that structural barriers such as lack of access, insufficient skills or lack of motivation can severely limit the use of digital offerings (Ajzen 1991; Sørensen et al., 2012). Only the combination of psychological and structural models enables a realistic assessment of the opportunities and limitations of digital health communication. Individual models are not comprehensive. HBM neglects social norms, TPB neglects structural barriers and the digital divide does not take individuality into account. The extension of these frameworks with additional perspectives further strengthens explanatory power. The incorporation of TAM and UTAUT highlights the importance of usability, effort expectancy and facilitating conditions for the adoption of digital health technologies (Venkatesh et al. 2012; Marangunić and Granić 2015). Intersectional analyses show that factors such as gender, migration background and regional inequalities interact with psychological determinants and structural divides to produce multi-layered barriers (Robinson et al. 2015).

Addressing these complexities requires integrative frameworks that move beyond isolated models and systematically combine behavioral, social and technological dimensions. Such an approach has clear implications for practice and policy. On the one hand, the design of digital offerings must be target group-specific, barrier-sensitive and grounded in evidence-based models. Strategies such as participatory development and co-design with vulnerable groups are essential to foster trust and increase acceptance. On the other hand, policymakers must ensure equitable access

and provide the necessary infrastructure and training programs to reduce digital inequalities. The promotion of digital health literacy, particularly among older adults, socioeconomically disadvantaged groups and those with limited language skills, emerges as a key lever for reducing disparities (Dratva et al. 2024; Levin-Zamir and Bertschi 2018).

For future research, it is necessary to conduct empirical studies that jointly operationalise these models and test them in different population groups. Mixed-methods designs and longitudinal analyses would allow a more comprehensive understanding of how attitudes, norms and digital skills interact with structural conditions over time. Greater attention should be paid to the role of credibility and trust in digital environments, given that misinformation and algorithmic bias significantly affect health behavior (Çelik 2023; Veinot et al. 2018).

Building on these findings, current research underlines that digital trust and ethical governance are now key determinants of sustainable participation in digital health communication. Trust must be understood not as a static construct but as an evolving relationship between users, technologies and institutions (de Camargo Catapan et al. 2025). Its development depends on transparency, data integrity and fairness in algorithmic decision-making. When users perceive a lack of control or are uncertain about how data are used, trust declines sharply, even when usability is high (Stark et al. 2023). Conversely, clear communication about data protection policies and participatory design processes significantly enhances users' confidence and willingness to engage.

Ethical frameworks have become increasingly relevant to address these challenges. The World Health Organization's Guidance on Ethics and Governance of Artificial Intelligence for Health (2023) explicitly calls for principles such as explainability, accountability and human oversight in digital health technologies. Without these safeguards, algorithmic systems risk reinforcing the very social inequalities that digitalization aims to mitigate. Integrating ethical and governance dimensions into existing models (HBM, TPB, TAM) expands their predictive and normative value, linking behavioral motivation with fairness and responsibility (Okan et al. 2024). Another essential dimension is participation. Empirical studies indicate that co-design and participatory research significantly improve user acceptance, perceived empowerment and long-term engagement (Bernaerts et al. 2024; Toloza et al. 2024). Participation thus transforms digital health communication from a one-directional information process into an inclusive dialogue that enhances digital health literacy and equity. Participatory models also operationalise social capital, showing that engagement in digital communities promotes both trust and resilience against misinformation (Baumgart et al. 2023). Recent approaches, such as the Digital Health Engagement Framework and the Digital Health Literacy Maturity Model (Nguyen et al. 2023), highlight the interplay between digital competence, motivation and system design. These models confirm that health literacy mediates between socio-economic position and digital engagement, reinforcing the need for capacity-building interventions at community level. The concept of an algorithmic health divide broadens the understanding of inequality beyond access, focusing on fairness, transparency and the distribution of algorithmic risk (Okan et al. 2024).

These findings underline from a policy perspective that digital inclusion requires more than infrastructure. It must also ensure informational justice and user agency. National digital health strategies should therefore institutionalize trust audits, ethical impact assessments and participatory design guidelines (World Health Organization 2023). Embedding these measures in governance frameworks ensures that digital transformation in health communication aligns with values of fairness, inclusion and accountability. The convergence of behavioral, structural and ethical perspectives points towards a comprehensive integrative model of digital health communication. This model acknowledges that cognitive, social and algorithmic environments co-shape health behavior in digital contexts. By systematically linking user psychology, technology design and governance ethics, such a framework offers a foundation for both research and implementation. It shows that digitalization in healthcare can only reach its full potential when it informs and empowers. Digital health communication must therefore be designed to be trustworthy, inclusive and equitable.

In conclusion the synthesis of behavioral, structural and ethical dimensions demonstrates that digital health communication cannot be understood as a purely technological process or as an in-

dividual act of information seeking. It represents a socially embedded and normatively significant practice that depends on trust, literacy and transparent governance. Strengthening digital health literacy therefore requires not only educational efforts but also systemic measures that promote equitable access, participatory design and institutional accountability. Future frameworks in research and policy should integrate these elements to ensure that digital health transformation contributes to empowerment and health equity rather than reinforcing existing disparities. Sustained interdisciplinary collaboration between communication science, public health and information technology is essential to achieve this goal and to establish digital health communication as a credible, inclusive and ethically grounded field of practice.

REFERENCES

AJZEN, I., 1991. The theory of planned behaviour. *Organizational Behavior and Human Decision Processes*, 50(2), pp. 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

AJZEN, I.; SCHMIDT, P., 2020. Changing behaviour using the Theory of Planned Behaviour. In: HAGGER, M. S. et al. (Eds.). *The Handbook of Behaviour Change*. Cambridge: Cambridge University Press, pp. 17–31. https://doi.org/10.1017/9781108677318.002

BAUMGART, D. C.; KLASCHIK, S.; LEHMANN, C., 2023. The Digital Health Engagement Framework: A user-centred model for sustainable patient interaction. *Journal of Medical Internet Research*, 25, e48233. https://doi.org/10.2196/48233

BECKER, M. H., 1974. The Health Belief Model and sick role behaviour. *Health Education Monographs*, 2(4), pp. 409–419. https://doi.org/10.1177/109019817400200407

BERNAERTS, S.; JONKERS, C.; VERMEULEN, J., 2024. User involvement in digital mental health: approaches, potential and the need for guidelines. *Frontiers in Digital Health*, 6, 1440660. https://doi.org/10.3389/fdgth.2024.1440660

CINELLI, M.; QUATTROCIOCCHI, W.; GALEAZZI, A. et al., 2020. The COVID-19 social media infodemic. *Scientific Reports*, 10, 16598. https://doi.org/10.1038/s41598-020-73510-5

ÇELIK, I., 2023. Exploring the determinants of artificial intelligence (AI) literacy: digital divide, computational thinking, cognitive absorption. *Telematics and Informatics*, 83, 102026. https://doi.org/10.1016/j.tele.2023.102026

DADACZYNSKI, K.; OKAN, O.; MESSER, M.; RATHMANN, K.; VON SEELEN, J., 2021. Digital health literacy and web-based information-seeking behaviors of university students in Germany during the COVID-19 pandemic. *Journal of Medical Internet Research*, 23(1), e24097. https://doi.org/10.2196/24097

DE CAMARGO CATAPAN, S.; RODRIGUES, L. M.; MARTINS, M., 2025. A systematic review of consumers' and healthcare professionals' trust in digital healthcare. *npj Digital Medicine*, 8, p. 115. https://doi.org/10.1038/s41746-025-01510-8

DEURSEN, A. J. A. M.; HELSPER, E. J., 2015. The third level digital divide: who benefits most from being online? *Communication and Information Technologies Annual*. Bingley: Emerald, pp. 29–52. https://doi.org/10.1108/S2050-206020150000010002

DRATVA, J.; SCHAEFFER, D.; ZEEB, H., 2024. Digital health literacy of the population in Germany: current status, concepts and challenges. *Federal Health Gazette – Health Research – Health Protection*, 67(3), pp. 277–284. https://doi.org/10.1007/s00103-024-03841-5

FRIEMEL, T. N., 2016. The digital divide has grown old: determinants of a digital divide among seniors. *New Media & Society*, 18(2), pp. 313–331. https://doi.org/10.1177/1461444814538648

GLANZ, K.; RIMER, B. K.; VISWANATH, K., 2015. *Health Behaviour: Theory, Research, and Practice*. 5th edn. San Francisco: Jossey-Bass.

HONG, Q. N.; FÀBREGUES, S.; BARTLETT, G. et al., 2018. The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for Information*, 34(1), pp. 1–7. https://doi.org/10.3233/EFI-180221

JONES, C. L.; JENSEN, J. D.; SCHERR, C. L. et al., 2015. The Health Belief Model as an explanatory framework in communication research. *Health Communication*, 30(6), pp. 566–576. https://doi.org/10.1080/10410236.2013.873363

LEVIN-ZAMIR, D. and Bertschi, I. (2018) 'Media health literacy, eHealth literacy, and the role of the social environment in context', *International Journal of Environmental Research and Public Health*, 15(8), 1643. https://doi.org/10.3390/ijerph15081643

MARANGUNIĆ, N.; GRANIĆ, A., 2015. Technology acceptance model: a literature review from 1986 to 2013. *Universal Access in the Information Society*, 14(1), pp. 81–95. https://doi.org/10.1007/s10209-014-0348-1

NGUYEN, M. H.; LEE, C.; NGUYEN, K., 2023. Digital health literacy as a mediator of socio-economic inequalities in eHealth use. *BMC Public Health*, 23, 1042. https://doi.org/10.1186/s12889-023-11042-4

NOBLIT, G. W.; HARE, R. D., 1988. *Meta-Ethnography: Synthesizing Qualitative Studies*. Newbury Park, CA: Sage Publications. https://doi.org/10.4135/9781412985000

NORMAN, C. D.; SKINNER, H. A., 2006. eHealth literacy: essential skills for consumer health in a networked world.

Journal of Medical Internet Research, 8(2), e9. https://doi.org/10.2196/jmir.8.2.e9
OKAN, O.; PAIGE, S. R.; ROOTMAN, I., 2024. Health literacy in the digital era: advancing theory, measurement and practice. *Journal of Health Communication*, 29(2), pp. 145–160. https://doi.org/10.1080/10810730.2024.2391073
ROSENSTOCK, I. M., 1974. Historical origins of the Health Belief Model. *Health Education Monographs*, 2(4), pp. 328–335. https://doi.org/10.1177/109019817400200403
ROBINSON, L.; COTTEN, S. R.; ONO, H. et al., 2015. Digital inequalities and why they matter. *Information, Communication & Society*, 18(5), pp. 569–582. https://doi.org/10.1080/1369118X.2015.1012532
SCHEERDER, A.; VAN DEURSEN, A.; VAN DIJK, J., 2017. Determinants of Internet skills, uses and outcomes: a systematic review of the second- and third-level digital divide. *Telematics and Informatics*, 34(8), pp. 1607–1624. https://doi.org/10.1016/j.tele.2017.07.007
SEALE, H.; HESELMAN, L.; SLATTERY, C. et al., 2020. COVID-19 is rapidly changing: Examining public perceptions and behaviours in response to this evolving pandemic. *PLOS ONE*, 15(6), e0235112. https://doi.org/10.1371/journal.pone.0235112
SHMUELI, L., 2021. Predicting intention to receive COVID-19 vaccine among the general population using the Health Belief Model and the Theory of Planned Behavior. *BMC Public Health*, 21, p. 804. https://doi.org/10.1186/s12889-021-10816-7
SØRENSEN, K.; VAN DEN BROUCKE, S.; FULLAM, J. et al., 2012. Health literacy and public health: a systematic review and integration of definitions and models. *BMC Public Health*, 12, p. 80. https://doi.org/10.1186/1471-2458-12-80
STARK, L.; ZAROUALI, B.; HO, S. S., 2023. Algorithmic trust and public perceptions of fairness in digital health technologies. *Computers in Human Behavior*, 147, 107927. https://doi.org/10.1016/j.chb.2023.107927
TOMCZYK, S.; STADLER, M.; SCHMIDT, P.; BUCK, C., 2021. Utilising health behaviour change and technology acceptance models to predict the adoption of COVID-19 contact tracing apps: cross-sectional survey study. *Journal of Medical Internet Research*, 23(5), e25447. https://doi.org/10.2196/25447
TOLOZA, S.; RAMOS, L.; HARRIS, P., 2024. Digital health literacy interventions for older adults: a systematic review. *JMIR Aging*, 7, e50622. https://doi.org/10.2196/50622
VAN DIJK, J., 2005. *The Deepening Divide: Inequality in the Information Society*. Thousand Oaks, CA: Sage Publications. https://doi.org/10.4135/9781452229812
VEINOT, T. C.; MITCHELL, H.; ANCKER, J. S., 2018. Good intentions are not enough: how informatics interventions can worsen inequality. *Journal of the American Medical Informatics Association*, 25(8), pp. 1080–1088. https://doi.org/10.1093/jamia/ocy052
VENKATESH, V.; THONG, J. Y. L.; XU, X., 2012. Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), pp. 157–178. https://doi.org/10.2307/41410412
WORLD HEALTH ORGANIZATION, 2023. *Ethics and Governance of Artificial Intelligence for Health: Guidance for Trustworthy AI in Health*. Geneva: World Health Organization. https://doi.org/10.4060/cc9029en

ЦИФРОВА КОМУНИКАЦИЯ В ОБЛАСТТА НА ЗДРАВЕОПАЗВАНЕТО И ЗДРАВНАТА ГРАМОТНОСТ: ТЕОРЕТИЧНИ МОДЕЛИ И ИНТЕГРАТИВНИ СЪОБРАЖЕНИЯ

Резюме: *Цифровите медии са се превърнали в централен компонент на комуникацията в областта на здравеопазването. Те влияят върху информационното поведение на потребителите и предлагат нови възможности за повишаване на здравната грамотност. В същото време възникват рискове, включително дезинформация и нарастващи неравенства в достъпа до здравна информация. Тази публикация представя теоретични модели, които обясняват поведението на потребителите в цифровия контекст на здравеопазването и подчертават техните ограничения. Акцентът е върху модела на здравните вярвания (HBM), теорията за планираното поведение (TPB) и концепцията за цифровото разделение. Докато HBM и TPB анализират индивидуалните възприятия, нагласи и намерения, цифровото разделение се занимава със структурните бариери. Последните проучвания показват, че цифровата комуникация в областта на здравеопазването трябва да взема предвид и етичните, технологичните и свързаните с доверието измерения. Възходът на алгоритмично медиираните среди е донесъл нови предизвикателства по отношение на прозрачността, справедливостта и отчетността (Stark et al. 2023; Световна здравна организация 2023). Тези развития водят до понятието за алгоритмична здравна пропаст, което разширява традиционното разбиране за неравенството, като се включват различията в алгоритмичната грамотност и управлението на данните (Okan et al. 2024). Доверието*

и етичното боравене с данни са се превърнали в ключови фактори за ангажираността на потребителите. Комбинирането на психологически, структурни и етични перспективи предлага основа за приобщаваща, надеждна и основана на доказателства цифрова комуникация в областта на здравеопазването, която укрепва здравната грамотност и равенството.
Ключови думи: *цифрова комуникация в здравеопазването; здравна грамотност; цифрова здравна грамотност; модел на вярвания за здравето; теория на планираното поведение*

Надин Захариас, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: nadine_zacharias@gmx.de

ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ
PUBLIC COMMUNICATIONS AND INFORMATION SCIENCES

ORGANIZATION AND MANAGEMENT OF INFORMATION BETWEEN SURGICAL CAPACITY AND HOSPITAL BED OCCUPANCY

Dennis Komossa
University of Library Studies and Information Technologies
https://doi.org/10.70300/QVOO7468

Abstract: *The study examines the organization and management of information regarding surgical capacity and inpatient bed occupancy in German hospitals. The study is conducted at two German hospital sites, using 480,000 anonymized and standardized patient data from 2012 to July 2024, as well as 190,000 surgical data from 2013 to July 2024. The analysis focuses on the factors influencing elective and emergency surgeries, their effects on length of stay, and their distribution across weekdays. Using quantitative methods, including descriptive statistics and the Pearson correlation coefficient, significant anomalies could be identified. Surgeries from elective admissions are intensely concentrated on Tuesday and Wednesday, while surgeries from emergency admissions increase on weekends. In addition, there are significant correlations between operation duration and inpatient length of stay (r = 0.516) and between preoperative length of stay and total length of stay (r = 0.477). The study provides a valuable contribution to evidence-based resource management in the inpatient sector and highlights the relevance of efficient OR planning for capacity management. The study shows that optimising the information and communication process, through targeted management of surgical capacity in coordination with structural and personnel resources, not only improves the quality of care but also optimizes hospital utilisation.*
Keywords: *information management; hospital organisation and management; hospital information process; capacity utilisation; surgical capacities*

INTRODUCTION

Diseases, ailments, or physical injuries of persons are treated in hospitals, which are medical institutions in the healthcare system, through medical, nursing, and therapeutic services (§ 2 para. 1 KHG). Hospital treatments can be provided as complete inpatient, partial inpatient, or outpatient services. Full inpatient stays include at least one overnight stay, partial inpatient treatments are limited to the day without an overnight stay, and outpatient services are provided on an hourly basis without requiring an overnight stay (cf. Behrends/Vollmöller 2020, 60). A portion of medical treatment services is performed in operating rooms. The operating room is a specialized facility in a hospital or medical practice where surgical procedures are performed by opening the skin or mucous membranes, and where primary wound care is provided to patients. In the hospital, the operating room is usually located in an operating suite, which in turn has an anteroom with an airlock and changing rooms that serve as vestibules, separating it from the outside area. This separation is necessary due to the high hygiene standards (cf. DocCheck 2020). As a rule, the procedure is performed under anaesthesia, whereby the entire body or parts of the body are rendered insensate for a limited period by medications (cf. BDA 2018). The highest remuneration in hospital financing is attributable to treatment services involving surgical procedures (cf. Bremer 2015). In German hospital financing, health insurance funds and federal states share costs; therefore, it is also referred to as dual hospital financing. The health insurance funds are responsible for reimbursing operating and treatment costs. In the inpatient sector, these are based on the catalogue of case-based lump sums in the Diagnosis-Related Groups system for somatic care (cf. Bundesministerium für Gesundheit 2021). The catalogue assigns a fixed point value to each treatment service. The corresponding euro value per point is specified by the state base case value, which is determined annually in negotiations between representatives of health insurance funds and hospitals in each federal state. The annual developments in personnel and material costs in the hospital are also of

decisive importance in the negotiations. An intra-year adjustment of the state base case value is not provided for (cf. GKV-Spitzenverband, 2022). The investment costs of hospitals, i.e., for long-term fixed assets or construction measures, are financed by the federal states, independently of the case-based lump sums. Funding is provided either as a lump-sum amount determined by hospital size or through individual funding upon application for specific projects (cf. vdek 2021). The federal states have fulfilled their obligation to finance investments to an increasingly limited extent. From 1991 to the present, financing has declined by 18%. As a result, an investment backlog has emerged in recent years in the German hospital landscape, meaning that many necessary investments for modernization, for example, in buildings and medical technology, could not be carried out. Therefore, outdated technology and building structures are prevalent across many hospital areas (cf. DKG 2021). The economization of the healthcare system and dual hospital financing require the most efficient use of personnel and infrastructure resources. A key indicator of the effectiveness of this resource utilization is bed occupancy, which can be interpreted as a measure of the optimal use of available capacity (cf. Hentze/Kehres 2010: 316). The study aims to examine the impact of inpatient bed occupancy on surgical capacity across weekdays and to examine information and communication processes in the hospital. From this, discrepancies and patterns should be identified to conclude typical bed occupancy and potentially available capacity. The study results can serve as a basis for strategic information and decision-making, for example, in patient flow management or personnel planning, so that the analytical focus is designed to enable the results to be used as management information.

RESEARCH METHODOLOGY

The study on the influence of surgical capacities on inpatient bed occupancy in the information and communication process was conducted at both sites of Alfried Krupp Hospital in Essen. The basis of the analysis is retrospectively collected patient data from 18 medical departments covering the period from January 2012 to July 2024. Available are 480,000 anonymized and standardized case records with over 100 different variables relating to patient and hospital information. Furthermore, 190,000 anonymized and standardized surgical data are available from the period from January 2013 to July 2024. The institution itself dates to the late 19th century, when the Krupp company built a hospital for its workforce in 1870. Over the decades, the institution experienced continuous expansion of its capacity, successive modernization of its technical equipment, and increased accessibility to the general public. The impacts of the Second World War led to a temporary relocation of the site, whereby operations could not be maintained (cf. Brüggemeier 1990). In the 1960s, Alfried Krupp von Bohlen und Halbach ultimately initiated the construction of a modern clinic, which opened in 1980 with a capacity of 560 beds (cf. H. O. Wörner 1974, 840 –842). An institutional expansion occurred in 2008 through the integration of the Evangelical Hospital, Lutherhaus Essen. Since then, the two sites have been referred to as “Alfried Krupp Hospital Rüttenscheid” and “Alfried Krupp Hospital Steele” (cf. Hesse 2008). The dataset covers all inpatient admissions and surgical data from 01.01.2013 to 31.07.2024. Over this period of 4,234 days, the weekdays are distributed as 604 Mondays, 605 Tuesdays, 605 Wednesdays, 604 Thursdays, 604 Fridays, 604 Saturdays, and 604 Sundays. Inpatient hospitalization means that patients remain in the hospital for at least one day and one night, resulting in at least one day of length of stay (cf. Behrends/Vollmöller 2020: 60). For the initial data overview using the average number of operations per weekday, the period from 01.01.2024 to 31.07.2024 is selected, since the preceding period of the Covid-19 pandemic cannot be used. In connection with the COVID-19 pandemic, elective patient admissions were significantly reduced across all hospitals in Germany in accordance with § 22 para. 1 sentence 1 KHG, so that free capacities were available for emergency patients, on whom a special focus was placed. For the study on the influence of surgical capacity on inpatient bed occupancy in the information and communication process in the hospital, a quantitative research method is employed. This methodology enables the collection and evaluation of large datasets, thereby yielding a generalizing statement about the relationships and patterns among the variables (cf. Genau 2019). The analytical approach includes descriptive statistics, which serve to

structure the presentation and preparation of the collected data. Using frequency analyses, the central characteristics of the data distribution are captured. These include, in particular, measures of central tendency and measures of association between variables. Typical key figures for measures of central tendency include, among others, the arithmetic mean (1), colloquially referred to as the average, and the total (2), which is the sum of all individual values (cf. Studyfix 2024).

$$\bar{X} = \frac{a_1 + a_2 + \ldots + a_n}{n} \tag{1}$$

$$n = \sum_{k=1}^{n} k = \frac{n(n+1)}{2} \tag{2}$$

Furthermore, the percentage ratio (3), which is among the measures of frequencies and reflects the distribution of shares within the total, is applied (cf. Bortz/Schuster 2010: 39-40).

$$p\% = \frac{W}{G} \tag{3}$$

To analyse the relationship between two variables, the Pearson correlation coefficient is used (4). This statistical parameter ranges from -1 to +1. A negative value indicates an inverse relationship, whereas a positive value indicates a direct relationship between the variables. A correlation coefficient close to zero indicates a weak or non-existent linear association between the characteristics considered (cf. Studyfix 2024).

$$r_{xy} = \frac{s_{xy}}{s_x \cdot s_y} \tag{4}$$

The three central quality criteria of quantitative research, validity, reliability, and objectivity, are considered within the framework of this study. Validity is established by the legally mandated transmission of data in accordance with § 21 para. 1 of the Hospital Remuneration Act (KHEntgG), which ensures a standardized and substantively accurate representation of inpatient care services and surgical documentation (cf. InEK 2024). Reliability is ensured by using uniform recording and structuring of the aforementioned data, thereby ensuring consistent measurement and reproducible analytical results. Established software tools, such as IBM SPSS Statistics and Microsoft Excel, are used for statistical analysis. The objectivity of the investigation is ensured, as the data are used without intervention and evaluated using transparent, mathematically sound procedures. To investigate the organization and management of information on surgical capacity and inpatient bed occupancy within the hospital, the study formulates research questions and hypotheses.

Is there an influence of the duration of surgery on the length of stay?

Null hypothesis $H_0.1$ = There is no relationship between the utilised surgical capacities and the length of stay.

Alternative hypothesis $H_1.1$ = There is a relationship between the utilised surgical capacities and the length of stay.

Is there an influence of the preoperative length of stay on the total length of stay?

Null hypothesis $H_0.2$ = There is no relationship between preoperative length of stay and total length of stay.

Alternative hypothesis $H_1.2$ = There is a relationship between preoperative length of stay and total length of stay.

RESULTS

Significant for the study on the influence of surgical capacity on inpatient bed occupancy is the total number of inpatient surgeries across weekdays and by department. Based on the available data, fluctuations in utilization and potential resource reserves within the allocation structure are evident. To determine the average number of surgeries on regular working days (Monday = 1 to Friday = 5) in the period from 01.01.2024 to 31.07.2024, excluding public holidays, a categorization of admission reasons is carried out. Electively planned admission types are aggregated into

category 1, and emergency admissions into category 7. This simplified dichotomization enables a clear separation between elective and emergency-related surgeries. For site A (n1), it is shown that on all weekdays and across all departments, elective surgeries clearly dominate over emergency surgeries. The highest total number of elective procedures occurs on Wednesday (18.0), followed by Tuesday (17.9). The lowest elective values occur on Monday (14.8) and Thursday (14.9). In contrast, emergency procedures show overall lower case numbers, but a slight increase toward the end of the week. While 3.5 emergency surgeries were performed on Monday, this value rises to 4.6 by Friday. The ratio of elective to emergency surgeries favours elective procedures on all days, with the ratio most pronounced on Wednesday at approximately 7:1 and lowest on Friday at approximately 3.3:1. Differentiation by medical departments reveals further relevant differences. In department 1, the number of elective procedures is highest on Wednesday at 4.4, whereas the number of emergency surgeries remains consistently low, ranging from 0.3 to 0.5. Department 2 shows a marked increase in elective procedures on Tuesday (6.7) and Thursday (5.7), with emergency procedures on these days also comparatively high at 2.8 and 2.7, respectively. In department 14, the volume of elective surgeries is constant, with a slight increase on Thursday to 4.0; by contrast, emergency procedures remain very low. Particularly striking is the development in department 15. While elective procedures peak on Tuesday at 6.3, they decline to 2.5 on Thursday. At the same time, the number of emergency surgeries in this department rises to 0.9 by Friday, representing the highest emergency value in this department (cf. Table 1).

Table 1. Average surgeries per weekday (Site A)

Weekday	**1**		**2**		**3**		**4**		**5**	
Admission type/ Department	**1**	**7**	**1**	**7**	**1**	**7**	**1**	**7**	**1**	**7**
1	2.5	0.3	2.8	0.4	4.4	0.4	2.6	0.3	2.9	0.5
2	3.9	2.1	6.7	2.8	4.2	1.0	5.7	2.8	4.8	2.7
14	2.5	0.4	2.1	0.2	3.4	0.5	4.0	0.6	2.5	0.5
15	5.9	0.7	6.3	0.5	6.0	0.6	2.5	0.3	5.3	0.9
Total	**14.8**	**3.5**	**17.9**	**4.0**	**18.0**	**2.5**	**14.9**	**4.0**	**15.4**	**4.6**

For site B (n2), it is shown that, across all weekdays, elective surgeries are significantly more frequent than emergency surgeries. Elective procedures remain constant, ranging from 28.1 on Thursday to 32.4 on Tuesday. In contrast, emergency surgeries exhibit greater variability, increasing from 6.5 on Tuesday to 10.5 on Friday. A more differentiated analysis of the medical departments reveals distinct constellations. Without anomalies, elective procedures in department 1 remain constant between 4.3 and 4.5 across weekdays, and emergencies between 0.7 and 0.8. In department 2, however, a marked fluctuation is evident. Elective procedures increase significantly from Monday at 5.4 to Wednesday at 8.0, then decline slightly to 6.5 on Friday. In parallel, emergency procedures increase over the course of the week, particularly on Friday, to 5.7. Department 7 shows lower total numbers than the other departments, but displays a slight increase in elective procedures over the week, from 1.1 on Monday to 2.0 on Friday. Emergency surgeries remain constant and low in this department. In department 8, elective surgeries increased from Monday at 3.8 to Thursday at 4.6, followed by a slight decline on Friday to 4.5. Emergency numbers remain moderate and vary only slightly. A notable development is seen in department 11. Elective surgeries decrease significantly over the week, from 16.1 on Tuesday to 10.6 on Thursday, whereas emergency surgeries remain consistently low between 0.5 and 0.8 (cf. Table 2).

Table 2. Average surgeries per weekday (Site B)

Weekday	1		2		3		4		5	
Admission type / Department	**1**	**7**	**1**	**7**	**1**	**7**	**1**	**7**	**1**	**7**
1	4.5	0.7	4.3	0.7	4.5	0.8	4.3	0.7	4.3	0.8
2	5.4	3.1	6.4	2.6	8.0	5.6	7.0	4.0	6.5	5.7
7	1.1	1.2	1.4	1.4	1.2	0.8	1.7	1.1	2.0	2.0
8	3.8	1.2	4.1	1.0	4.2	1.1	4.6	0.9	4.5	1.4
11	16.0	0.5	16.1	0.8	11.6	0.7	10.6	0.7	11.9	0.7
Total	**30.7**	**6.7**	**32.4**	**6.5**	**29.5**	**9.1**	**28.1**	**7.4**	**29.1**	**10.5**

However, not all patients undergo surgery as part of hospital treatment. From 2013 to 2024, the data show the development of the proportions of patients operated on in the hospital, again using the standard categorization of elective admissions (category 1) and emergency admissions (category 7). For n1, a moderate yet continuous increase in the proportion of operated patients is observed initially. In 2013, the proportion of electively admitted patients who underwent surgery remained 54%. This proportion increased to 58% by 2019. During 2020 to 2022, which were shaped by the COVID-19 pandemic, the operational proportion ranged from 62% to 69%. After the end of the COVID-19 pandemic, the proportion decreases slightly again but remains between 62% and 63%, which is significantly above the 2013 level. Among patients admitted as emergencies, the proportion increased from 23% in 2013 to 30%-35% from 2020 onward.

For n2, a continuously increasing development is shown. The proportion of electively admitted and operated patients initially increases steadily from 44% in 2013 to 52% in 2021. Only at the end of the period shaped by the Covid-19 pandemic, in 2022, an increase to 58% is recorded. In the two subsequent years, 2023 and 2024, the proportion is 60%. The proportion of emergency admissions with surgery, however, has increased only slightly from 19% to 22%, and over several years it has even decreased to 17% (cf. Table 3).

Table 3. Ratio of patients with surgery

	Site A			Site B		
Admission type/ Year	**1**	**7**	**n1**	**1**	**7**	**n2**
2013	54%	23%	44%	44%	19%	37%
2014	55%	23%	43%	44%	18%	37%
2015	57%	24%	44%	45%	18%	38%
2016	59%	25%	45%	46%	17%	37%
2017	54%	25%	43%	48%	17%	36%
2018	59%	25%	45%	50%	17%	36%
2019	58%	27%	44%	50%	17%	36%
2020	62%	30%	48%	51%	20%	38%
2021	64%	32%	51%	52%	21%	38%
2022	69%	35%	55%	58%	21%	41%
2023	62%	34%	51%	60%	22%	42%
2024	63%	30%	49%	60%	22%	42%
Total	**56%**	**27%**	**45%**	**48%**	**19%**	**37%**

The relationship between the total length of hospital admission (variable “Vwd”) and the utilised surgical capacity (variable “OPBeginnEnde”) can be examined using the Pearson correlation coefficient. Data on patients who underwent surgery during their hospital stay are used. Thus, 187,863 data points are available. For n = 187,863, a correlation coefficient r = 0.516 is observed at the significance level p = 0.000. The values indicate a statistically significant association between longer operating time and longer length of stay. The correlation coefficient is above 0.500, indicating a strong relationship and clear relevance. Thus, the null hypotheses that there is no relationship

between surgery duration and length of stay, and between length of stay and bed occupancy, can be rejected. However, this does not imply that a causal relationship can be assumed, as additional factors may be at play (cf. Table 4).

Table 4. Correlation between length of stay and surgery duration

		Vwd
OPBeginnEnde	Pearson Correlation	0.516
	Sig. (2-tailed)	0,000
	n	187,863

One of these further influencing factors can be the so-called preoperative length of stay. This preoperative length of stay may result from bottlenecks in surgical capacity, which prevent surgery and require patients to wait. It is reported as waiting time in days; i.e., the preoperative length-of-stay count begins only after at least one day and one night have elapsed. If patients undergo surgery on the same day despite a several-hour waiting period, no preoperative length-of-stay days accrue. Preoperative length-of-stay days are disadvantageous from both patients' and hospitals' perspectives, as resources tied up during this period are neither reimbursed nor otherwise available for care. Optimal utilisation of surgical capacity can help reduce or avoid preoperative inpatient days.

To investigate the relationship between length of stay (variable "Vwd") and preoperative length of stay (variable "TagePraeOP"), the statistical test of the Pearson correlation coefficient is used again. Data on patients' preoperative length of stay during hospital admission are used. Thus, 95,514 data points are available. For n = 95,514, a correlation coefficient r = 0.477 is observed at the significance level p = 0.000. The values indicate a statistically significant association: preoperative length of stay is associated with longer postoperative length of stay. The correlation coefficient is close to 0.500, indicating a relatively strong and relevant relationship. Thus, the null hypothesis that there is no relationship between preoperative length of stay and length of stay, or between preoperative length of stay and bed occupancy, can be rejected. Again, no causal relationship should be assumed, as additional influencing factors may be present (cf. Table 5).

Table 5. Correlation between length of stay and preoperative length of stay

		Vwd
TagePraeOP	Pearson Correlation	0.477
	Sig. (2-tailed)	0,000
	n	95,514

CONCLUSIONS/DISCUSSION

The study provides reliable insights into the influence of surgical capacity on inpatient bed occupancy in German hospitals, based on data from two sites. For understanding organisation and management, the identified patterns mustn't merely represent "statistical findings" but instead planning- and communication-relevant information structures: the distribution of elective and emergency-related surgeries across weekdays reflects a recurring control rhythm that materialises in bed occupancy. The results show that surgeries from elective admissions are primarily concentrated on the working days Tuesday and Wednesday. It is reasonable to assume that on these days, optimization of the information and communication process goes hand in hand with targeted control and planning of surgical capacity, coordinated with structural and personnel resources.

The increase in surgeries of patients admitted as emergencies at the end of the week, especially on Fridays, indicates increasing urgency and a more urgent need for care. The particularly marked increase from 2020 onward will presumably reflect a pandemic-related effect, as elective patient admissions, including surgeries, were suspended or postponed during the COVID-19 pandemic.

In subsequent years, a further special effect may arise from catch-up effects following previously postponed procedures or from changes in indication-setting favouring surgical measures. This suggests a corresponding adjustment to resource planning, particularly with respect to emergency readiness, staff availability, and workload. The large sample size of operated patients (n = 187,863) increases the explanatory power of the analysis and reduces the likelihood of a spurious result. A significant positive correlation between the duration of surgical procedures and total inpatient length of stay (r = 0.516) and between preoperative length of stay and total length of stay (r = 0.477) was identified, underscoring the relevance of surgical processes for hospital occupancy capacity. Nevertheless, a correlation does not imply a causal relationship. Additional influencing factors, such as the severity of the procedure, postoperative complications, or patient-specific risk factors (e.g., age or comorbidities), may co-determine this relationship and should be considered in future studies. In addition, the number of preoperative length-of-stay days does not result exclusively from limited surgical capacity; it may also reflect that, in emergency patients, the need for surgical treatment is recognized only with a delay. For the preoperative length of stay, the structural specification in the DRG system is also of central importance.

Based on the identified anomalies and patterns, simulations and forecasting models can be developed in subsequent studies that not only enable forward-looking capacity planning for bed occupancy and the OR area, but also systematically map the underlying information and communication processes because capacity management in the hospital depends on the timely, complete, and role-specific transmission of relevant information (e.g., OR schedule, expected OR duration, preoperative waiting time, postoperative monitoring and nursing needs profile, planned discharges) between the actors and systems involved. Overall, the study makes an essential contribution to evidence-based capacity planning by showing at which points in the care process information flows are particularly capacity-relevant and where communication breakdowns can lead to delays and mismanagement. The demonstrated relationship between OR duration, preoperative waiting time, and total length of stay suggests that hospitals could significantly increase their efficiency through communicatively secured OR planning and information-based capacity management. As a result, capacity planning becomes less a purely resource question and more a controlled, information- and communication-based process that delivers the correct information to the right roles at the right time, thereby enabling coordinated action.

REFERENCES

BDA – BERUFSVERBAND DEUTSCHER ANÄSTHESISTEN E. V., 2018. *Anästhesie allgemein*. [viewed 11 December 2024]. Available from: https://www.anaesthesisten-im-netz.de/anaesthesie/anaesthesie-allgemein/

BEHRENDS, B.; VOLLMÖLLER, T., 2020. *Praxishandbuch Krankenhausfinanzierung*. Berlin: Medizinisch Wissenschaftliche Verlagsgesellschaft.

BORTZ, J.; SCHUSTER, C., 2010. *Statistik für Human- und Sozialwissenschaftler*. Berlin: Springer.

BREMER, P., 2015. *10 Jahre Diagnosis Related Groups (DRGs) in deutschen Krankenhäusern – Eine Zwischenbilanz aus ökonomischer Perspektive.* [viewed 27 July 2025]. Available from: https://www.statistik-bw.de/Service/Veroeff/Monatshefte/20151108

BRÜGGEMEIER, F.-J., 1990. *Die Krupp'schen Krankenanstalten*. [viewed 15 September 2024]. Available from: https://www.krupp-krankenhaus.de/tradition-und-stiftung.html#history

BUNDESMINISTERIUM FÜR GESUNDHEIT, 2021. *Krankenhausfinanzierung.* [viewed 16 October 2024]. Available from: https://www.bundesgesundheitsministerium.de/krankenhausfinanzierung.html

DKG – DEUTSCHE KRANKENHAUSGESELLSCHAFT, 2021. *Länder vernachlässigen weiter ihre Pflicht zur Krankenhausfinanzierung.* [viewed 11 December 2024]. Available from: https://www.dkgev.de/dkg/presse/details/laender-vernachlaessigen-weiter-ihre-pflicht-zur-krankenhausfinanzierung/

DOCCHECK, 2020. *Operationssaal.* [viewed 11 December 2024]. Available from: https://flexikon.doccheck.com/de/Operationssaal

GENAU, L., 2019. *Quantitative Forschung in wissenschaftlichen Arbeiten*. [viewed 16 September 2024]. Available from: https://www.scribbr.de/methodik/quantitative-forschung/

GKV-SPITZENVERBAND, 2022. *Fokus: Krankenhausfinanzierung*. [viewed 11 December 2024]. Available from: https://www.gkv-spitzenverband.de/gkv_spitzenverband/presse/fokus/krankenhausfinanzierung/thema_krankenhausfinanzierung.jsp

HENTZE, J.; KEHRES, E., 2010. *Krankenhaus-Controlling – Konzepte, Methoden und Erfahrungen aus der Krank-*

enhauspraxis. Stuttgart: Kohlhammer.
HESSE, P., 2008. *15 Millionen und ein neuer Name fürs Lutherhaus*. [viewed 15 September 2024]. Available from: https://www.nrz.de/staedte/essen/article924278/15-millionen-und-ein-neuer-name-fuers-lutherhaus.html
INEK – INSTITUT FÜR DAS ENTGELTSYSTEM IM KRANKENHAUS, 2024. *Datenlieferung gem. § 21 Abs. 1 KHEntgG.* [viewed 19 October 2024]. Available from: https://www.g-drg.de/datenlieferung-gem.-21-khentgg/datenlieferung-gem.-21-abs.1-khentgg
STUDYFLIX, 2024. *Deskriptive Statistik*. [viewed 15 November 2024]. Available from: https://studyflix.de/statistik/deskriptive-statistik-1052
VDEK – VERBAND DER ERSATZKASSEN, 2021. *Krankenhausfinanzierung*. [viewed 16 October 2024]. Available from: https://www.vdek.com/vertragspartner/Krankenhaeuser/krankenhausfinanzierung.html
WÖRNER, H. O., 1974. Neubau der Krupp Krankenanstalten in Essen. *Bauwelt*, no. 23.

ОРГАНИЗАЦИЯ И УПРАВЛЕНИЕ НА ИНФОРМАЦИЯТА МЕЖДУ ХИРУРГИЧНИЯ КАПАЦИТЕТ И ЗАЕТОСТТА НА БОЛНИЧНИТЕ ЛЕГЛА

Резюме: *Изследването разглежда организацията и управлението на информацията относно хирургичния капацитет и заетостта на болничните легла в германските болници. Изследването е проведено в две германски болници, като са използвани 480 000 анонимизирани и стандартизирани данни за пациенти от 2012 г. до юли 2024 г., както и 190 000 хирургични данни от 2013 г. до юли 2024 г. Анализът се фокусира върху факторите, които влияят върху плановите и спешните операции, тяхното влияние върху продължителността на престоя и разпределението им през делничните дни. С помощта на количествени методи, включително описателна статистика и корелационен коефициент на Пиърсън, бяха идентифицирани значителни аномалии. Операциите от плановите хоспитализации са силно концентрирани във вторник и сряда, докато операциите от спешните хоспитализации се увеличават през уикенда. Освен това съществуват значителни корелации между продължителността на операцията и продължителността на престоя на пациента в болницата (r = 0,516) и между продължителността на престоя преди операцията и общата продължителност на престоя (r = 0,477). Изследването дава ценен принос за управлението на ресурсите в сектора на болничното лечение, основано на доказателства, и подчертава значението на ефективното планиране на операционните зали за управлението на капацитета. Проучването показва, че оптимизирането на процеса на информиране и комуникация чрез целенасочено управление на хирургичния капацитет в координация със структурните и персоналните ресурси не само подобрява качеството на грижите, но и оптимизира използването на болницата.*
Ключови думи: *управление на информацията; организация и управление на болници; информационни процеси в болниците; използване на капацитета; хирургичен капацитет*

Денис Комоса, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: dennis_komossa@gmx.de

ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ
PUBLIC COMMUNICATIONS AND INFORMATION SCIENCES

DIGITAL GOVERNANCE AND PUBLIC POLICIES IN TRANSITION ECONOMIES: THE ROLE OF INFORMATION TECHNOLOGIES IN INSTITUTIONAL EFFICIENCY AND ECONOMIC GROWTH IN KOSOVO

Adil Rexhepi
University of Library Studies and Information Technologies
https://doi.org/10.70300/KEXI5846

Abstract: *This study examines the role of information technologies in advancing digital governance and assesses their impact on institutional efficiency and economic growth in Kosovo as a transition economy. Employing a mixed-methods research design, the study combines quantitative survey data from 178 respondents with qualitative interviews and document analysis. The findings demonstrate that digital governance significantly enhances institutional efficiency, particularly through improved service delivery, transparency, and operational performance. However, its contribution to economic development is primarily indirect and mediated by improvements in institutional capacity. Structural constraints, including system complexity and limited digital competencies, restrict the transformative potential of digital reforms. The study contributes to the theoretical debate on digital governance in transition economies and offers policy-relevant recommendations for strengthening institutional resilience and sustainable digital transformation.*
Keywords: *digital governance; public policies; information technology; institutional efficiency; economic growth*

INTRODUCTION

Transition economies face structural challenges in transforming political, economic, and institutional systems. Public administration reform remains central to modernization efforts and long-term development strategies. Digital governance has emerged as a strategic response to institutional fragility, aiming to improve administrative efficiency, transparency, and service delivery through information technologies.

Despite the normative discourse supporting digital governance, empirical evidence regarding its measurable impact on institutional efficiency and economic growth in transition contexts remains limited. In many cases, digital reforms are fragmented and technologically driven without corresponding organizational transformation.

Against this background, the study seeks to bridge the gap between normative digital governance discourse and empirical institutional realities in transition contexts. By focusing on Kosovo, the research evaluates whether digital reforms translate into measurable institutional improvements and whether such improvements generate broader economic implications. The analytical emphasis lies not only on technological adoption, but on institutional performance as a mediating mechanism of development.

This study addresses three main research questions. It examines the extent to which digital governance improves institutional efficiency, evaluates how digital governance influences economic development in a transition economy, and analyzes the structural challenges that constrain digital transformation in Kosovo.

The study tests three hypotheses. The first hypothesis (H1) states that digital governance positively affects institutional efficiency. The second hypothesis (H2) proposes that digital governance has a significant positive impact on economic development. The third hypothesis (H3) assumes that institutional efficiency mediates the relationship between digital governance and economic growth.

THEORETICAL FRAMEWORK

The theoretical framework integrates contemporary literature on digital governance, public sector reform, and institutional development in transition economies. Digital governance has evolved from early e-government initiatives toward broader institutional transformation models encompassing decision-making processes, accountability mechanisms, and state–citizen relations.

Heeks (2006) argues that digital governance should not be understood merely as technological adoption but as structural transformation of public authority. Similarly, Digital Era Governance emphasizes reintegration of government functions and strategic use of information technologies for institutional transformation (Dunleavy et al. 2006; Margetts and Dunleavy 2013).

Institutional theory provides the analytical foundation for understanding how governance reforms influence economic development. Effective institutions reduce uncertainty and create favorable conditions for investment and innovation (North 1990; Acemoglu and Robinson 2012). Digital governance enhances institutional efficiency through process optimization and improved transparency.

However, technological reforms do not automatically produce institutional transformation. Their impact depends on organizational culture, leadership capacity, and coordination (Cordella and Tempini 2015).

INSTITUTIONAL AND DIGITAL CONTEXT IN KOSOVO

Kosovo, as a transition economy, has undergone extensive public administration reforms following state-building processes. Institutional consolidation and European integration aspirations have shaped governance reforms.

Strategic government documents emphasize digitalization as a tool for modernization and economic development (Government of Kosovo 2019; World Bank 2017). Nevertheless, structural challenges persist, including system fragmentation and digital skill gaps (OECD 2018; World Bank 2021).

Digital governance must therefore be understood as a gradual and context-dependent reform process.

RESEARCH METHODOLOGY

This study employs a mixed-methods research design combining quantitative and qualitative approaches. The quantitative component consists of a structured questionnaire distributed to employees in central and local public institutions using a five-point Likert scale. A total of 178 respondents participated.

The qualitative component includes semi-structured interviews with public officials and analysis of strategic documents. Purposive sampling ensured respondents possessed direct experience with digital governance implementation.

Data were analyzed through descriptive statistics and interpretative synthesis to evaluate the proposed hypotheses.

RESULTS

Descriptive Profile of Respondents

The sample includes 178 respondents representing multiple institutional layers. Administrative employees constitute the majority, followed by managerial, policy-oriented, and technical roles. The dominance of respondents with more than six years of professional experience strengthens the reliability of institutional assessments.

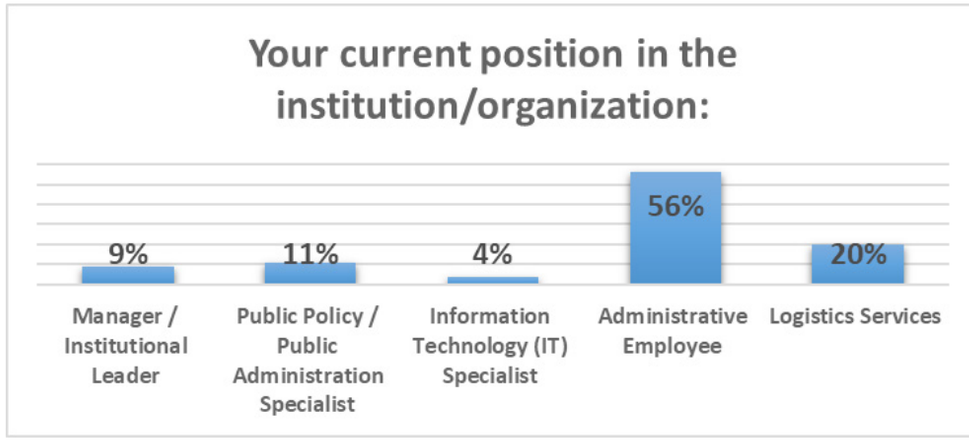

Fig. 1. Distribution of respondents by professional position

The sectoral distribution reflects representation from the public, private, and NGO sectors, allowing cross-sectoral interpretation of digital governance practices.

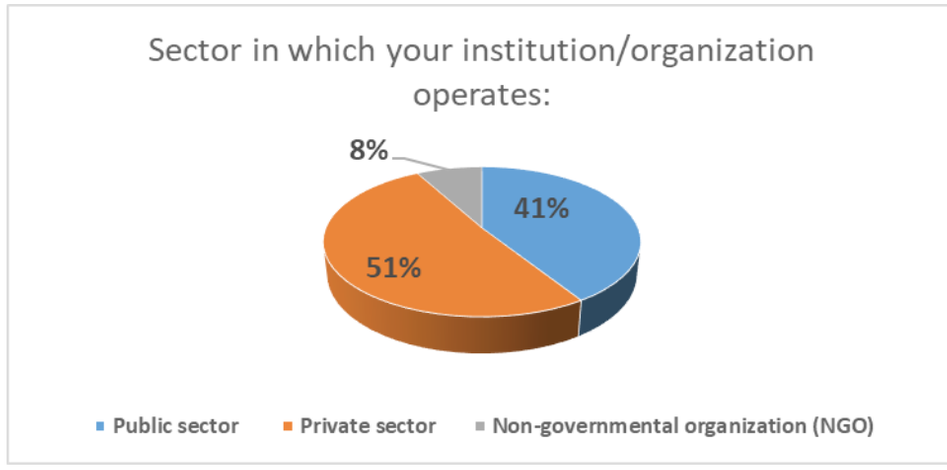

Fig. 2. Sectoral distribution of respondents

The distribution of years of experience further confirms the institutional maturity of the respondent group.

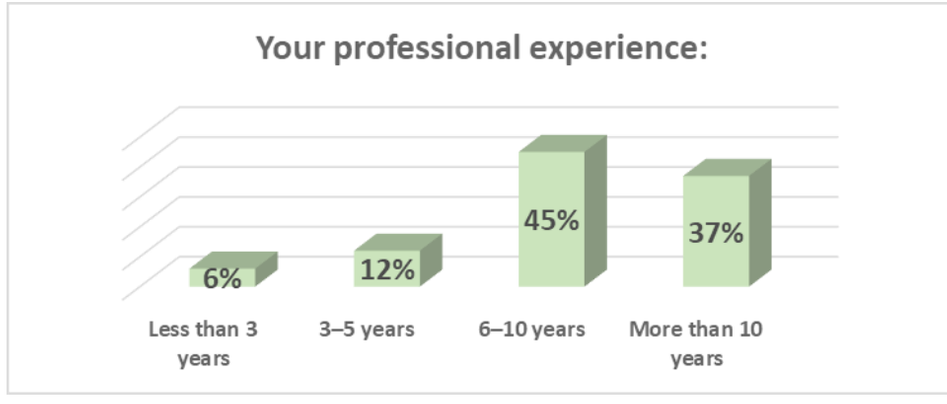

Fig. 3. Years of professional experience

These characteristics provide a solid empirical basis for evaluating digital governance implementation and institutional performance.

Digital Governance Practices

The findings indicate that digital governance in Kosovo is primarily concentrated on service digitalization and electronic administrative platforms.

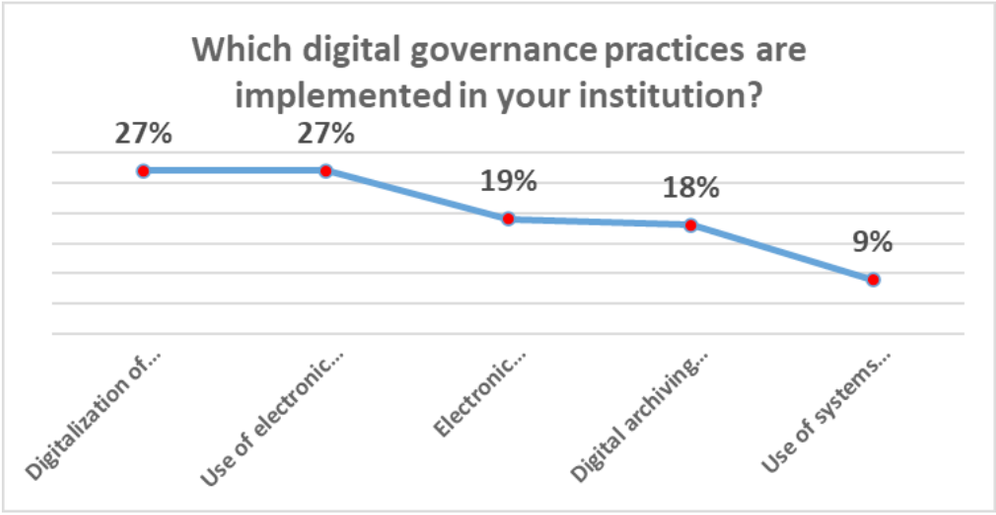

Fig. 4. Types of digital governance practices implemented

These practices represent operational modernization rather than comprehensive institutional integration. Respondents overwhelmingly perceive digital governance as strategically important for institutional success.

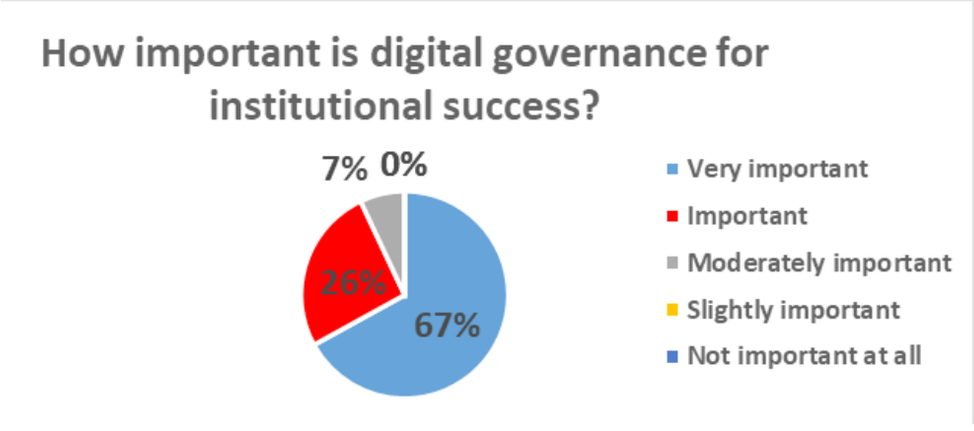

Fig. 5. Perceived importance of digital governance

Information Technologies and Institutional Functioning

Cloud-based platforms and digital collaboration tools are the most widely adopted technologies.

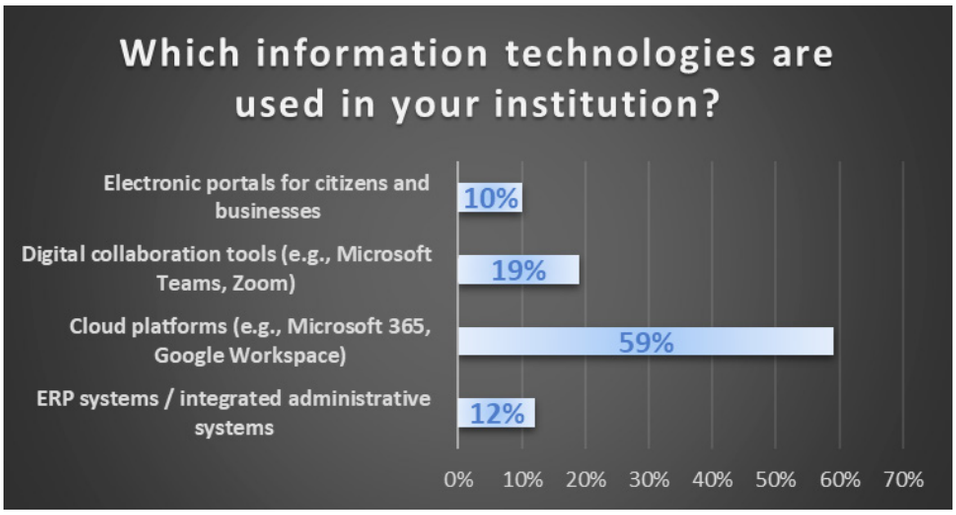

Fig. 6. Types of information technologies used

Respondents evaluate implemented technologies as highly effective in improving institutional functioning.

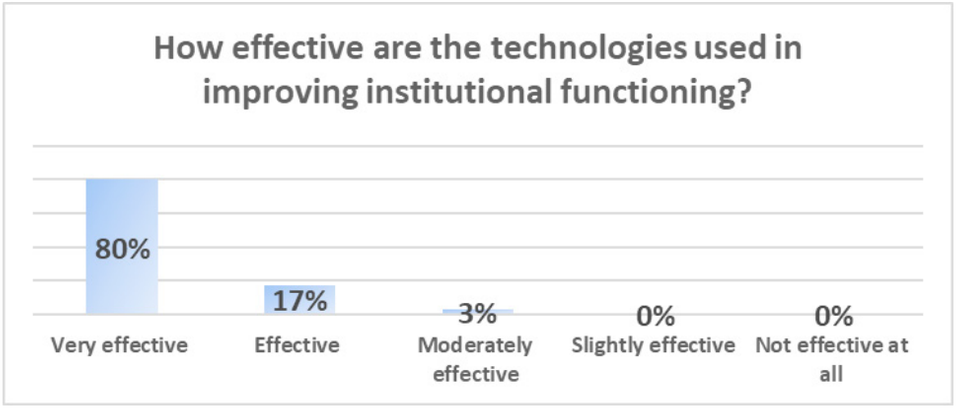

Fig. 7. Perceived effectiveness of digital technologies

The strong consensus regarding effectiveness provides empirical support for H1.

Digital Governance and Institutional Performance

Digital governance contributes most significantly to improved service delivery and enhanced transparency.

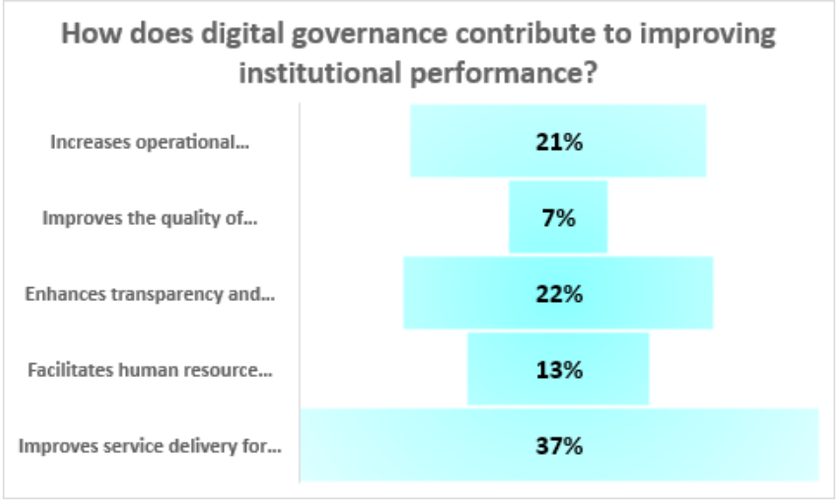

Fig. 8. Areas of institutional improvement

Gains in operational efficiency are evident, while improvements in decision-making quality are comparatively limited.

Digital Governance and Economic Development

Perceptions of the economic impact of digital governance are predominantly moderate to significant.

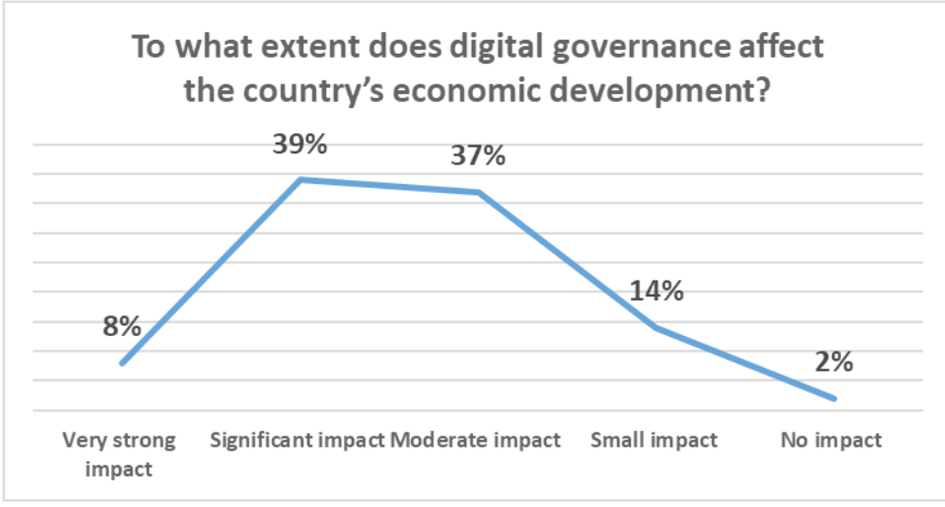

Fig. 9. Perceived economic impact of digital governance

The findings indicate that digital governance contributes indirectly to economic development, providing partial support for H2.

Implementation Challenges

The primary obstacles identified include system complexity and limited digital skills.

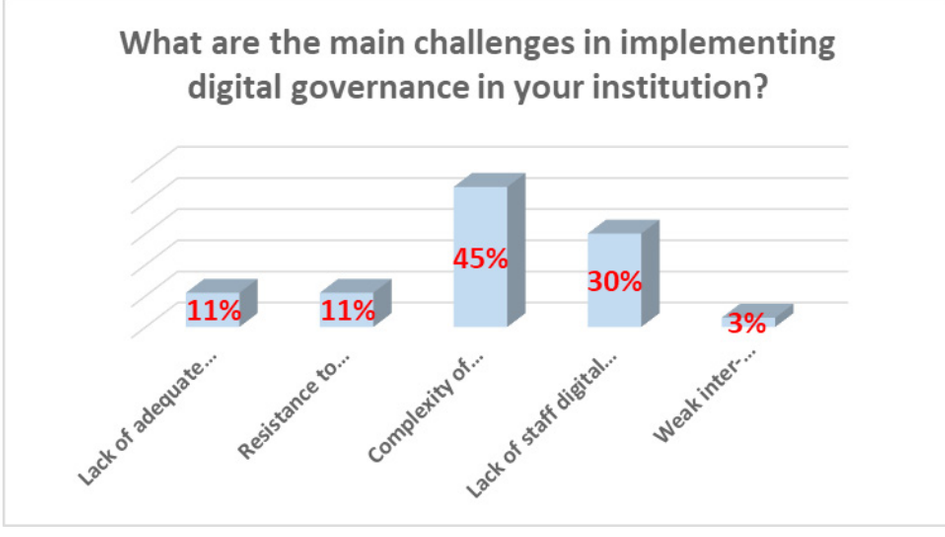

Fig. 10. Main challenges in digital governance implementation

Investment in new technologies and staff training are identified as the most necessary improvements.

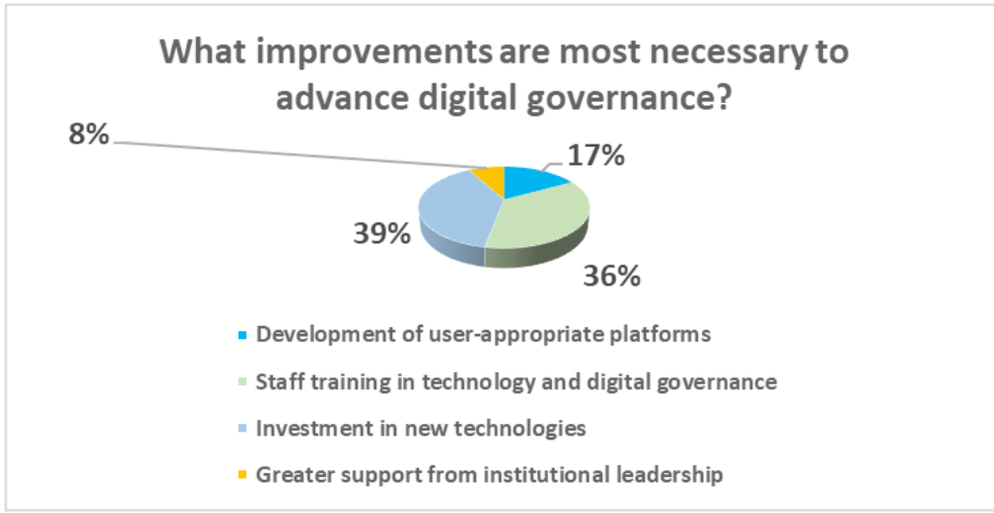

Fig. 11. Priority areas for improvement

The evidence confirms that institutional efficiency functions as a mediating variable between digital governance and economic development, supporting H3.

DISCUSSION

The findings confirm that digital governance in Kosovo has generated measurable operational benefits. However, transformation remains predominantly functional rather than systemic. The confirmation of H1 aligns with governance literature emphasizing performance gains through modernization (Hood 1991; Dunleavy et al. 2006). Partial support for H2 reflects institutional theories highlighting broader structural determinants of growth (North 1990; Acemoglu and Robinson 2012). The confirmation of H3 demonstrates that institutional efficiency mediates the relationship between digital governance and economic development.

Kosovo remains in an intermediate phase of digital governance transformation, requiring deeper integration and strategic coordination.

CONCLUSION

Digital governance in Kosovo contributes meaningfully to institutional efficiency and indirectly to economic development. Institutional efficiency emerges as the key mediating variable linking digital transformation to development outcomes. Sustainable reform requires integrated strategies, technological investment, and long-term institutional capacity-building.

REFERENCES

ACEMOGLU, D.; ROBINSON, J. A., 2012. *Why nations fail: The origins of power, prosperity, and poverty*. New York: Crown Business.

ANDERSEN, T. B.; RAND, J., 2006. Governance and corruption in developing countries. *World Economy*, vol. 29, no. 9, pp. 1195–1213. Available from: https://doi.org/10.1111/j.1467-9701.2006.00826.x

BANNISTER, F.; CONNOLLY, R., 2014. ICT, public values and transformative government. *Government Information Quarterly*, vol. 31, no. 1, pp. 119–128. Available from: https://doi.org/10.1016/j.giq.2013.06.002

CORDELLA, A.; TEMPINI, N., 2015. E-government and organizational change. *Government Information Quarterly*, vol. 32, no. 3, pp. 279–286. Available from: https://doi.org/10.1016/j.giq.2015.03.005

DUNLEAVY, P.; MARGETTS, H.; BASTOW, S.; TINKLER, J., 2006. *Digital era governance*. Oxford: Oxford University Press.

HEEKS, R., 2006. *Implementing and managing eGovernment*. London: SAGE Publications.

HOOD, C., 1991. A public management for all seasons? *Public Administration*, vol. 69, no. 1, pp. 3–19. Available from: https://doi.org/10.1111/j.1467-9299.1991.tb00779.x

MARGETTS, H.; DUNLEAVY, P., 2013. The second wave of digital-era governance. *Philosophical Transactions of the Royal Society A*, vol. 371, no. 1987. Available from: https://doi.org/10.1098/rsta.2012.0382

NORTH, D. C., 1990. *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.

OECD, 2018. *Public governance reviews: Kosovo*. Paris: OECD Publishing.
WORLD BANK, 2021. *Digital government for development: Global perspectives*. Washington, DC: World Bank Group. Available from: https://doi.org/10.1596/978-1-4648-1666-8

ДИГИТАЛНО УПРАВЛЕНИЕ И ПУБЛИЧНИ ПОЛИТИКИ В ПРЕХОДНИ ИКОНОМИКИ: РОЛЯТА НА ИНФОРМАЦИОННИТЕ ТЕХНОЛОГИИ ЗА ИНСТИТУЦИОНАЛНАТА ЕФЕКТИВНОСТ И ИКОНОМИЧЕСКИЯ РАСТЕЖ В КОСОВО

Резюме: *Настоящото изследване анализира ролята на информационните технологии за развитието на дигиталното управление и тяхното въздействие върху институционалната ефективност и икономическия растеж в Косово като преходна икономика. Използван е смесен методологичен подход, включващ анкетно проучване, интервюта и анализ на документи. Резултатите показват, че дигиталното управление подобрява институционалната ефективност, особено чрез по-добро обслужване на гражданите и повишена прозрачност. Въздействието върху икономическия растеж е индиректно и се осъществява чрез подобряване на институционалната среда. Изследването предлага препоръки за устойчиво развитие на дигиталното управление.*
Ключови думи: *дигитално управление; публични политики; информационни технологии; институционална ефективност; икономически растеж*

Адил Реджепи, докторант
Университет по библиотекознание и информационни технологии
София, България
Email: adil.rexhepi89@gmail.com

NATIONAL SECURITY
НАЦИОНАЛНА СИГУРНОСТ

QUANTIFICATION OF OPERATIONAL RISKS IN GERMAN BANKS AS AN ELEMENT OF NATIONAL SECURITY

Florian Becker
University of Library Studies and Information Technologies
https://doi.org/10.70300/UJIM4140

Abstract: *Risk management is a central pillar of modern banking, serving market-driven objectives, regulatory requirements aimed at safeguarding financial stability and national security alike. Within this framework, operational risk (OpRisk) represents one of the four major risk types alongside credit, market, and liquidity risk. This paper examines how German banks can quantify OpRisk for the purpose of economic risk-bearing capacity as an element of national security. Building on regulatory foundations such as MaRisk and the Basel framework, two key data sources are emphasized: historical loss databases and forward-looking risk assessments. Their combined use allows banks to capture both past events and potential future risks. For quantification, the loss distribution approach is applied, separating frequency and severity distributions and aggregating them through Monte Carlo simulation to derive a comprehensive loss distribution. Additional structuring into business lines and event categories enables granular modelling and the incorporation of dependencies through correlation assumptions. The study illustrates an exemplary, though widely established, methodology that provides banks with a statistically sound basis for determining Value-at-Risk at a 99.9% confidence level and integrating it into risk-bearing capacity calculations. While variations in implementation remain, the model demonstrates how quantitative methods can strengthen operational resilience and contribute to systemic stability as well as national security.*
Keywords: *operational risk; risk bearing capacity; loss distribution, risk management*

INTRODUCTION

Risk management is an integral part of business operations for banks today. However, from a bank's perspective, the motivation for risk management is not exclusively intrinsic in nature, but can be divided into two aspects. From a market-driven perspective, risk management plays a supporting role in corporate management and in achieving objectives, as mentioned above. From a regulatory and legal perspective, however, there are also requirements that serve to protect creditors and the entire financial system (Strauß 2008, p. 34). The financial system is based on financial stability, so to speak. Financial stability refers to a state in which the financial system can smoothly fulfil its core functions, e.g. lending and payment transactions. Such a system not only prevents financial crises, but is also directly linked to national security. National security strategies usually even include the resilience of the financial sector. Therefore, it can be argued that national security also depends significantly on efficient and resilient operational risk management in banks, since it also needs financial security and a resilient financial system.

The last financial crisis in 2008 clearly showed that deficits in the operational risk management of individual actors or banks are sufficient to cause insolvencies. Conversely, these insolvencies or financial difficulties can result in a chain action that, as in the past, affects the stability of the financial system. Although such crises are unlikely to repeat themselves completely identically, similar effects are also imaginable in today's world. While the financial difficulties of individual EU member states in recent years cannot be attributed exclusively to banking crises, they illustrate the potential danger that underlies the European Union's financial system. Around 2009/2010, for example, Greece was plunged into a major sovereign debt crisis. In this context, immense rescue packages from other EU member states have flowed to Greece not long afterwards. However, the situation also worsened seriously for other member states, which put Italy, Portugal and other

countries in financial difficulties as well. Such a chain of circumstances is also quite conceivable with regard to the banking sector. Attempts to rescue other banks or states could also trigger a chain reaction that would exacerbate the financial problems of one or more banks rather than solve them in the long term. However, financial security has several levels that go beyond the mere stability of the financial system. Other companies associated with financial service providers may also be affected. Bank failures and insolvencies can also have a massive impact on companies that have loans. If, for example, loans are no longer available to strengthen and stabilise production and manufacturing, this may result in a crash in profits. The same applies to consumers and households. Many households depend on the stability of banks and the financial sector for real estate financing or other loans and financial products. When problems arise, their own real estate, savings and the entire financial security of private households are sometimes at risk. The combination of potential impacts on the financial sector and private households also makes it clear that the state as such is also dependent on a stable banking system. The dimensions in this context are diverse. There may be a loss of trust in the financial system. Problems in the financial system can lead to lower tax revenues and, as a result, problems for the state. Potential financial support for banks, as in the past, can also be extremely costly for the state. In summary, due to the potential far-reaching consequences, the national security of entire countries is affected by the issue.

In this context, it is the task of a bank's risk management to determine the appropriate level of capital adequacy. If institutions are not permanently able to offset losses, there is a risk of insolvency which might result in a chain reaction with effect to national security like it did during the last financial crisis. To prevent this, the legal framework for financial institutions provides for a sufficient liquidity buffer with an appropriate loss buffer in the form of equity capital. When calculating risk-bearing capacity (RBC), two approaches are distinguished. On the one hand, there is the normative perspective and, on the other, the economic perspective. The normative perspective comprises an annual review and capital planning over a planning horizon of at least three years. This planning is divided into a planned scenario (base scenario) and an adverse scenario. The perspective that is more relevant to this paper is that of economic risk-bearing capacity. In this context, present-value risks are compared with an economic risk coverage amount, which in the best case corresponds to the company's present value. The risks are usually risk indicators on a one-year risk horizon with a confidence level of at least 99.9%. Put simply, this means that all risks with a probability of occurrence greater than 0.1% must be quantitatively taken into account in the RBC. To provide a brief overview of the industry, it can be said that smaller companies on average also have weaker equity capitalisation in percentage terms. Companies with annual revenues of up to €2 million have average coverage of 18.5%, while companies with annual revenues between €25 million and €50 million already have an average ratio of 30.3%. In the range between €50 million and €250 million, the ratio is approximately 31.9% (Mohr & Rödl 2017, p. 135). Adequate equity capital is particularly important for banks because they play a key role in the stability of the financial system (Ercoc & Met & Seker 2023, p. 1000).

In the context of risk management at banks, OpRisk is often referred to as one of the main types of risk alongside counterparty default risk, market risk and liquidity risk. OpRisk has different meanings in the banking sector, and different institutions use their own definitions for internal purposes. However, it is important to note that all definitions take into account the regulatory definition of operational risk in the narrower sense. According to the Capital Requirements Regulation (CRR), OpRisk is defined as the risk of loss resulting from inadequate or failed internal processes, people, systems, or from external events, including legal risks.

This paper aims to illustrate how German banks can quantify their operational risks for the economic perspective of risk-bearing capacity to strengthen their risk management and be more resilient in view of financial stability.

RESEARCH METHODOLOGY

The basic functioning of a model for quantifying operational risks in banks is to be illustrated within the framework of a theoretical conception of such a model. The core methodology is the

Loss Distribution Approach, which originally comes from actuarial science. By modelling the frequency and severity of loss events separately and then aggregating them using Monte Carlo simulation, reliable loss distributions can be derived. On this basis, value-at-risk values can be determined up to a 99.9% confidence level and integrated into the calculation of risk-bearing capacity. The representation of the risk cell structure also illustrates how different business areas and event categories can be considered separately and potential correlations can be embedded.

The relevant technical and statistical background for this approach is derived from a literature analysis using the online database ResearchGate. In addition, the relevant regulatory requirements, in this case the Minimum Requirements for Risk Management (MaRisk) and the requirements of the Basel Framework, were analyzed.

RESULTS

In addition to MaRisk, there is also the Basel framework. These are capital adequacy requirements published by the Basel Committee on Banking Supervision, based in Basel, in December 2010 and December 2017. These requirements stipulate, for example, that banks must maintain an internal loss database and use it to quantify operational risk (Kudinska & Sobanova 2022, p. 123).

These have a modular structure and contain specific requirements for the management and control processes for individual risk types as well as for risk reporting (Müller 2022, p. 98).

In addition to regular, mandatory reporting of current risks, two key instruments for managing and quantifying risks can be distinguished in the area of operational risk: a loss database and a risk assessment.

1. Loss database

Another key component of the operational risk management is the loss database. This is a database of OpRisk losses that have already occurred. In addition to the amount of the loss and the date of occurrence, any measures taken and a description of the course of events or background to the loss are also recorded. The database is used to build up historical loss data at institutional level. Cases are usually recorded above a certain loss amount, which often ranges between €1,000 and €5,000, depending on the bank (Hartmann-Wendels et al. 2014, p. 416). In addition, it is also possible to record known risks in the database in a standardised manner. Since the internal database is often not extensive enough to perform statistical calculations based on it, internal data is often supplemented with external data pools (e.g. ORX) in practice.

The historical data also forms the basis for statistical modelling of OpRisk, which in turn is required for inclusion in the bank's RBC calculation (Hager & Romeike 2020, p. 156).

2. Risk assessment

As already mentioned, the risk management process begins with the identification of risks. This also applies to the operational risk management (Baijal 2021, p. 254). Risks are usually identified primarily through a risk assessment. This refers to the general process of risk identification, analysis and evaluation. Essentially, this is the basis and starting point for the entire process (Lyon & Popov 2017, p. 35).

Conceptually, the survey is usually conducted in the form of structured questionnaires. Although there are certain differences in detail, the questions generally cover the amount and frequency of potential losses, the quality of processes and possible measures (Maslen 2010, p. 29).

Based on these two data sources, it is possible to quantify the RBC. The combination of both data sets is particularly important because historical data can only take into account events that have already occurred and therefore does not cover potential risks that do not appear in the historical data. In order to take the individual risks of specific institutions into account appropriately, it therefore makes sense to supplement the historical data with forward-looking, possibly theoretically oriented risk queries in order to obtain as comprehensive and realistic a picture as possible for the quantification.

There are various mathematical and statistical methods that can be used to perform quantifica-

tion. Historical loss data is often used to model the probabilities of occurrence and the amounts of damage separately. To obtain a distribution estimate for the frequency, Poisson, binomial or negative binomial distributions can be used, for example. For severity, on the other hand, lognormal, Pareto, Weibull or generalized Pareto distributions are commonly used. The distributions are then aggregated using a Monte Carlo simulation to obtain an overall risk distribution, i.e. the value at risk (VaR) (see Fig. 1). Since operational risks are often correlated with each other (e.g. an IT failure may lead to legal or reputational risks), there are also many copula models for mapping these dependencies using multivariate modelling and aggregation.

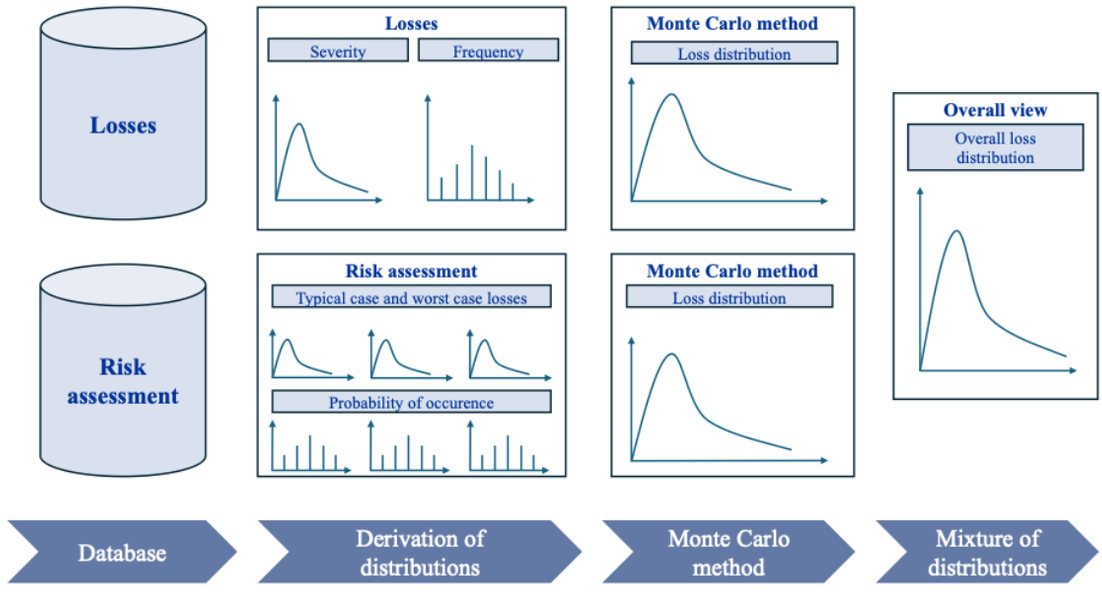

Fig. 1. Four steps of OpRisk quantification

In a sense, the quantification of operational risks can be divided into four steps. The creation of an appropriate database has already been discussed as a basic prerequisite. Building on this, two distributions with the data points contained in there are first generated from the data source of empirical claims. On the one hand, there is a distribution for the amounts of damage, which is derived from the individual damage sums, and on the other hand, there is a distribution of the frequencies of claims, which is formed from the respective occurrence data.

Similarly, two distributions are also generated from the data in the expert estimate. Technically, this works by requiring the experts to estimate the amount of average damage and extreme damage in some form. Put simply, the average damage then represents the maximum of the damage distribution, while the maximum damage limits the distribution on the abscissa to the right.

After deriving the distributions, both distributions per data source are combined into a loss distribution using a statistical method. Monte Carlo simulation is typically used for this purpose.

Random numbers are generated from the existing data in order to statistically map as many future scenarios as possible. An example of this process is as follows:

1. The number of losses in a year is drawn from the frequency distribution.
   a. Example: 7 losses.
2. For each loss, a loss amount is drawn from the severity distribution.
   a. Example: 7 losses with amounts [0.5 million; 2 million; 0.3 million; ...].
3. All losses are added together to give a total annual loss.
   a. Example: EUR 9.1 million.

This process is repeated thousands or even millions of times, so that ultimately a statistically usable empirical loss distribution function can be derived from it.

In the fourth and final step, the overall view, i.e. the combination of the annual losses from both Monte Carlo simulations, is converted into a combined loss distribution. The 99.9% quantile value of this distribution represents the VaR required by the supervisory authorities for the RBC.

Certain dependencies between different categories of operational risk can be modelled by dividing the input data into specific categories in advance. In collaboration with the banking sector, the Basel Committee has defined the following seven event types that encompass OpRisk. These categories are intended to cover aspects of banking operations that can result in large operational losses. The first level of categories can be further broken down into a specific second level and a third level with explicit examples (Maslen 2010, p. 11). In addition to these seven categories, the business areas defined in accordance with CRR are also suitable for this purpose (see Fig. 2).

Business lines		**Event types**	
Corporate finance e.g. Corporate finance; Government finance; Merchant banking	Trading and sales e.g. Sales; Market-making; Proprietary positions; Treasury	Internal fraud e.g. Transactions not reported (intentional); Transaction type unauthorised (intentional)	External fraud e.g. Theft / robbery; Forgery; Hacking damage
Retail banking e.g. Retail banking; Private banking; Card services	Commercial banking e.g. Commercial banking	Employment practices and workplace safety e.g. General liability; All discrimination types	Clients, products and business practices e.g. Breach of privacy; Money laundering
Payment and settlement e.g. External clients	Agency services e.g. Custody; Corporate agency; Corporate trust	Damage to physical assets e.g. Natural disaster losses; Human losses from external sources	Business disruption and system failures e.g. Hardware; Software; Telecommunications
Asset management e.g. Discretionary fund management	Retail brokerage e.g. Retail brokerage	Execution, delivery and process management e.g. Accounting error; Outsourcing	

Fig. 2. Overview of business lines and event types according to the CRR

Before quantification can begin, all input data must first be assigned to the corresponding business areas and event categories. This also involves a corresponding dependency on external data, as this should ideally have identical mapping to the internal loss data for consistency reasons. The risk assessment must also be structured in advance in such a way that all data points and values can be assigned to a business area and an event category without overlap.

If the input data is parameterized accordingly, the model can also be constructed in a matrix structure of 'risk cells', each combining a business area and an event category, i.e. a total of 56 risk cells (see Fig. 3).

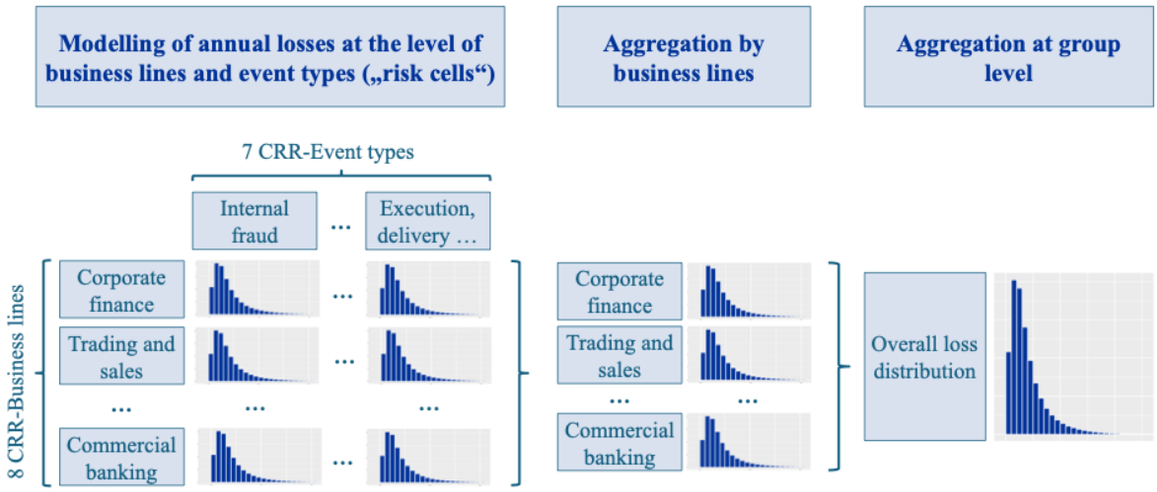

Fig. 3. Exemplary matrix structure of an OpRisk model

The methodology differs only slightly from the example procedure described above; in fact, the statistical methods are completely identical. The various functions are simply formed at a granular level. In the first step, a function for annual losses is formed for each risk cell (e.g. internal fraud & corporate finance) from all assigned data sets. As described above, this results from the combination of the two distributions for the amount and frequency of loss events.

In the second step, after a distribution has been generated for each of the 56 risk cells, these are aggregated at a higher level. It does not matter whether the distributions are aggregated at the business area level or at the event category level. In the example shown here, the aggregation is performed at the business area level, resulting in eight distributions for annual losses. In the final step, these eight functions are combined to form an overall group loss distribution, from which the VaR can then be derived.

Compared to the simplified version, this methodology has the advantage that any correlations between different business areas and event categories can be mathematically represented by assuming certain predefined correlation assumptions when aggregating the distributions from the business area level and at the group level, and integrating them into the model. The distributions are therefore not superimposed 1:1, but it is assumed that certain risks or losses occur more frequently together, or that when certain risks or losses occur, other circumstances cannot occur, which influences the aggregated function accordingly.

The calculation concept is also known as the loss distribution approach and originally comes from the field of actuarial science. Mathematically, this can be expressed as follows:

$$S = \sum_{k=1}^{N} X_k$$

Here, „N“ is the random number of loss events, while „X_k“ represents the random amount of each individual loss.

„N“ describes the number of claims per year in the value range [0, 1, 2, 3, ...] and is typically modelled using a Poisson distribution. Assuming that the distribution is independent of the amount of damage, this gives the expected number of loss events within a year.

„X_k“ describes the amount of the k'th loss in a year in a value range [0, ¥]. The variable is modelled by a right-skewed distribution, which means that there are a large number of small losses with low amounts and a few serious large losses. The assumption here is that all losses originate from the same distribution and that individual losses are independent of each other.

„$k = 1$“ refers to the summation index in the formula and marks the starting value of the count. This means that the summation begins with the first loss event.

CONCLUSION

This paper has shown how German banks can quantify their operational risks within the framework of economic risk-bearing capacity. The starting point for this is both regulatory requirements – in particular MaRisk and Basel regulations – and economic requirements for adequate capitalization. An important aspect, regardless of the point of view, is the strengthening of resilience and thus national security. A key component is the use of two data sources: on the one hand, historical losses, which are systematically recorded in a loss database, and on the other hand, risk-oriented assessments in the form of risk assessments. Only the combination of both approaches enables the most comprehensive possible representation of the risk situation, as historical data alone cannot sufficiently take future developments into account.

It should be emphasized that the procedures described are examples of a widely used approach in practice. The specific design – such as the choice of distributions, the calibration of parameters or the assumptions about correlations – may vary depending on the institution, the data available and the regulatory environment. Nevertheless, the methodology described here illustrates the basic functioning and the essential steps of a statistically sound quantification of operational risks.

Overall, it is clear that a methodologically sound and practical model not only meets regulatory requirements but also serves as an essential tool for internal risk management. In this way, banks can strengthen their resilience to operational risks and thus make an important contribution not only to the stability of the financial system but to national security as well.

The findings of the paper are limited in that they merely represent an example of how operational risks in banks can be quantified. The reality is sometimes very diverse and requires further research in the future with regard to differences in the approaches. Current topics such as ESG, sustainability and artificial intelligence will also influence the quantification of operational risks in banks in the future and should be examined accordingly.

REFERENCES

BAIJAL, R., 2021. Identification, quantification and monitoring of operational risk. *Journal of Securities Operations & Custody*, vol. 13, no. 3, pp. 235–263.

ERKOC, A.; MET, I.; SEKER, S., 2023. Performance, efficiency and target setting for bank branches: Time series with automated machine learning. *IEEE Access*, vol. 11, pp. 1000–1010.

HAGER, P.; ROMEIKE, F., 2020. *Erfolgsfaktor Risikomanagement 4.0: Methoden, Beispiele, Checklisten – Praxishandbuch für Industrie und Handel*. Wiesbaden: Springer Gabler.

HARTMANN-WENDELS, T.; SCHLÜTER, T.; WEBER, T.; ZANDER, M., 2017. Die Risikoberichterstattung deutscher Banken: Erhebung des Branchenstandards. *Schmalenbach Journal of Business Research*, vol. 66, pp. 368–427.

KUDINSKA, M.; SOBANOVA, J., 2022. New tendencies in operational risk management in banks: Challenges and opportunities. *Humanities and Social Sciences Latvia*, vol. 30, no. 1, pp. 108–125.

LYON, B.; POPOV, G., 2017. Communicating and managing risk: The key result of risk assessment. *Professional Safety*, vol. 62, pp. 35–44.

MASLEN, M., 2008. *Steuerung und Reduktion operationeller Risiken im Bankensektor*. Hamburg: Diplomica.

MOHR, B.; RÖDL, H., 2017. Wachsendes Eigenkapital stärkt Stabilität des deutschen Unternehmenssektors. In: *Betriebswirtschaftliche Fragen zu Steuern, Finanzierung, Banken und Management*, pp. 131–143. Wiesbaden: Springer Gabler.

MÜLLER, K., 2022. *Handbuch Unternehmenssicherheit: Umfassendes Sicherheits-, Kontinuitäts- und Risikomanagement mit System*. Wiesbaden: Springer Vieweg.

STRAUSS, M., 2008. *Wertorientiertes Risikomanagement in Banken: Analyse der Wertrelevanz und Implikationen für Theorie und Praxis*. Wiesbaden: Gabler.

КОЛИЧЕСТВЕНО ИЗМЕРВАНЕ НА ОПЕРАТИВНИТЕ РИСКОВЕ В ГЕРМАНСКИТЕ БАНКИ КАТО ЕЛЕМЕНТ ОТ НАЦИОНАЛНАТА СИГУРНОСТ

Резюме: *Управлението на риска е централен стълб на съвременното банкиране, който служи на пазарно ориентирани цели и регулаторни изисквания, насочени към опазване на финансовата ста-*

билност и националната сигурност. В тази рамка оперативният риск (OpRisk) представлява един от четирите основни вида риск, наред с кредитния, пазарния и ликвидния риск. В настоящата статия се разглежда как германските банки могат количествено да измерват OpRisk с цел определяне на икономическата рискоустойчивост като елемент на националната сигурност. Въз основа на регулаторни основи като MaRisk и Базелската рамка се подчертават два ключови източника на данни: бази данни за исторически загуби и прогнозни оценки на риска. Тяхното комбинирано използване позволява на банките да отразят както минали събития, така и потенциални бъдещи рискове. За количествено измерване се прилага подходът на разпределение на загубите, като разпределенията се разделят по честота и тежест и се агрегират чрез симулация на Монте Карло, за да се получи цялостно разпределение на загубите. Допълнителното структуриране по бизнес линии и категории събития позволява детайлно моделиране и включване на зависимости чрез корелационни предположения. Проучването илюстрира примерна, макар и широко установена методология, която предоставя на банките статистически обоснована основа за определяне на стойността на риска при 99,9% ниво на достоверност и интегрирането ѝ в изчисленията на капацитета за поемане на риск. Въпреки че все още съществуват различия в прилагането, моделът показва как количествените методи могат да укрепят оперативната устойчивост и да допринесат за системната стабилност, както и за националната сигурност.

Ключови думи: *оперативен риск; капацитет за поемане на риск; разпределение на загубите; управление на риска*

Флориан Бекер, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: flo.becker@online.de

NATIONAL SECURITY
НАЦИОНАЛНА СИГУРНОСТ

AI-ENABLED SURVEILLANCE SYSTEMS IN THE CONTEXT OF NATIONAL SECURITY AND CRITICAL INFRASTRUCTURE PROTECTION

Bastian Nagel
University of Library Studies and Information Technologies
https://doi.org/10.70300/CSJX1373

Abstract: *The article examines whether and to what extent AI-based motion and behavior pattern recognition can enhance both safety and security at train stations. To answer this research question, secondary research was conducted through a comprehensive literature review. The findings indicate that AI-supported video surveillance is essential for effective safety and security management, as it overcomes the human limitations of conventional monitoring systems. These technologies can identify and track individuals and objects, interpret behavior, and distinguish between relevant and irrelevant activities – although their performance is heavily dependent on the quality of the training data used. The systems learn typical behavior patterns and can automatically trigger alerts in case of deviations. This enables the detection of crowd dynamics, group behavior, and potentially dangerous situations, as well as the timely response to security-related incidents such as pickpocketing, unauthorized access to tracks, acts of vandalism, or even terrorism and sabotage. As a result, security personnel can be used more efficiently, and the public's sense of safety and security can be strengthened. Despite concerns regarding data protection, initial legal frameworks demonstrate that clear regulatory conditions can be established to legitimize the use of such technologies.*
Keywords: *Artificial Intelligence; CCTV; Threat Prevention; Public Safety; Risk Mitigation*

INTRODUCTION

The use of video technology at railway stations in Germany has almost doubled since 2012. By the end of 2024, a total of 11,000 cameras were in use at 750 stations, inevitably forming a central component of the security architecture of the Federal Republic of Germany (Bundesministerium des Innern 2024). In addition to the expansion of conventional video surveillance, the focus in recent years has shifted from simply recording and visualising sequences using video cameras to processing and analysing the data obtained using intelligent systems. Is the person in the video waving to his wife, who is just leaving on the train, or is he about to punch a man on the platform? The video surveillance of the future should provide an answer in a fraction of a second. These video surveillance systems, which use intelligent software to perform automated data analysis and provide users with pre-processed information, are referred to as 'smart video surveillance systems'(Schreiber 2009, 2). The prerequisite for such classification is that the software used can independently recognise patterns in the processed images using an algorithm. Possible application scenarios include biometric facial recognition, tracking people and objects, and analysing behaviour patterns (Held 2014, 21). Although it is difficult for a person being filmed to assess the extent of surveillance even in the context of conventional video surveillance, it can be assumed that the use of artificial intelligence will further restrict the personal rights of a large part of the population. Particularly when used by government agencies, this requires specific government regulation. In this context, the European Union enacted the EU Artificial Intelligence Act in 2024, which includes a risk classification for AI systems and is intended to regulate intelligent video surveillance, among other things. A comprehensive description of all usage scenarios would exceed the scope of this paper. For this reason, the focus is on motion and behaviour pattern recognition, as the author sees the greatest potential for application in this area. The aim of this article is to answer the question of whether and to what extent AI-supported movement and behaviour pattern recognition can improve safety and security at railway stations.

RESEARCH METHODOLOGY

The research methodology used for this paper includes a review and analysis of the existing literature. As part of this literature analysis research, the existing literature is not only reviewed, but also summarized, evaluated and interpreted in the context of the scientific question. This involves consulting academic literature and evaluation studies, as well as the legal situation and, in isolated cases, media reports. The evaluation of specialist literature is expected to provide information on the state of the art, legal conditions and developments in particular. By analysing the evaluation studies, information can be obtained on how the initial trials of intelligent video surveillance have progressed and what actual benefits motion and behaviour pattern recognition could have for security and safety at a railway station.

RESULTS

Necessity of using intelligent video surveillance at railway stations

The use of intelligent video technology is an option in places where conventional video surveillance is already in place. In addition to public events and gatherings, conventional video surveillance focuses in particular on public places prone to danger and particularly vulnerable objects (Desoi 2018, 268). According to the German Minister of the Interior, rail transport is a critical infrastructure that is particularly worthy of protection (Deutscher Bundestag 2007, 5). In addition to airports, railway stations are also considered particularly vulnerable, with the added factor that the open system of the railway does not provide for any security checks on persons or fencing around the infrastructure, as is customary at airports. In particular, the open system and the transport of large numbers of people make both railway stations and trains potential terrorist targets (Bergfink 2016, 16). In addition to the specific threat of terrorist attacks, there are other reasons for installing conventional video surveillance. These include deterring potential perpetrators and enabling identification in cases of offences commonly committed at railway stations, such as damage to property, bodily harm or theft, from a police perspective, and ensuring smooth operations on the part of transport companies (Bergfink 2016, 4). However, operating companies have also recognized that the safer passengers feel, the more frequently they use rail transport. Preventing crimes against passengers and protecting operating facilities from vandalism is therefore just as important as increasing rail users' subjective sense of safety (Harter 2023, 46). Since artificial intelligence has now become suitable for mass use and can be utilized on widely available standard devices (Kämpfer und Voss-de Haan 2019, 1).Security authorities and public service companies cannot ignore this technology either. This is particularly true when it can be assumed that the use of such technology will prevent or immediately stop both terrorist acts and everyday crimes through early detection of the perpetrators. Especially since manual evaluation would require a much larger workforce, particularly when dealing with large amounts of data, e.g. in the context of major events. But the accuracy of humans searching for matches can also be called into question (Wübbelt 2020, 44). In this context, Desoi refers to a decline in performance in relation to the viewing time of the video images (monitor blindness) and long response times between the reporting of a relevant event and the deployment of security personnel. For these reasons as well, effective security and safety measures within the framework of conventional video surveillance can only be achieved through a high personnel effort. (Desoi 2018, 18).

CCTV vs. intelligent video surveillance

The basic principle of conventional video surveillance is simple. A video camera films an area and the images are transmitted one-to-one to a monitor, where they can be viewed by a control person. Intelligent video surveillance uses software for this purpose, which filters the video material for predefined anomalies. If the software detects an anomaly, an operator is notified, who then has the opportunity to view the detail filtered out by the software and take appropriate action (Held 2014, 18 ff.). This means that intelligent video surveillance goes beyond the motion detection already available in conventional video surveillance. Instead, the software can recognise, categorise, track, locate and interpret the behavior of relevant objects. These can be both people and objects that can change a situation (Fraunhofer IOSB 2017, 10). A prerequisite for the evaluation of dig-

itized data by algorithms is that the software also has access to as much training data as possible with known patterns or statistical average patterns with which a comparison can be made (Held 2014, 50).

Technical fundamentals of intelligent video surveillance

Due to the complexity and varying designs offered by different manufacturers, only a rough overview can be provided here. Intelligent video surveillance systems usually consist of several interconnected 'intelligent' video cameras. The number depends on the user's requirements and is only limited by the performance capabilities of the existing hardware. Multiple networked cameras have the particular advantage that the probability of comprehensive motion detection within a video-recorded area increases with the number of cameras used (Desoi 2018, 27). The oldest analysis method, which can be considered the basis for further steps in the vast majority of existing video surveillance systems, is 'motion detection', which is particularly suitable for static events, such as leaving a suitcase behind, because it is already possible to recognize simple behavior patterns and trigger an alarm based on such a detection (Anstädt et al. 2010, 5). The system thus recognizes that something is moving in an image. In many cases, this is followed by 'tracking', which aims to map the actual movement of the detected object (Desoi 2018, 28). Object tracking continuously determines the position of an object in the camera image during recording. In the subsequent activity detection, the algorithms learn to recognize typical behavior in the monitored area. If an unusual or predefined deviating movement is detected, the system triggers an alarm (Lang 2023, 124).

Operational applications of motion and behaviour pattern recognition

Security research therefore focuses in particular on analysis software that can be used in the field of hazard prevention and hazard control. Examples of areas of application include behavioral analysis for the prevention of security-related incidents and the analysis of people flows at large events with the aim of identifying and avoiding potential accident situations at an early stage (Desoi 2018, 3). In 2018, Horn et al. investigated the capabilities of computer vision in relation to the sociological analysis of group emotions and escalation processes within a group. According to their findings, image-based evaluations can be used to perform systematic and large-scale analyses of group behavior. This enables the detection of relevant events and provides new research approaches for further phenomena of group behaviour (Horn et al. 2018, 146). Since technology allows behavior to be declared irregular, it is also possible to monitor high-crime areas with regard to specific offences. In the case of railway stations, these offences include pickpocketing, damage to property and drug dealing. By detecting loitering, pre-delinquent behavior can be identified at an early stage and crimes can thus be prevented before they occur (Lang 2023, 126). Railway companies also do not want groups of people or individuals to linger for long periods without the intention of travelling by train. Loitering can therefore also be detected when the usual length of stay in an area is exceeded. Risks to people associated with rail transport can also be minimized. For example, if someone enters a defined alarm zone, such as the track area, video analysis can detect unauthorized access and immediately alert security personnel (Harter 2023, 47). Subsequently, track closure could be initiated immediately or security personnel could be dispatched. Depending on the susceptibility to error, fully automated track closure due to a person entering the track would also be conceivable. For several years now, Berlin Südkreuz station has been used for research purposes by Deutsche Bahn (Germany´s national railway company) and the Federal Police with the aim of improving security and responsiveness at a busy station through modern video surveillance and intelligent analysis systems. The focus here is on preventing dangers and providing automated support for security personnel. Following the completion of a project on facial recognition at railway stations (Bundespolizeipräsidium Potsdam 2018) video technology has been expanded since 2019 and research is being conducted in the field of behaviour recognition. Here, too, AI-supported software is used to generate automatic alerts to a control centre. The research project aims to identify certain scenarios, such as people in need of assistance, abandoned luggage, crowds and people entering restricted areas, and to derive appropriate measures. Tests are carried out with actors to demonstrate the scenarios and optimize the software by simulating real-life hazardous situations (Deutsche Bahn 2024a). The focus here is on the aforementioned alarm

system that is triggered when certain areas are entered. The software detects people or objects that remain in sensitive areas, such as the platform edge or directly on the tracks, for a prolonged period of time and automatically triggers warnings to the control center. A final report is not yet available (Deutsche Bahn 2024b). From a police perspective, there are also further test phases. For example, the police in Mannheim have been testing an AI-supported system since 2018 that automatically detects potentially criminal behavior and alerts the police control center. The system was initially installed at Mannheim railway station and in other areas of the city center. Encrypted data is transmitted to the police control center, where it is evaluated by the algorithm and then assessed by police officers. The focus here is on determining the extent to which certain algorithms can reliably detect behavior patterns relevant to policing, such as hitting or kicking (Kannenberg 2018). The project was extended by three years in December 2023 (Fraunhofer IOSB 2025). Right from the start of the project, the police were able to provide initial positive feedback. When a critical movement pattern was detected, e.g. a fight breaking out, the police were able to arrive at the scene with police officers after an average of two and a half minutes (Wübbelt 2020, 44). In the immediate vicinity of the station, alarm messages can be used even more immediately by addressing perpetrators or endangered persons via loudspeaker announcements and demanding that they take or refrain from taking certain actions. Behavior pattern recognition can also be useful outside enclosed railway facilities, as it allows unauthorized persons in the track area to be detected, thereby preventing metal theft or acts of sabotage on the railway infrastructure (Harter 2023, 47).

Legal Challenges

Although conventional video surveillance in public spaces has been the subject of legal debate for decades due to the limited personal rights of railway station users (Desoi 2018, 4), it is undisputed that, given the greater intensity of the intrusion, the existing legal basis for conventional video surveillance is insufficient for the use of AI-based analysis software (Wübbelt 2020, 45) (Desoi 2018, 282) (Golla 2020). The European Union has recognized this problem and already enacted the EU AI Act in August 2024, which applies to all European Member States and sets out binding regulations depending on the risk that an AI system poses to society. Behavioral pattern recognition is indirectly regulated in Article 5(1)(c) and (d), Annex III(6a) and Annex III(4b). According to these provisions, it is prohibited when used for social scoring or mass surveillance and highly regulated when used in the areas of law enforcement, security or emotion recognition. These applications therefore fall under the category of 'high-risk AI' and special requirements are imposed to ensure that the use of AI in the field of behavioural pattern recognition does not violate fundamental rights and the GDPR (European Parliament 01.08.2024). The newly enacted police powers in some federal states are based on these principles and were developed at state level to meet specific requirements. In February 2025, Hamburg introduced a change in the law that allows the police to train and test AI systems under strict data protection and security requirements (§ 37a PolDVG). In December 2024, the federal state of Hesse passed the 'Law on Strengthening Internal Security'. Section 14 explicitly regulates motion and behavior pattern recognition. According to this, AI-based video analysis may be used to recognize and evaluate motion patterns that indicate a criminal offence, as well as patterns of a weapon, knife or dangerous object. If movement patterns indicating a criminal offence are detected, the police subsequently check whether a criminal offence of considerable significance is likely; in the case of a weapon pattern, the police may also automatically track the person (Landtag Hessen 13.12.2024).

CONCLUSIONS/DISCUSSION

It is clear that police authorities, railway companies and station operators cannot resist the continuous development and expansion of intelligent video surveillance, as it is an important component of an innovative, digitally supported security architecture. Motion and behavior pattern recognition can be used not only for law enforcement purposes but is also essential from a preventive policing perspective in order to be able to prevent criminal acts at an early stage or to recognize in good time when a person poses a danger or is in a dangerous situation. AI-based video surveillance will continue to face criticism from data protectionists who are concerned about mass surveillance

and a lack of control. However, the first police intervention standards show that legislators are perfectly capable of creating clear legal regulations that can dispel some doubts. In addition to reducing the workload on staff, knowledge of intelligent video surveillance and, in particular, behavior pattern recognition, which can also prevent terrorist offences in certain circumstances, can lead to an increased sense of security among the general public and railway users. Another benefit not considered here could also be in the area of occupational safety. For example, motion detection could warn of an approaching train, or the system could detect people in the track area or people who are not wearing high-visibility vests. Such benefits could be explored further in the future.

REFERENCES

ANSTÄDT, T.; KELLER, I.; LUTZ, H., 2010. *Intelligente Videoanalyse. Handbuch für die Praxis*. 1. Auflage, neue Ausg. Weinheim: Wiley-VCH.

BERGFINK, A., 2016. *Videoüberwachung im öffentlichen Personennahverkehr*. Dissertation. Edewecht: OLWIR – Oldenburger Verlag für Wirtschaft, Informatik und Recht.

BUNDESMINISTERIUM DES INNERN, 2024. *Gemeinsam für mehr Sicherheit: 11.000 Kameras an Bahnhöfen – Zahl der durch die Bundespolizei aufgeklärten Straftaten verdreifacht*. [viewed 08 July 2025]. Available from: https://www.bmi.bund.de/SharedDocs/pressemitteilungen/DE/2024/12/bahnhof-kameras.html

BUNDESPOLIZEIPRÄSIDIUM POTSDAM, 2018. *Teilprojekt 1: Biometrische Gesichtserkennung. Abschlussbericht.* Potsdam. [viewed 13 September 2025]. Available from: https://media.frag-den-staat.de/files/foi/431222/20191023_Abschlussbericht_Stand_18.09.2018.pdf

DESEOI, M., 2018. *Intelligente Videoüberwachung: Rechtliche Bewertung und rechtsgemäße Gestaltung*. Wiesbaden: Springer Vieweg.

DEUTSCHE BAHN, 2024a. *Ausbau der Videotechnik. Deutsche Bahn und Bundespolizei bauen gemeinsam die Videotechnik an Bahnhöfen aus*. [viewed 13 September 2025]. Available from: https://sicherheitsbahnhof.bahnhof.de/suedkreuz/Videotechnik/Ausbau-der-Videotechnik-9642248#9642248

DEUTSCHE BAHN, 2024b. *Fragen und Antworten zur Videotechnik und Videoanalyse*. [viewed 13 September 2025]. Available from: https://sicherheitsbahnhof.bahnhof.de/suedkreuz/Videotechnik/Fragen-und-Antworten-zur-Videotechnik-und-Videoanalyse-9643002

DEUTSCHER BUNDESTAG, 2007. *Beschlussempfehlung und Bericht des Innenausschusses zu dem Gesetzentwurf der Bundesregierung – Drucksachen* 16/6292, 16/6570 (neu). Entwurf eines Dritten Gesetzes zur Änderung des Bundespolizeigesetzes. Berlin. [viewed 14 September 2025]. Available from: https://dserver.bundestag.de/btd/16/071/1607148.pdf

EUROPEAN PARLIAMENT, 2024. *Artificial Intelligence Act (AI Act)*. 01 August 2024. [viewed 14 September 2025]. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401689

FRAUNHOFER IOSB, 2017. *Öffentliche Sicherheit – intelligente Videoauswertung. Ed. J. Beyerer. Karlsruhe: Fraunhofer Institut für Optronik, Systemtechnik und Bildauswertung*. [viewed 12 September 2025]. Available from: https://www.iosb.fraunhofer.de/content/dam/iosb/iosbtest/documents/projekte/intelligente-video%C3%BCberwachung/visIT3_2017%20Oeffentliche%20Sicherheit.pdf

FRAUNHOFER IOSB, 2025. *Intelligente Videoüberwachung für mehr Sicherheit und Datenschutz. Algorithmenbasierte Videoüberwachung im öffentlichen Raum zur Bekämpfung von Straßenkriminalität*. [viewed 13 September 2025]. Available from: https://www.iosb.fraunhofer.de/de/projekte-produkte/intelligente-videoueberwachung.html

GOLLA, S., 2020. *Lernfähige KI erfordert lernfähiges Polizeirecht. Verfassungsblog*. [viewed 13 September 2025]. Available from: https://verfassungsblog.de/lernfaehige-ki-erfordert-lernfaehiges-polizeirecht/

HARTER, M., 2023. Intelligente Videoüberwachung sichert Bahnhöfe und Bahnanlagen. *Der Nahverkehr*, no. 12, pp. 46–48.

HELD, C., 2014. *Intelligente Videoüberwachung*. Dissertation, Universität Würzburg, 2013. Berlin: Duncker & Humblot.

HORN, D.; HOUBEN, S.; SCHÖNER, G., 2018. Erste Ansätze zur automatischen Erkennung von Gruppenverhalten mithilfe des Computersehens. In: REICHERTZ, J.; KEYSERS, V. (Eds.). *Emotion, Eskalation, Gewalt. Wie kommt es zu Gewalttätigkeiten vor, während und nach Fußballspielen?* 1. Auflage. Weinheim; Basel: Beltz Juventa, pp. 130–147.

KÄMPFER, A.; VOSS-DE HAAN, P., 2019. *Künstliche Intelligenz und ihre Bedeutung für die Polizei. Bundeskriminalamt.* [viewed 12 September 2025]. Available from: https://www.bka.de/SharedDocs/Downloads/DE/Publikationen/ForumKI/ForumKI2019/kiforum2019VossKaempferAbstract.html

KANNENBERG, A., 2018. *Mannheim testet verhaltensbasierte Videoüberwachung. In Mannheim soll ein intelligentes Kamerasystem kriminelles Verhalten erkennen und die Polizei alarmieren*. [viewed 13 September 2025]. Available from: https://www.heise.de/news/Mannheim-testet-verhaltensbasierte-Videoueberwachung-4239279.html

LANDTAG HESSEN, 2024. *Gesetz zur Stärkung der Inneren Sicherheit in Hessen*. 13 December 2024. [viewed 10 September 2025]. Available from: https://starweb.hessen.de/cache/GVBL/2024/00083.pdf

LANG, J., 2023. Intelligente Videoüberwachung. Eine Wirkungsanalyse am Beispiel der Verhaltens-/Bewegungsmustererkennung. *Kriminalistik*, no. 2, pp. 124–128.
SCHREIBER, S., 2009. *Personenverfolgung und Gestenerkennung in Videodaten*. Technische Universität München. [viewed 08 July 2025]. Available from: https://mediatum.ub.tum.de/doc/676401/676401.pdf
WÜBBELT, B., 2020. Zankapfel intelligente Videoüberwachung: Verwaltungsgericht Hamburg kassiert Löschungsanordnung. *Polizei, Verkehr und Technik*, vol. 65, no. 2, pp. 42–45.

СИСТЕМИ ЗА НАБЛЮДЕНИЕ, ПОДПОМАГАНИ ОТ ИЗКУСТВЕН ИНТЕЛЕКТ, В КОНТЕКСТА НА НАЦИОНАЛНАТА СИГУРНОСТ И ЗАЩИТАТА НА КРИТИЧНАТА ИНФРАСТРУКТУРА

Резюме: *Статията разглежда дали и до каква степен разпознаването на модели на движение и поведение, базирано на изкуствен интелект, може да подобри безопасността и сигурността на железопътните гари. За да се отговори на този изследователски въпрос, беше проведено вторично проучване чрез цялостен преглед на литературата. Констатациите показват, че видеонаблюдението, поддържано от ИИ, е от съществено значение за ефективното управление на безопасността и сигурността, тъй като преодолява човешките ограничения на конвенционалните системи за наблюдение. Тези технологии могат да идентифицират и проследяват лица и обекти, да интерпретират поведението и да правят разлика между релевантни и нерелевантни дейности, въпреки че ефективността им силно зависи от качеството на използваните данни за обучение. Системите учат типични модели на поведение и могат автоматично да задействат сигнали в случай на отклонения. Това дава възможност за откриване на динамиката на тълпата, групово поведение и потенциално опасни ситуации, както и за навременна реакция при инциденти, свързани със сигурността, като джебчийство, неразрешен достъп до релси, вандалски актове или дори тероризъм и саботаж. В резултат на това персоналът по сигурността може да се използва по-ефективно, а чувството за безопасност и сигурност на обществеността може да се засили. Въпреки опасенията, свързани със защитата на данните, първоначалните правни рамки показват, че могат да бъдат създадени ясни регулаторни условия, които да легитимират използването на такива технологии.*

Ключови думи: *изкуствен интелект; видеонаблюдение; предотвратяване на заплахи; обществена безопасност; намаляване на риска*

Бастиан Нагел, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: bastian.nagel2@gmx.de

НАЦИОНАЛНА СИГУРНОСТ
NATIONAL SECURITY

DELEGATING CYBER DEFENSE TO ALGORITHMS: THE LEGAL BOUNDARIES OF AUTONOMOUS RESPONSE IN BULGARIA

Vladimir Babanov
South-West University "Neofit Rilski"
https://doi.org/10.70300/NEXH2197

Abstract: *The article examines the legal implications of autonomous response mechanisms in the Bulgarian cyber defense system. It analyzes Bulgaria's legal framework and observes it into the broader context of NATO and EU's strategic documents. The article defines and studies the legal viability of autonomous cyber response, highlighting how automated defensive actions challenge existing legal standards. The evolution of Bulgaria's cyber defense posture is documented, beginning with early cyber defense strategies and through to the most recent alignment of the EU directives and NATO requirements. The discussion reveals that the Bulgarian law does not provide specific legal authorization for automated counter-measures in the case of cyber-attacks. The lack of legal authorization creates theoretical and compliance issues. The article concluded that while the national law of Bulgaria provides a comprehensive base to address cybercrime and protect critical infrastructure, there are challenges to incorporate autonomous cyber responses into existing legislation. It is based on the clear presumption that development of any strategy requires compatibility with the international obligations of the country.*
Keywords: *cyber defense; autonomous response; artificial intelligence; legal framework; Bulgarian legislation*

INTRODUCTION

Cyber defense has become an essential aspect of national security. With the rise of autonomous response systems, utilizing artificial intelligence (AI) for detecting and countering cyber threats without human intervention, nation-states seek to develop ways to defend their networks at machine speed. However, the development of technology complementing cyber defense is evolving ahead of existing legal frameworks and EU's policy for investment in cyber defense is a broad attempt to reverse this tendency. Still, there is little clarity regarding the legal authorization of these types of activities. The disconnect between developing technologies and established legal frameworks is evident in Bulgaria as the country seeks to expand its cyber defense capabilities, while maintaining the rule of law and guaranteeing human rights.

The circumstances in Bulgaria represent the dilemma of how to facilitate the national legislature to the emerging practices in cyber defense. Bulgaria has established an internal legal foundation for cybersecurity via the Updated National Strategy for Cybersecurity, the Cybersecurity Law and the Criminal Code, which source from EU directives. At present, due to delay in implementing the NIS2 Directive, Bulgaria's cyber defense system is based on Cybersecurity Act of 2018 and the NIS1 Directive, which establishes the nation's apparatus for overseeing the security of networks. Additionally, as a NATO ally, Bulgaria is integrated into alliance cyber strategies and engages in joint exercises and information-sharing (SHAPE Public Affairs Office 2025).

Evidently, there are still unknowns to whether the Bulgarian legislature allows for more proactive or automated cyber responses to threats. Such unknown is the question: would an AI-enhanced defense system be legally cleared to act autonomously against an ongoing threat? Additionally, the problem for legal accountability in case an autonomous countermeasure results in unintended damage remains open. This article addresses such questions by assessing the relevant legal framework of the country in relation to autonomous cyber operations.

METHODOLOGY

This paper follows an academic approach to describe Bulgaria's legal and institutional framework, covering national laws under the impact of EU and NATO agendas. Following the description of the legal and institutional framework, a definition of autonomous cyber response is derived to clarify the terms used throughout the paper. The development of Bulgaria's cyber defense posture within the context of EU and NATO is approached in a holistic manner. The empirical data, gathered by reviewing and analyzing laws, codes and relevant literature, illustrates the legal specifics and theoretical gaps in the Bulgarian law for potential areas of ambiguity or lack of alignment with autonomous response capabilities. The Discussion section fuses the findings while the Conclusion offers final thoughts on reconciling the technological possibilities of autonomous cyber response with the legal and ethical imperatives in Bulgaria's cyber defense.

DISCUSSION

Defining "Autonomous response"

Autonomous cyber response refers to the process of automated systems performing various cyber defense functions. Conducted by a blending of software, hardware and AI, the autonomous actions might include identifying and blocking malicious traffic, isolating an attacker's access to a network, or response to a cyber-attack without human involvement in the decision-making process. Autonomous cyber response should hold a degree of automation sufficient enough for the system to operate independently of human presence. The defining characteristic of autonomous response systems is their ability to monitor circumstances and execute adequate countermeasures with speed and agility that exceeds the ability of humans to respond.

Legally centered literature distinguishes "passive" automated responses to cyber threats from "active", that may include offensive countermeasures against an adversary. While there has been increasing discussion on active cyber defense in Europe, the legal and political circumstances for their use remain poorly defined (Bendiek & Bund 2024). They emphasize on European cyber defense postures that delegate responsibility to the states to create normative frameworks regarding the deployment of active cyber defense measures. The aim is avoidance of unregulated or disorganized uses of active cyber defense, which would be likely to result from undefined authorities. A major concern with respect to the use of cyber countermeasures is the compliance of the actions with established principles of international law, including sovereignty, due diligence, and proportionality. For example, Germany's 2023 National Security Strategy explicitly ruled out "hackback" as a means of defense, stating that "there are high legal hurdles" to using this type of measure, and that reliable attribution of an attacker is necessary prior to taking action (Bendiek & Bund 2024). This provokes a broader caution in Europe regarding crossing the line between defensive and offensive operations in cyberspace.

A key distinction must be made between autonomous defensive cyber response and offensive hacking. Organizations today often employ automated cyber defenses as most recognize their legitimacy and legality, since they only occur inside an organization's own network. However, the focus of the discussion is on more comprehensive and autonomous cyber defense measures, which may involve the use of cyber defense techniques that actively seek out attackers and pursue disruption of the source of an attack. In particular, when these measures are automated, they begin to approach what has been referred to as "offensive security". For example, an autonomous defense system might be capable of injecting a code to clog a server that has been identified as malicious for the Bulgarian infrastructure. While the intention behind such action may be legitimate, the manner of its implementation raises legal concerns if it were to operate across networks outside the jurisdiction of the Bulgarian government.

From a military perspective, autonomous cyber capabilities may be seen as similar to a sentry system that alerts authorities in case of an attack and takes active steps to counter it. Researchers at NATO have noted that the term "autonomy" in the context of cyber operations can apply equally to both defensive and offensive tools (Liivoja, R. et al. 2021). The mentioned level of autonomy can reside in three different areas: target selection to counter, methods on how to counterattack or iso-

late, and effect on the parameters within which the system operates to achieve a desired outcome. However, fully autonomous cyber weapons may be able to replicate themselves across a network and disable enemy systems on their own or go rogue, and examples of such autonomous weapons include Stuxnet (Scharre 2018).

However, the focus of this examination remains centered on national cyber defense, specifically autonomous responses employed by a nation-state or its critical infrastructure in order to protect itself against cyber-attacks. Importantly, complete autonomy in cyber defense systems does not exist, rather there exists varying degrees of human oversight. Systems may require a human to approve suggested courses of action (human-in-the-loop), may provide a human with monitoring and intervention capabilities, or may strive for completely independent action. As the degree of autonomy increases, so too does the challenge to existing legal frameworks that strongly assume the existence of human agency. Therefore, as part of the current examination, the existing Bulgarian law is assessed.

Legal and institutional context in Bulgaria

The legal system in Bulgaria primarily regulates cybersecurity at the national level via its general criminal laws, and special laws. The Bulgarian Criminal Code has been regulating the key cybercrimes since 2005, when Bulgaria signed the Budapest Convention on Cyber Crime (Council of Europe 2001). The Criminal Code specifically forbids illegal access to a computer systems and data, attacks on critical infrastructure, or systems interference as well as other cybercrimes (Criminal Code: Article 319a-319e). The penalties for the unauthorized intrusion and other cybercrimes can result in prison sentences of up to 12 years, increasing to 15 years for compromise of national security or state secrets. These provisions suggest that private "hackback" or vigilante justice is prohibited in the cyber realm and is still perceived as a criminal offence. According to the Criminal Code, the defensive actions in cyberspace must be conducted within the law, which generally requires protective measures instead of offensive retaliation.

In 2018, Bulgaria passed the Cybersecurity Act to create a regulatory framework for the protection of network and information security. This Act transposes the European Union's (EU) NIS Directive (2016/1148) and therefore primarily addresses the resilience of vital infrastructure and digital service providers. The Act assigns tasks and mechanisms for inter-agency cooperation rather than the execution of offensive cyber operations. The Ministry of e-Governance is designated as the national competent authority and single point of contact for cybersecurity matters pursuant to this law (Geneva Digital Platform 2018) Under the Act, a multi-layered structure is created including Cybersecurity Council to coordinate high-level matters, a National Computer Security Incident Response Team (CERT Bulgaria) to handle operational incident response issues, and sectoral CSIRTs for critical sectors.

Essential services operators such as energy, transportation, banking, healthcare, etc., are required to implement security measures and report incidents quickly pursuant to the Act. While the Cybersecurity Act enhances an entity's readiness to defend itself, it does not authorize any form of "active defense" beyond an entity's own network. In fact, cyber incidents that may be criminal in nature are to be referred to law enforcement, not to defense authorities. The Act stipulates that the cybercrime unit of the Ministry of Interior is to be consulted with during investigations of incidents that may constitute a crime.

Bulgaria's defense establishment has also undergone changes to address cyber threats. The Law on Defense and Armed Forces was amended in 2021 to include a new Cyber defense Command as part of the Bulgarian Army. The creation of the Cyber defense Command, along with a Logistics Support Command, signifies that cyberspace is formally recognized as a domain of military action. The Chief of Defense now has control of the Cyber defense Command and has integrated it into defense planning and operations. However, in peacetime, the mandate of the Cyber defense Command is limited by law as the military cannot take action against cyber threats without certain legal thresholds, such as a state of war or emergency, being met or providing assistance to civilian authorities upon their request.

Bulgaria's law traditionally separates internal security, handled by the police and security

agencies under civilian law, from defense against external aggression, handled by the armed forces under defense-related laws and international conventions. Thus, the question for cyber defense arises as sophisticated cyber threats can often blur the distinction between internal and external or criminal activity and a breach in national security. At present, Bulgaria has not publicly defined rules of engagement for its Cyberdefense Command. Autonomous cyber response by the military, if any, would need to respect both domestic law restrictions and international legal norms.

Bulgaria's cyber defense is shaped by its commitments to the EU and NATO. EU law is the underlying structural framework for Bulgaria's national cyber defense and EU initiatives guide predominantly Bulgaria's legal approach. The NIS Directive, the future NIS2 Directive updates for Bulgaria, and the EU's 2022 Cyber Defense Policy, call on member states to develop full-spectrum cyber defense capabilities, including active cyber measures, in a coordinated manner (Bendiek & Bund 2024). The Council of the EU in 2023 stressed that such measures must remain "defensive" in character, and the decision and responsibility for implementing them rests with each state. Therefore, Bulgaria must develop its own policy on active cyber defense, ensuring that any actions taken comply with EU principles and with the UN-endorsed norms of responsible state behavior in cyberspace. Furthermore, as an EU member state, Bulgaria participates in ENISA's programs and can partake in joint cyber drills or the Cyber Rapid Response Teams initiative, that is a voluntary initiative among some EU states.

These mechanisms improve Bulgaria's capability to respond to cyber threats, but do not supersede Bulgaria's law regarding the use of force or law enforcement.

Membership in NATO is yet another dimension of the context in which Bulgaria adopts its laws. NATO recognized cyberspace as a domain of operations in 2016 and allies agreed to enhance their collective cyber defenses. As a member of NATO since 2004, Bulgaria has aligned its policies with the Alliance's Cyber Defence Pledge and Strategic Concept. NATO's 2022 Strategic Concept describes cyberspace as "continuously contested", requiring preparation for defense across the spectrum of peace, crisis, and conflict. In July 2023, NATO approved a new cyber defense policy to enable seamless civil-military cooperation in respective situations.

From a practical perspective, this encourages NATO members to enhance coordination between their civilian cybersecurity organizations and their military cyber organizations at all times. In fact, Bulgarian officials emphasize that the armed forces, security services, and civilian agencies must work "side-by-side" to develop cyber resilience (Petrova 2025). Bulgaria also benefits institutionally from NATO resources by participating in Cooperative Cyber Defence Centre of Excellence (CCDCOE) in Tallinn. Bulgaria also hosts the NATO Crisis Management and Disaster Response Centre of Excellence in Sofia (Council of Ministers 2021). Participation in these centers of excellence provides Bulgaria with expertise on cyber defense and cyber law doctrines. NATO exercises such as Cyber Coalition test Bulgaria's ability to respond to large scale cyber-attacks in concert with its allies. The interoperability within the alliance is further developed by the NATO's Federated Mission Networking which is critical for cyber defence and Bulgaria is a part of it.

With the update of the Bulgarian national laws and strategies a key benefit is the establishment of a Cybersecurity Monitoring and Response Center assigned to the State Agency for National Security. Its function is monitoring of critical communications infrastructure resilience, cyber incidents and responding adequately when needed. In terms of legislation, Bulgaria is currently in the process of transposing into national law the European Union's NIS2 Directive (Directive (EU) 2022/2555). Amendments to the Cybersecurity Act are being drafted as part of a broader effort to expand the range of regulated industries and impose increased requirements for security and reporting on those entities. The new regulatory regime is expected to be implemented any time soon and foresees additional organizations to cybersecurity regulations, promoting further cross-border coordination. While NIS2 primarily addresses resilience and incident response, it also has an indirect impact on active defense through the elevation of capabilities to detect and respond to threats at an earlier stage. In such cases, an autonomous system would act in a preventative manner.

However, any offensive cyber response by Bulgaria in a real-world scenario would likely require political approval at the highest levels, and if executed as part of NATO, would require

consensus among allies. This comprises a difficult threshold that inherently restricts autonomous or unilateral cyber responses through its traditional chain of command. Therefore, Bulgaria's legal context for cyber defense includes criminalization of cyberattacks and a comprehensive cybersecurity governance framework focused on prevention, resilience, and incident response. The institutional arrangements for addressing cybersecurity overlap civilian organizations and the military in conjunction with the recommendations provided by the EU and NATO. What is absent is clear legal direction on autonomous or active countermeasures in cyberspace as it becomes a pressing issue with the AI development and adoption.

Legal uncertainties and gaps

Evidently, the Bulgarian cyber defense architecture is still in development and the possibility of a legal framework authorizing autonomous cyber response is not discussed yet. The gaps in the legal framework are both theoretical and practical. The next pages focus on several crucial gaps that need to be addressed for entertaining the concept of autonomous response in cyber defense.

The first one illustrates the lack of legal authority for offensive cyber operations. Neither Bulgarian cybersecurity nor defense legislation contain precise allowances for offensive cyber operations, whether conducted by humans or machines. There is no provision that permits an entity to "hackback" an attacker that has compromised their systems, even in self-defense. Such actions would likely fall within the scope of Article 319a of the Criminal Code or similar, putting the entity at risk of prosecution, just as the hackers would be. Bulgarian authorities, though, do have the power to conduct undercover technical activities with court order through legally regulated offensive means for the purposes of investigation.

However, these are limited to specific cases and do not provide blanket authorization for autonomous retaliatory actions. The Law on Defense and Armed Forces and the associated strategies detail plans for developing defensive capabilities to counter cyberattacks, but they fail to specify rules of engagement for taking offensive action against adversary computing resources through autonomous systems. In essence, Bulgarian law currently views cyber defense as protecting native systems, and pursuing cybercriminals through law enforcement and investigation. Preemptive or autonomous disruption of an external threat, therefore, exists in a gray area of legality.

The Bulgarian defense law explicitly grants authority for decision making to human officials. The status of the President as Commander-In-Chief, the Government, the Minister of Defense, and the Chief of Defense have been established for the use of force or active defense measures. For example, any deployment of military capabilities, presumably regarding cyber operations beyond Bulgarian networks, would require proper legal approval and likely parliamentary review if not regulated in NATO and EU's strategic documents. The existence of an autonomous cyber response system that could operate outside of Bulgarian networks would disrupt the chain of command.

Legally, delegating military responsibilities to a machine even partially is not regulated. However, in an allied nation, such as the U.S., the case has an answer through the Department of Defense's Directive 3000.09 Autonomy in Weapon Systems (US Department of Defense 2023). The Directive excludes cyberspace operations from the scope due to the complexity of creating legal regulation (Scharre 2018) that is non-existent at the moment. Hence, if the Bulgarian Cyber defense Command was using AI to counterattack in cyberspace, it would be operating in a policy void. A possible interim solution is that such a system must be overseen by a human command responsible for the initiation and consequences of the autonomous defense. In this context, the questions about the legal liability in such developments are numerous.

Autonomous responses could also blur the distinction between the pursuit of criminal justice and national defense. In Bulgaria, as in most countries, if an incident is attributable to state actors or constitutes a national security threat, agencies such as DANS and possibly the military would be engaged. However, the legal standards for escalating involvement by law enforcement or defense agencies in cyber incidents are not clearly articulated. In this grey area, a serious cyber incident would likely be addressed under the Law of measures and actions in a State Emergency or the Defense Act only if it exceeded certain impact thresholds. In addition, an autonomous system responding with counter-measures could involuntarily draw Bulgaria into an unauthorized use

of force on foreign systems. If the addressed incident proves to be a criminal case and as such- a matter to international cooperation, Bulgaria might be violating international treaties and laws.

As mentioned above, there is a key theoretical void in how Bulgarian law would assign accountability for the decisions by an automated AI system in cyber defense. In a presumable case, an autonomous response tool employed by the Bulgarian state identifies a cyber-attack on critical infrastructure and therefore automatically executes a script that incapacitates the attacking party's source. Consequently, the source turns out to be a legitimate server that had been spoofed by an attacker resulting in harm to a foreign business or a critical service. Such a scenario would raise many legal issues. Under the Bulgarian law, such actions are deemed responsible for damages suffered by the legitimate server owner and potentially criminally liable.

The EU's AI Act does not provide a basis for holding AI systems accountable. Instead, it provides a basis for human legal responsibility. In the context of Bulgaria, however, there is no specific legislation that addresses the use of AI in defense or security. Therefore, any autonomous action taken by Bulgaria in defense would be governed by existing laws that presume human purpose and control. This could result in a discouragement for the adoption of autonomous tools due to the associated legal risks. Alternatively, for the provider of the autonomous tool there is a potential legal gray area that might be exploited unethically.

Although the primary focus is on national law, Bulgaria's use of autonomous cyber responses intersects with its international obligations. If an autonomous cyber response by Bulgaria were to unintentionally harm systems of another state, it could be interpreted as a violation of sovereignty or as an unlawful use of force under international law. Bulgaria, as an EU member, endorses the 11 voluntary norms of responsible state behavior in cyberspace that were recognized by the UN (UN General Assembly 2021). However, if an autonomous counterstrike results in unintended consequences such as collateral damage, it may violate some of these norms too.

Additionally, if Bulgaria becomes a victim of a cyberattack, NATO's collective defense provisions could be invoked, but a response, including an autonomous one, would still require human political decision. In other words, while technology may automate certain parts of the response, the law and the international obligations do not foresee automation of war. The existing theoretical gap can be found in the lack of a conceptual or legal framework connecting low-level autonomous defensive mechanisms to higher level countermeasures.

The term "autonomous response" itself is undefined in Bulgarian legislation. Addressing the problem should begin with clearing the uncertainty around its meaning. For Bulgaria, defining this in law or strategy would be beneficial. The current National Cybersecurity Strategy (as updated through 2023) includes provisions for an "effective mechanism for rapid and coordinated response to large-scale cyber and hybrid attacks" (Council of Ministers 2021) and for the development of countermeasures to reduce the negative consequences of such attacks. However, the strategy does not mention offensive measures but the ambiguity can be viewed as a deliberate precautionary measure. Nevertheless, as Bulgaria develops new strategies, a clearer policy definition may become necessary. Gaps in definitions at the theoretical level could bring operational gaps in implementation.

Bridging the gaps and possible solutions

The development of Bulgaria's cyber defense showcases the difficulty of integrating modern, advanced technology into an established, legal and institutional framework. The prior analysis illustrated Bulgaria's progress in enhancing cyber defense under the rule of law. However, there is still considerable policy and legal work to be accomplished in terms of autonomous cyber-response if the government deems it necessary.

The analysis brings forward the need towards a reactive-only posture for cybersecurity to a more proactive posture, provoked by the pressing technology advancements. Recent legal framework trends in EU and NATO clearly demonstrate a shift toward anticipating and preventing cyber-attacks, rather than responding after their occurrence. For Bulgaria, this suggests a requirement for national legislation to explicitly permit the government engagement in proactive cyber defense activities. This does not necessarily mean the inclusion of autonomous response to attacks

but refinement of the legislation to reflect the current trends in technology should be considered. Any such provision would need to incorporate adequate checks and balances as clear criteria, human oversight, and compliance with international law. Importantly, if these actions are to be autonomous, then regulatory mechanisms must provide for human accountability to remain. A viable mechanism to accomplish this is to require a chain of command to approve or authorize the deployment of autonomous counter-measures to preserve human accountability.

NATO's emphasis on conducting operations throughout the spectrum provides Bulgaria the opportunity to develop doctrines for military assistance in large-scale cyber incidents short of war. An initial step would be to establish legislation or protocols between the civilian authority in charge of cybersecurity and the Ministry of Defense specifying the conditions and manner in which the Cyber-defense Command could assist in the event of a national cyber-crisis. Such protocols may provide specific details on when and how military cyber-units may utilize certain tools, including automated ones, to assist in containing and recovering from cyber-attacks under the direction of the civilian authority during times of peace. Establishing such formal relationships would eliminate uncertainty and ambiguity on role separation and how Bulgaria intends to conduct national cyber-defense.

A primary concern raised in the context of autonomous response is the possible balkanization of cyberspace with unaccountable algorithms. To mitigate, Bulgaria and similarly situated countries, could commit that any active cyber-defense measures employed would be defensive and proportionate. Enshrining such a commitment would be consistent with the normative principle of due diligence and responsible state behavior, and would provide a framework for domestic purposes. Hence, instead of focusing on autonomous counterattacks, Bulgaria could focus on employing autonomous containment.

Another factor frequently overlooked in the context of law is whether operators and decision makers have a sufficient level of competence to operate and direct autonomous cyber response systems. In order for the Bulgarian command to either authorize or rely on AI-based cyber response systems, they would need understanding of the systems' capabilities and limitations. Therefore, while Bulgaria may need to invest in technical capacity to train personnel to effectively operate AI-based cyber response systems, the capacity building itself should also be clear and legal in nature. Training programs should provide scenarios illustrating autonomous cyber response and teach how to assess such actions under both domestic and international law. The fact that Bulgaria has incorporated academic institutions into its cyber-exercise program, suggests that it can extend effort to include law academics and practitioners to facilitate simulation of decision-making in cyber-crises. Ultimately, this enables a body of professionals with understanding of both the technology and the jurisprudence associated with cyber defense.

Due to Bulgaria's membership in NATO and the EU, it is able to participate in shaping the evolving norms related to autonomous cyber defense. Through participation in NATO's CCDCOE and EU working groups, Bulgarian experts could contribute to the development of common definitions for concepts such as active defense, countermeasures, law enforcement activities and armed response in cyberspace. In addition to ensuring that Bulgarian national interests are represented, participation in these forums would also enable Bulgaria to advocate for a cautious, law governed approach to autonomous cyber defense.

The upcoming NIS2 Directive would increase the number of entities subjected to cybersecurity obligations in Bulgaria. Therefore, entities would need to implement more advanced security measures, some of which may utilize AI-based security solutions. Bulgarian regulators would need to prepare to provide guidance and assess the upcoming advanced security measures. Under the law, regulators may interpret provisions allowing for autonomous responses within the control of entities managing their own risk. Regulators may also encourage the use of automation for increased speed. However, regulators must ensure that internal autonomous responses do not become inadvertently offensive. For example, an overly aggressive endpoint security AI should not be allowed to "strike back" at foreign IP addresses unless authorized by competent authorities. Additionally providing guidance in implementing regulations of the Cybersecurity Act, amended to comply with NIS2, would be advisable.

CONCLUSION

The research has revealed the gap between what technology is capable of and what the law permits. The legislation should play a major role in regulating what benefits risk-countering associated with the use of technology. As part of the EU, Bulgaria has implemented relevant EU Directives and NATO strategies with relative success, envisioning the lagging NIS2 implementation. This has allowed the country to build institutions that boost the increase of cyber resilience and promote international cooperation. However, technology and threats continue to advance at a rapid rate. The next step in improving cyber defenses is to develop legislation that regulates systems capable of automatic responses to cyber incidents but in limited scope and always with human-in-the-loop.

The Bulgarian legislation currently follows a conservative approach according to automated processes. Presently, there is no legal provision for an AI to conduct independent counter-measures against hackers but its usage in certain activities is definitely an entertainable option. Therefore, the three key gaps identified in the research regarding authorization, accountability, and the overlap of defense and law enforcement functions, are not unique to Bulgaria, as the country's law-making must be in compliance with the rest of its allies in NATO and EU. Furthermore, addressing the gaps would require establishing clear boundaries and responsibilities regarding the deployment and usage of autonomous response systems. It is possible to deploy autonomous response systems, consistent with Bulgaria's existing legal obligations. For example, allowing the use of automated blocking or deception of incoming attacks is achievable and is unlikely to generate ethical controversy. Debating and defining whether and when active measures may be taken, including disabling an attacker's capabilities, is a complex task that could be undertaken in policy forums involving stakeholders.

The case of Bulgaria illustrates a problem that exists in many countries today. It consists of reconciling technological innovations in cyber defense with a commitment to legality and solidarity among allies. The debate of AI adoption on all levels of defense is persistent and urgent which means that the legislation would not avoid dealing with the matter in the future. By actively identifying and closing the gaps in the legal and theoretical frameworks, Bulgaria can establish a solid basis for integration of autonomous response capabilities into its cyber defense apparatus. The goal would be enhancement of cyber defense posture while maintaining the principles of accountability and state responsibility.

REFERENCES

BENDIEK, A.; BUND, J., 2024. Hardening Norms and Networks: Europe's Cyber Defence Posture. *Intereconomics*, *59*(4), pp. 198–203. [viewed 7 January 2026]. Available from: https://sciendo.com/2/v2/download/article/10.2478/ie-2024-0041.pdf

COUNCIL OF EUROPE, 2001. *Convention on Cybercrime, Budapest, European Treaties Series-185*. [viewed 7 January 2026]. Available from: https://rm.coe.int/1680081561

COUNCIL OF MINISTERS OF REPUBLIC OF BULGARIA, 2021. *Updated National Cybersecurity Strategy "Cyber-Resilient Bulgaria 2023"*. [viewed 7 January 2026]. Available from: https://www.enisa.europa.eu/sites/default/files/ncss-map/strategies/reports/BG_NCSS_2021_en %28draft translation%29.pdf

GENEVA DIGITAL PLATFORM, 2018. *Bulgaria's Cybersecurity Law*. [viewed 7 January 2026]. Available from: https://dig.watch/resource/bulgarias-cybersecurity-law

LIIVOJA, R.; VÄLJATAGA, A. (Eds.), 2021. *Autonomous cyber capabilities under international law*. NATO Cooperative Cyber Defence Centre of Excellence. [viewed 7 January 2026]. Available from: https://ccdcoe.org/uploads/2019/07/Autonomy-in-Cyber-Capabilities-under-International-Law_260619-002.pdf

PAUL, S., 2018. *Army of None: Autonomous Weapons and the Future of War* (W W Norton & Company 2018) 214–5; ISBN 0393608980. [viewed 8 January 2026]. Available from: https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/MILITARY%20PLATFORM%20DESIGN/Army%20of%20None%20Autonomous%20Weapons%20and%20the%20Future%20of%20War.pdf

PETROVA, P., 2025. *Defence Minister: Bulgaria Must Continue to Develop Cyber-defence Capabilities*, БТА. [viewed 8 January 2026]. Available from: https://www.bta.bg/en/news/bulgaria/1021735-defence-minister-bulgaria-must-continue-to-develop-cyber-defence-capabilities

SHAPE PUBLIC AFFAIRS OFFICE, 2025. *Exercise Cyber Coalition, NATO's flagship Cyber Defence exercise, concludes in Estonia*. [viewed 7 January 2026]. Available from: https://shape.nato.int/news-archive/2025/exercise-cy-

ber-coalition--natos-flagship-cyber-defence-exercise--concludes-in-estonia
THE US DEPARTMENT OF DEFENSE, 2023. *DOD DIRECTIVE 3000.09 AUTONOMY IN WEAPON SYSTEMS*. [viewed 8 January 2026]. Available from: https://media.defense.gov/2023/Jan/25/2003149928/-1/-1/0/DOD-DIRECTIVE-3000.09-AUTONOMY-IN-WEAPON-SYSTEMS.PDF
UN GENERAL ASSEMBLY. *Group of Government Experts on Advancing responsible state behaviour in cyberspace in the context of international security*, A/76/135, 14 July 2021, paragraph 15; UN General Assembly, Open-ended working group on developments in the field of ICTs in the context of international security, A/75/816, 18 March 2021. [viewed 8 January 2026]. Available from: https://docs.un.org/en/A/80/257
ZAKON ZA OTBRANATA I VAORAZHENITE SILI NA REPUBLIKA BULGARIA, obn. DV, br. 35 ot 12 may 2009 g., izm. i dop. DV, br. 100 ot 25 noemvri 2025 g., popr. DV, br. 101 от 27 noemvri 2025 g. [viewed 7 January 2026]. Available from: https://www.lex.bg/en/laws/ldoc/2135631954
NAKAZATELEN KODEKS, chlen 319a-319e, obn. DV, br. 35 ot 12 may 2009g., izm i dop. DV, br. 100 ot 25 noemvri 2025g., popr. DV, br. 101 ot 27 noemvri 2025 g. [viewed 7 January 2026]. Available from: https://lex.bg/laws/ldoc/1589654529

ДЕЛЕГИРАНЕ НА КИБЕРОТБРАНАТА КЪМ АЛГОРИТМИТЕ: ПРАВНИ ГРАНИЦИ НА АВТОНОМНИЯ ОТГОВОР В БЪЛГАРИЯ

Резюме: *Статията изследва правните последствия от възможностите за автономен отговор в българската система за киберотбрана. Тя анализира правната рамка и я поставя в широкия контекст на стратегически документи на НАТО и ЕС. Статията определя и изследва правната жизненост на автономния киберотговор, подчертавайки как автоматизирани отбранителни действия отправят предизвикателство към съществуващите правни стандарти. Еволюцията на българската позиция спрямо киберотбраната е документирана с преход от първоначални отбранителни стратегии към синхронизиране с актуални директиви на ЕС и изисквания на НАТО. Дискусията разкрива, че българското законодателство не предлага специфично правно разрешение за автоматизирани контрамерки в случай на кибератака. Статията заключава, че докато в българското законодателство съществува ясна база за борба с киберпрестъпността и защитата на критична инфраструктура, в него има значителни предизвикателства по отношение на включването на автономни киберотговори. Статията отчита презумпцията, че разработката на всяка стратегия изисква съвместимост с международните ангажименти на страната.*
Ключови думи: *киберотбрана; автономен отговор; изкуствен интелект; правна рамка; законодателство*

гл. ас. д-р Владимир Бабанов
ORCID 0000-0001-8596-6493, SCOPUS ID: 60021493300
Югозападен университет „Неофит Рилски”
Благоевград, България
E-mail: v.babanov@law.swu.bg

NATIONAL SECURITY
НАЦИОНАЛНА СИГУРНОСТ

КРИТИЧЕН АНАЛИЗ НА МОТИВАЦИОННИТЕ ФАКТОРИ ЗА ПРИВЛИЧАНЕ НА ОПЕРАТИВНИ ИЗТОЧНИЦИ КЪМ СЪТРУДНИЧЕСТВО С НАЦИОНАЛНИТЕ РАЗУЗНАВАТЕЛНИ СТРУКТУРИ

Огнян Костадинов
Висше военноморско училище „Н. Й. Вапцаров“
https://doi.org/10.70300/YKLF8499

Резюме: *Публикацията предлага критичен анализ на мотивационните фактори, определящи процеса на привличане на оперативни източници за сътрудничество с разузнавателни структури. Обект на изследване е агентурното разузнаване, разгледано в исторически контекст – от Втората световна война и Студената война до съвременните условия. В теорията на информационно-агентурното разузнаване са известни две основни рамки, използвани при вербуването – MICE и RASCLS. Това е предметът на изследването – прави се сравнителен анализ, като се дават примери от литературата и от практиката на различни служби. Изследването поставя акцент върху психологическите, ценностните и прагматичните мотиви, определящи решението на едно лице да сътрудничи с разузнавателна структура. Анализът стъпва на материали от открити източници – академична и специализирана литература, интервюта с ветерани, както и официално достъпни американски и български публикации. Авторът представя свои собствени изводи и становища, допринасящи за по-дълбоко разбиране на човешкия фактор в разузнавателния процес.*
Ключови думи: *информационно-агентурно разузнаване (HUMINT); вербуване на агенти информатори; мотивационни фактори; MICE и RASCLS; национални разузнавателни структури*

ВЪВЕДЕНИЕ

Разузнаването е многостранен процес, осъществяван чрез различни средства и методи. То преследва специфични цели в различни области на държавното управление – отбрана, икономика, вътрешни работи и външна политика. Основната му цел е събирането на класифицирана информация за чужди държави.

Едно от традиционните средства за придобиване на такава информация е задграничната агентурна дейност. Структурите, ангажирани с информационно-агентурно разузнаване (Human Intelligence – HUMINT), използват комбинация от публични източници (Open Source Intelligence – OSINT) и конспиративни методи за придобиване на класифицирана информация (Classified Information).

Разузнавателните структури извършват дейността си на територията на чужди държави чрез свои служители, които търсят, идентифицират и привличат граждани с достъп до ценна информация. Тези служители действат под прикритие, или като „нелегали“ – с чужда самоличност и гражданство. Процесът по привличане на лица за сътрудничество е известен като привличане на оперативни източници, или вербуване на агенти информатори.

Вербуването се основава на разнообразни мотивационни фактори и изисква използването на широк набор от средства за постигане на целите. Това е една от най-важните и най-деликатни задачи в разузнавателната дейност – задача, свързана с висока степен на риск и изключителна отговорност.

Съвременната изследователска литература по темата обръща внимание на психологическите, ценностните и прагматичните аспекти, стоящи в основата на решението на едно лице да сътрудничи с разузнавателна служба. Настоящата публикация се включва в този изследователски контекст, като предлага критичен анализ на мотивационните модели, използвани при вербуването – с акцент върху рамките MICE и RASCLS, които намират приложение в теоретичната и оперативната практика.

МЕТОДОЛОГИЯ НА ИЗСЛЕДВАНЕТО

Изследването е изградено върху качествен анализ и интердисциплинарен подход, комбиниращ историографски, психологически и социокултурни аспекти на агентурното външно разузнаване. Прави се сравнителен анализ между двете най-разпространени и международно признати мотивационни системи, използвани при вербуването на оперативни източници – обозначавани с акронимите MICE (Money, Ideology, Coercion, Ego) и RASCLS (Reciprocation, Authority, Scarcity, Commitment, Liking, Social proof). В съвременната теория тези два подхода оформят концептуалната основа за разбиране на човешката мотивация и поведение в контекста на разузнавателното взаимодействие.

Авторът използва данни от открити източници – научна литература на български, английски и руски език, публични доклади и интервюта с ветерани от времето на Студената война. Изследвани са практики от американската и бившата съветска разузнавателна школа. Съпоставителният анализ между MICE и RASCLS е подкрепен с конкретни примери от публикувани казуси и мемоари. Изследването цели не просто да класифицира мотивите, а да ги интерпретира в съвременен контекст, отчитайки промените в средата за сигурност, културните разлики и институционалните цели.

Въз основа на събраните данни и анализи авторът формулира собствени изводи и изразява обосновано становище по ключови въпроси, като допринася за развитието на теорията и практиката на агентурното разузнаване. Изследването има както теоретична, така и приложна стойност, особено в контекста на необходимостта от ефективни методи за идентифициране и мотивиране на сътрудници в съвременната среда.

МОТИВАЦИЯ ЗА СЪТРУДНИЧЕСТВО В РАЗУЗНАВАТЕЛНА ДЕЙНОСТ

Формата и мотивацията за сътрудничество може да са приятелска услуга, предоставянето на друга услуга от ваша страна, идеологическа близост, принадлежност към вашата нация и извършване на услуга на бившето отечество, лични чувства, заплащане, заплахи за компрометиране и т.н. (Boyadzhiev 2016).

Мотивацията е основният елемент за вербуване, но това не е достатъчно. Освен мотивация потенциалният агент информатор трябва да бъде принципно склонен да сътрудничи и да осъществява шпионаж, но отговорът на този въпрос е неизвестен. Основните мотиви за сътрудничество с чужда разузнавателна агенция по същество са значително по-неубедителни от контрааргументите на това опасно и незаконно начинание. Това е проблемът, който разузнавачът вербовчик трябва да решава при всяка вербовка. Във връзка с това разузнавателните служби усъвършенстват своята дейност, като обръщат внимание на ефективността на своите задгранични кадрови служители.

В областта на агентурното разузнаване промените бяха насочени към: Повишаване на ефективността в дейността на наличния щатен агентурен апарат (оперативни работници от състава на резидентурите под прикритие и на териториалните органи на РУ-ГЩ), както и на действащите агенти (Zikulov 2007).

Теза: Агентът информатор е във фокуса на информационно-агентурното разузнаване (Human Intelligence – HUMINT). Бъдещият агент информатор трябва да е склонен да разкрие класифицирана информация под негов контрол, като тази склонност може да се развие в намерение при достатъчно силна мотивация и преодоляване на моралните задръжки и страха от нарушаването на закона. Мотивацията може да бъде материална или нематериална, а потенциалният агент информатор може и сам да инициира процеса, като се самопредложи. Вербовката е възможна при податливост за сътрудничество и изградено доверие между вербовчика и потенциалния агент информатор, което е правилният момент за начало на вербуването. По време на вербуването следва да се използват предварително добре изследвани мотивационни фактори, включително отношението към тях от страна на потенциалния агент информатор. Водеща роля има кадровият служител – вербовчик, който чрез психологически техники и похвати насочва обекта към съгласие за сътрудничество с разузнавателната служба.

Разузнаването зависи от кумулативния интелект на личния състав. Запазването на професионалния, кадровия и най-вече на интелектуалния капацитет е органично свързано с кумулиране на национално разузнавателно ноу-хау в поколенията през годините. Това е най-добрият начин една държава да има силно разузнаване. Големите разузнавателни служби в света имат свой собствен национален почерк за работа (Chukov 2021).

ПСИХОЛОГИЧЕСКИ АСПЕКТИ НА ВЕРБУВАНЕТО ПРИ ШПИОНАЖА

Основата на информационно-агентурното разузнаване (HUMINT) е събирането на разузнавателна информация, извършвано чрез човешки източници и междуличностни контакти. *В традиционното HUMINT: Този тип разузнаване включва събиране на информация чрез лични взаимодействия и комуникация с човешки източници, като служители, клиенти или други вътрешни лица, които имат достъп до чувствителна информация* (Steel 2010). *Първата стъпка на HUMINT във вербуването е, когато кадровият служител (вербовчик) забелязва и оценява целта* (Coleman 2023; Chaney and Irvin 2016).

В областта на психологията на шпионажа се изследват въпроси като факторите, влияещи върху решението на индивида да упражнява професия в разузнаването, психологическия профил на секретен служител, както и мотивацията на лице, на което е поверена властна позиция и впоследствие му се предлага да предаде това доверие чрез шпионаж. Защо някой би причинявал щети на собствената си държава и би подлагал семейството си на скандал или още по-сериозни последствия?

В рамките на настоящия анализ терминът „шпионин“ обозначава лице, преминало официална проверка, получило достъп до класифицирана информация и във формална връзка с организацията, която впоследствие предава; то може да е постоянен служител или външен изпълнител. Решението да предостави класифицирана информация на чужда страна, е умишлено нарушаване на възложеното доверие и следва да се разграничава от ръководещия го служител на чужда разузнавателна служба (handler), който е кадрови офицер.

Рационално ли е да се шпионира при мисълта за рисковете?

На пръв поглед шпионажът не изглежда рационален. Агентите рискуват смъртта си или от ръцете на врага, или от собствените си правни системи. Дори в някои държави, които не налагат смъртно наказание за престъпни деяния, те не правят изключения за шпионите, които се наказват сурово (Burkett 2013). Постоянният риск поставя агента информатор под голям психологически стрес, който го затруднява да преодолее силната си мотивация.

От друга страна, хората, които са пристрастни към шпионажа, не се страхуват от силата на закона, т.е. те преодоляват страха от наказание. Безразсъдни и смели, те обикновено водят изолиран живот от обществото. Действителното престъпление при шпионаж е предаването на класифицирана информация, което в основата си е повтарящ се процес. Тази повторяемост увеличава вероятността от прехващане от противниковото контраразузнаване. Рискът е особено висок, когато противниковото контраразузнаване индиректно открие изтичане на информация. Освен това противниковото контраразузнаване извършва рутинни проверки и наблюдения, което увеличава риска от провал и психологическия стрес.

Мотивационна рамка на процеса за вербуване на агенти информатори

Разузнавателните агенции използват сходни практики за вербуване на агенти информатори, които се базират на мотивацията. Сред разузнавателната общност са известни две мотивационни рамки за вербуване:

MICE (акроним на Money, Ideology, Coercion/Compromise, Ego/Excitement)

MICE означава пари, идеология, принуда/компромис, его/вълнение:

ПАРИ – егоцентричните мотиви, като алчност, могат да накарат шпионина да повярва, че шпионажът е оптималният метод за получаване на желаните средства. Фактори като културна връзка с материално богатство, социално влияние и престиж, задоволяване на егото и финансово облекчение допринасят за податливостта към парично изкушение. Тери Томпсън предполага, че склонността към поемане на риск може да доведе до неразумни финансови

избори и затруднения, което да направи шпионажа да изглежда като решение. Финансовата мотивация, самостоятелно или в комбинация с други мотиви, е сред най-честите основи за вербуване (Thompson 2009).

Във връзка със „Случая Сергей Антонов“ на български граждани е упражняван психологически натиск, като са им предлагани изключително големи суми пари с цел да посочат „съпричастност“ на българското разузнаване по случая (Konstantinov 2018).

- ИДЕОЛОГИЯ – идеологията е колективна система от вярвания за текущото състояние на света или за това какъв трябва да бъде в идеалния случай. *„Идеологията не се приписва на конкретна част или област на мозъка, тъй като е разпространена сред много хора“*. Тя е в съответствие с егото на индивида и позволява изразяване на лични ценности и вярвания. В шпионажа специфична идеология може да валидира съзнателни или несъзнателни убеждения: петорката от Кеймбридж вероятно са били *„истински вярващи“* в комунистическата идеология, а Юлиус и Етел Розенберг и по-късно Ана Монтес са действали по идеологически причини. Преди края на Студената война идеологията изглеждаше по-малко значима при вербуването на лица от Съветския съюз, което подтикна КГБ да търси алтернативни мотиви, но тя остава валидна мотивация и в настоящето и бъдещето (Thompson 2009).

Идеологическата мотивация е разнообразна. Към нея следва да се отнесат радикалните религиозни течения, също патриотичните чувства на малцинствените групи, които се борят за своята независимост.

По време на Втората световна война разузнаването на СССР вербува чужди граждани на етническа и политическа основа. Случаят с Ян Черняк – легенда в разузнаването, роден в Австро-Унгария, отбил военната си служба в армията на Румъния и работил за ГРУ (СССР). Той е с еврейски произход и това го е мотивирало да работи за ГРУ срещу фашистка Германия. Ян Черняк получава гражданство на СССР през 1946 г. (Sokolov 2022).

Извод: От идеологическите форми на мотивация най-силна е патриотичната. Патриотичните чувства представляват духовна и непреходна силно мотивираща сила. Тази сила може и би следвало да се използва не само за мотивация на служителите в националните разузнавателни служби, но и при вербуването на агенти информатори, чиито патриотични чувства съвпадат или са съвместими с патриотичните чувства на кадровите служители на разузнаващата държава. Това са сънародниците зад граница, също така националномалцинствените групи в разузнаваната държава, чиито патриотични чувства могат да се използват в полза на разузнаващата държава.

Изведено правило: *„От противниците на вашите (нашите) противници може да се очаква, че ще са склонни да бъдат привлечени като ваши (наши) сътрудници срещу общия противник“*.

Очакван ефект: Ако към тази мотивация се прибави материална помощ за реализиране на общо дело или задачи, ефектът би следвало да бъде много голям и устойчив във времето.

- КОМПРОМИС/ПРИНУДА – мотивацията „компромис/принуда“ в MICE включва вербуване, при което шпионинът е принуден да участва поради страх от наказание, разкриване или други неблагоприятни последици. Този тип мотивация е най-малко надежден, защото стимулът е избягване на наказанието, а не удовлетворяване на ръководителя, поради което се очакват сътрудничество само доколкото е необходимо, и опит за бягство от контрол. Типичен пример е „меденият капан“, при който чрез съблазняване и заплаха от разоблачаване се търси сътрудничество. В тази категория се използват компромати и зависимости, особено при вербуване на агенти за влияние (Thompson 2009).

По време на Студената война в някои западноевропейски държави, в които е имало временно пребиваващи български граждани, на същите е упражняван натиск за вербуване срещу удължаване на техните визи за престой в чуждата държава. Налагало се е българските дипломати да протестират срещу тези прояви пред съответното външно министерство с цел да бъдат прекратени (Kremenliev 2021).

- ЕГО/ВЪЛНЕНИЕ – егото е сложна концепция, която обхваща самовъзприятието на индивида и действията, предприети за неговото подобряване или защита, като значително

влияе върху процеса на вземане на решения (Thompson 2009).

При използването на термина в случая с Левченко се набляга върху желанието на потенциалния шпионин за предизвикателство, приключение и вълнение. Последвалите проучвания разкриха черти, свързани с егото, като нарцисизъм и недоволство на служителите. Всички категории MICE, с изключение на принудата, могат да се считат за част от егото, като парите и идеологията се използват за изразяване на егото (Chaney and Irvan 2016).

В своята статия Бъркет посочва, че рамката MICE е остаряла и не успява да улови сложността на човешката мотивация (Burkett 2013).

Критични бележки: Мотивационната рамка MICE е научно обоснована от психолози и принципно не се променя във времето, но идеи и ценности, водещи до идеологическа мотивация, се развиват според ценностната система на хората. По време на Студената война противоборството беше между комунистическата идеология и демокрацията, а днес борбата за демокрация продължава, като се появи и пацифизмът като мотивация срещу милитаризма. Патриотичната мотивация е постоянна и подтиква националните малцинства към самоопределение, а новото идеологическо противоборство е между демокрация и радикални религиозни течения. Задача на политическото разузнаване е да наблюдава тези тенденции и да актуализира MICE.

RASCLS (акроним на Reciprocation, Authority, Scarcity, Commitment/Consistency, Liking, Social Proof)

RASCLS означава реципрочност, авторитет, недостиг, ангажираност/постоянство, харесване, социално доказателство.

Горепосочените шест групи понятия могат да се разгледат като шест отделни концепции, които се отнасят до кадровите служители вербовчици, ангажирани с намиране и вербуване на чужди граждани като агенти информатори.

През 2013 г. Randy P. Burkett представи шестте принципа за влияние на Robert Cialdini (психолог). Тези принципи за влияние са кодифицирани от Steven Kleinman с рамката от правила RASCLS, използвана от разузнавателните агенции за вербуване на агенти информатори (Burkett 2013).

RASCLS – реципрочност/благодарност: принцип, според който *„всички човешки същества имат присъщо чувство за дълг да положат усилия да се отплатят по подобаващ начин за това, което е им предоставено (дарено) от друг“*. Това се демонстрира в правилото за ангажимента на Burkett: *„Винаги да предоставя или осигурява удобства“* по време на взаимодействие с агенти. Според Cialdini поклонниците на Кришна прилагат *„процедура за искане на дарения, която използва правилото за реципрочност“*, като раздават книги, списания или цветя на преминаващите лица, преди да поискат дарения (Burkett 2013).

Подобна практика се наблюдава в градския транспорт в големите градове на икономически развитите държави, където може да се видят пострадали граждани да продават носни кърпички, като с това те молят за помощ за лечение на техен близък болен човек или във връзка с някаква друга беда, сполетяла самите тях или семействата им.

Извод: Този принцип е полезен и може да бъде изключително ефективен в информационно-агентурното разузнаване. Например, ако кадровият служител вербовчик на разузнавателната агенция работи под прикритие, да речем, като търговец, то тогава може да се използва този принцип като първо сътрудничество за реализиране на някаква реална, макар и малка, но законна търговска сделка, от която потенциалният агент информатор ще получи дължимото възнаграждение по законен начин и след това може да се очаква реципрочна услуга от негова страна.

RASCLS – власт/статус в обществото: хората са *„учени от ранна възраст, че подчинението на властта ще доведе до награди, докато неподчинението ще доведе до наказания“*. *„Личният авторитет осигурява на разузнавача вербовчик предимство в процеса на вербуване на агенти информатори“*, пише Burkett, добавяйки, че по-скоро „подразбиращата се, отколкото демонстрираната власт“ е за предпочитане в отношенията между вербуващия служител и потенциалния агент информатор (Burkett 2013). Следвайки този принцип, разуз-

навателните агенции осигуряват на кадровите служители (вербовчици) прикритие с висок статус и широки правомощия, включително неофициална помощ при лични проблеми и разходване на средства в рамките на прикриващата дейност, с което се издига авторитетът им пред потенциалните агенти информатори.

Извод: Този принцип е полезен и може да бъде изключително ефективен в информационно-агентурното разузнаване. Например, ако кадровият служител на разузнавателната агенция, работещ под прикритие на висок пост в някаква организация или търговско дружество, в рамките на своята прикриваща дейност започне да обгрижва и съдейства по подходящ начин на обекта за разработка при решаването на различни лични въпроси с материален и нематериален характер, това ще доведе до сближаване между тях.

Изведено правило във връзка с принципите за „реципрочност“ и „власт/статус в обществото“: *„Получаването на лесни пари и съдействие при решаване на лични проблеми е винаги силен мотив за получаващия да желае това да продължава и в бъдеще“*. Очакван ефект: *„Получаването на лесни пари или съдействие при решаване на лични проблеми е не само задължаващо за потенциалния агент информатор, но е и компрометен инструмент в ръцете на платеца/съдействащия“*.

RASCLS – недостиг: *„Стойността на възможностите, изглежда, се увеличава, когато предлагането им е ограничено“*. Burkett посочва, че рамкирането на една възможност като преходна увеличава нейната стойност за индивида. Обратно, Cialdini подчертава ограничаването на свободата ни да притежаваме нещо, поради недостиг и характеризира нашия отговор на недостига като психологическа реакция. Burkett илюстрира тази концепция, като ангажира потенциалния агент със скромни задължения по време на „фазата на развитие“ на процеса на вербуване, с цел да се постигне взаимно разбирателство по маловажни въпроси, като след това агентът се кара да се ангажира с нови и по-дълбоки взаимоотношения (Burkett 2013).

Извод: Чрез представяне на събирането на разузнавателна информация като мимолетна възможност за извличане на печалба от техния достъп може да се повлияе на хората да участват. Препоръчително е този принцип първо да се тества, като поставената задача е свързана със събиране на несекретна информация. По този начин обектът на разработка ще се тества в ситуация, нерискова и за двете страни, и ще се направят съответните изводи дали да продължат вербовъчните усилия.

RASCLS – ангажимент и последователност: теоретици като Леон Фестингер, Фриц Хидер и Теодор Нюкомб разглеждат желанието за последователност като основен мотив за поведението ни. Представянето на себе си като последователни отразява идентичността ни и формира взаимодействието ни с обществото, а непоследователните често се етикетират като неблагонадеждни. Изследванията показват, че публично взетите решения се подкрепят по-силно, което подчертава ролята на общественото ангажиране. През Корейската война китайските комунисти използват това качество, за да изтръгнат „признания“ от американски военнопленници. Набирането на агенти също се базира на малки ангажименти и първоначално споделяне на информация, което прераства в непрекъснато сътрудничество (Burkett 2013).

Извод: При необходимост е възможно да се развие взаимно съгласие за съвместна работа. Например, ако даден обект на разработка предоставя малка част от непублична информация (например вътрешен телефонен указател), той може да бъде насърчен да увеличи типа или количеството информация, която споделя. С тази техника „крак във вратата“ се маркира миналото съгласие за споделяне на информация и се иска още.

RASCLS – харесване: този принцип подчертава важността на афинитета при набирането на агенти информатори. Оперативните служители (вербовчици) се учат, че хората най-много харесват тези, които са подобни на тях. Връзките с потенциални агенти се установяват чрез общи черти като минало, интереси и мироглед. Похвалата играе ключова роля в установяването на положителни връзки, а допълнителните срещи и време улесняват процеса на оценка. Процесът на създаване на връзка е етапен, преминавайки през стадии от колега към приятел и довереник. Целта на оперативните служители (вербовчици) е да създадат убеж-

дение у агента, че той е разбиран и подкрепен като резултат на тази връзка. Това води до очакване с нетърпение на срещите с такъв служител, като възможност за качествено време и подкрепа (Burkett 2013).

Извод: Този принцип е полезен и може да бъде изключително ефективен в информационно-агентурното разузнаване. Например кадровият служител под прикритие с висок интелект, висше образование, богата култура, дар слово, перфектно владеене на езика, добро възпитание, изтънчени обноски и материални възможности може по естествен начин да спечели личните симпатии на потенциалния агент информатор, а те водят до по-голямо доверие, което е задължително в разузнаването.

Като пример в подкрепа на тези разсъждения може да се посочи колоритната личност на Хачо Бояджиев, разузнавач нелегал, който е известен със своята публичност, ерудиция, владеене на няколко чужди езика (Mitev 2019).

RASCLS – социалното доказателство: тази концепция е ключова, когато хората я използват за определяне на правилното поведение, особено в непозната обстановка. Това включва наблюдение на други и следване на техния пример, който може да се наблюдава в различни контексти, като клубове или култове. Във връзка с това може да се посочи като пример общоизвестната сентенция *„Когато си в Рим, прави като римляните“*. Силата на социалното доказателство се разкрива в трагедии като масовото самоубийство в Джонстаун през 1978 г. и устойчивостта на шпионажа на Олег Пенковски. При набирането на агенти принципът на социалното доказателство е от съществено значение, като се предоставят примери в подкрепа за увереност и мотивация. Разузнавателната агенция, която стои зад кадровия работник (вебовчик), е от съществено значение за утвърждаване на правилните действия. Това допълнително помага да се преодолеят евентуални съмнения или безпокойства при агентите информатори, като им се предоставят примери на успешни случаи (Burkett 2013).

Извод: Този принцип е полезен и може да бъде ефективен във вербуването на агенти информатори, когато се прилага в комбинация заедно с някой друг от останалите пет принципа. Принципно, от теоретична гледна точка може да се разчита на положителни резултати, когато мотивиращите фактори са също така два и повече.

ИЗВОДИ

1. Изведено правило (във връзка с принципите „реципрочност“ и „власт/статус в обществото“): „Получаването на лесни пари и съдействие при решаване на лични проблеми е силен мотив за получаващия да желае това да продължава и в бъдеще, особено когато се съчетава с чувство за зависимост или благодарност у обекта“.

Очакван ефект: Получаването на лесни пари или съдействие при решаване на лични проблеми е задължаващо за агента информатор и компрометен инструмент в ръцете на платеца/съдействащия. Чувството на задълженост, комбинирано с неформален дълг, може да се използва и за постигане на емоционална обвързаност.

2. Изведено правило: „От противниците на вашите (нашите) противници може да се очаква, че ще са склонни да бъдат привлечени като ваши (наши) сътрудници“.

Очакван ефект: Ако към тази мотивация се прибави материална помощ за реализация на общото дело, ефектът би следвало да бъде голям и устойчив във времето. Подобна мотивация, особено при наличие на общ идеологически или емоционален противник, е основа за формиране на дългосрочна лоялност, която надхвърля прагматичните подбуди.

3. Изведено правило: „Препоръчва се вербовъчният процес да започне с поставяне на елементарни задачи за събиране на некласифицирана информация. Добре свършената работа трябва да се възнаграждава във форма, в каквато принципно се възнаграждава конспиративната работа“.

Очакван ефект: Целта е да се тестват възможностите, качествата и склонността за сътрудничество на обекта за разработка. Освен това поетапното въвеждане в дейност чрез леки задачи служи за психологическа подготовка и адаптация към конспиративна работа, като изгражда увереност и навик за изпълнение на поверителни действия.

РЕЗУЛТАТИ

В резултат на критичния и сравнителен анализ на мотивационните рамки MICE и RASCLS се оформя приложим модел за интерпретиране на човешката мотивация и поведение в процеса на привличане на оперативни източници. MICE структурира базовите мотиви на потенциалния агент информатор, а RASCLS конкретизира принципите и техниките на влияние, които кадровият служител вербовчик използва при изграждането на доверие, зависимост и устойчиво сътрудничество.

Резултатът от изследването се изразява във формулирането на практически ориентирани правила и очаквани ефекти, които подпомагат: 1) оценката и усилването на мотивацията чрез реципрочност, авторитет и контрол върху задължеността; 2) формирането на дългосрочна лоялност при наличие на общ противник и подкрепа за общо дело; 3) поетапното въвеждане на обекта в конспиративна работа чрез задачи с нисък риск, позволяващи проверка на неговите качества и склонност за сътрудничество.

Така получените резултати имат теоретична и приложна стойност, тъй като могат да бъдат използвани при изготвяне на технологични карти и сценарии за вербуване, както и при систематизиране на подходи за идентифициране и мотивиране на сътрудници в съвременната среда на повишен риск и конкуриращи се разузнавателни интереси.

ЗАКЛЮЧЕНИЕ

Концептуалните рамки MICE и RASCLS, използвани при вербуването на агенти информатори в полза на национални разузнавателни структури, са базирани на психологията. MICE е насочена към психологията на потенциалния агент информатор, а RASCLS – към образа и поведението на кадровия офицер вербовчик, и представляват съвкупност от психологически техники и похвати, върху които е изградена технологията на вербовъчния процес. Препоръчително е двете концепции да се използват при изготвяне на технологични карти и сценарии за срещи, като за всеки случай се отчитат конкретните обстоятелства и характеристиките на обекта и се предвижда план за отстъпление при негативна реакция.

Недостатък на MICE е, че не отчита възпиращото влияние на повишения риск и ролята на моралните ценности; липсата на етически ориентири улеснява вербуването, но носи рискове, включително от превръщане в двоен агент. Финансово мотивиран агент често пренебрегва качеството и достоверността на информацията, което може да доведе до предаване на непроверени данни и дезинформация. Най-съществения фактор остава дълбоката вътрешна мотивация, основана на устойчива ценностна система (патриотични убеждения, пацифистки възгледи, граждански права и защита на малцинствата), обединена като идейна мотивация.

Разузнаването обслужва три стратегически цели – отбрана на миролюбиви държави, възстановяване на исторически загуби и реализиране на завоевателни интереси, поради което не съществува универсален морален стандарт за всички служби; етичните норми варират според политическия, културния и геостратегическия контекст. Устойчивостта на агентурната мрежа зависи не само от техниките и моделите за вербуване, но и от разбирането на ценностната основа на личната мотивация.

ЛИТЕРАТУРА

БОЯДЖИЕВ, Т., 2016. *Наръчник на шпионина*. Том 1. София: Сиела Норма, с. 102.

БЪРКЕТ, Р., 2013. Алтернативна рамка за вербуване на агенти: от MICE към RASCLS (An Alternative Framework for Agent Recruitment: From MICE to RASCLS). *Studies in Intelligence*, том 57, бр. 1 (извадки). Издадено от CIA. [viewed 30 July 2025]. Available from: https://www.cia.gov/resources/csi/studies-in-intelligence/volume-57-no-1/an-alternative-framework-for-agent-recruitment-from-mice-to-rascls/

ЗИКУЛОВ, В., 2007. *Военното разузнаване на България и Студената война*. София: Българска книжарница.

КОЛМАН, Г., 2023. *Как разузнавателните агенции набират шпиони: Разкриване на сложния процес* (*How Do Intelligence Agencies Recruit Spies: Unveiling the Intricate Process).* [viewed 30 July 2025]. Available from: https://medium.com/@Gloria101cole/how-do-intelligence-agencies-recruit-spies-unveiling-the-intricate-process-c4482d15f7fb

КОНСТАНТИНОВ, В., 2018. *От първо лице за някои служби*. София: Изток-Запад.
КРЕМЕНЛИЕВ, А., 2021. *Из лабиринтите на българското разузнаване*. София: Труд.
МИТЕВ, В., 2019. *Тайни загадки на „тихия фронт“: Животът на големите български разузнавачи*. София: Книгомания.
СОКОЛОВ, Г., 2022. *Шпионаж и политика – Тайната христоматия*. София: Сиела.
СТИЙЛ, Р. Д., 2010. *Човешко разузнаване: Всички хора, всички умове, през цялото време (Human Intelligence: All Humans, All Minds, All the Time)*. Carlisle, PA: Strategic Studies Institute, U.S. Army War College. [viewed 30 July 2025]. Available from: https://www.loc.gov/resource/gdcebookspublic.2023692719/
СУН ДЗЪ, 2023. *Изкуството на войната. Използване на шпиони*. София: ФАМА.
ТОМПСЪН, Т., 2009. *Защо се случва шпионажът (Why Espionage Happens)*. Флорънс, САЩ: Seaboard Press.

REFERENCES

BOYADJIEV, T., 2016. *Narachnik na shpionina*. Tom 1. Sofia: Siela Norma, s. 102.
BURKETT, R., 2013. An alternative framework for agent recruitment: From MICE to RASCLS. *Studies in Intelligence*, vol. 57, no. 1 (excerpts). Published by the CIA. [viewed 30 July 2025]. Available from: https://www.cia.gov/resources/csi/studies-in-intelligence/volume-57-no-1/an-alternative-framework-for-agent-recruitment-from-mice-to-rascls/
COLEMAN, G., 2023. *How do intelligence agencies recruit spies: Unveiling the intricate process*. [viewed 30 July 2025]. Available from: https://medium.com/@Gloria101cole/how-do-intelligence-agencies-recruit-spies-unveiling-the-intricate-process-c4482d15f7fb
KONSTANTINOV, V., 2018. *Ot parvo litse za nyakoi sluzhbi*. Sofia: Iztok-Zapad, s. 46.
KREMENLIEV, A., 2021. *Iz labirintite na balgarskoto razuznavane*. Sofia: Trud.
MITEV, V., 2019. *Tayni zagadki na “tihiya front”: Zhivotat na golemite balgarski razuznavachi*. Sofia: Knigomania.
SOKOLOV, G., 2022. *Shpionazh i politika – Taynata hristomatia*. Sofia: Siela.
STEELE, R. D., 2010. *Human intelligence: All humans, all minds, all the time*. Carlisle, PA: Strategic Studies Institute, U.S. Army War College. [viewed 30 July 2025]. Available from: https://www.loc.gov/resource/gdcebookspublic.2023692719/
SUN DZI, 2023. *Izkustvoto na voynata. Izpolzvane na shpioni*. Sofia: FAMA.
THOMPSON, T., 2009. *Why espionage happens*. Florence, USA: Seaboard Press.
ZIKULOV, V., 2007. *Voennoto razuznavane na Bulgaria i Studenata voyna*. Sofia: Balgarska knizharnitsa.

CRITICAL ANALYSIS OF MOTIVATIONAL FACTORS FOR RECRUITING HUMAN SOURCES TO COOPERATE WITH NATIONAL INTELLIGENCE STRUCTURES

Abstract: *The publication offers a critical analysis of the motivational factors that shape the process of recruiting operational sources to cooperate with intelligence services. The object of study is agent-based intelligence, examined in a historical context – from the Second World War and the Cold War to contemporary conditions. In the theory of human intelligence (HUMINT), two main frameworks used in recruitment are well known: MICE and RASCLS. This constitutes the subject of the study: a comparative analysis supported by examples from the literature and the operational practice of various services. The study emphasizes the psychological, value-based, and pragmatic motives that determine an individual's decision to cooperate with an intelligence organization. The analysis draws on open-source materials – academic and specialized literature, interviews with veterans, and officially available American and Bulgarian publications. The author presents original conclusions and viewpoints that contribute to a deeper understanding of the human factor in the intelligence process.*

Keywords: *Human Intelligence (HUMINT); Agent Recruitment; Motivational Factors; MICE and RASCLS; National Intelligence Agencies*

Eng. Ognyan Kostadinov, DSc
ORCID ID:0000-0002-9183-5243
Nikola Vaptsarov Naval Academy
Varna, Bulgaria
E-mail: o.kostadinov@nvna.eu
ognyan.d.kostadinov@gmail.com

АКТУАЛНО
CURRENT TOPICS

ФОРМИРАНЕ НА НАЦИОНАЛНА ИДЕНТИЧНОСТ И РОДОЛЮБИЕ В ГИМНАЗИАЛЕН ЕТАП НА БЪЛГАРСКОТО ОБРАЗОВАНИЕ ЧРЕЗ ФИЛОСОФСКИ ИНТЕРДИСЦИПЛИННИ ПОДХОДИ

Виктория Цонева
Софийски университет „Св. Климент Охридски“
https://doi.org/10.70300/KNZZ4836

Резюме: *В съвременния свят темата за националната идентичност все повече изгубва своето значение. В процесите на глобализация и подмяна в институционалните ценности тя търси своето място в личността на човека сред многообразието от различни пътища и влияния. Образователните институции са тези, които носят голяма част от отговорността за формиране на родолюбие у българските ученици. Но липсва цялостна концепция за това. Съдържателният концептуален модел на учебния курс „Философия на родолюбието“ е насочен към създаване на онази основа за формиране и развитие на национална идентичност и принадлежност, която толкова липсва в училищата. Философските теории се осмислят през всички останали учебни дисциплини, но не като факти от съдържанието им, а като ценностен модел на поведение. По този начин интердисциплинността допринася за постигането на онази цел, която чрез трансверсалните компетентности ще формира национална идентичност и родолюбие.*
Ключови думи: *образование; идентичност; родолюбие; програми; философия*

ВЪВЕДЕНИЕ

„Национална идентичност“ и „родолюбие“ са понятия, които се тълкуват по различен начин в обществото. Съществуват крайни и противопоставящи се позиции в разбирането за тяхната същност. В съвременния свят на глобализация те или все повече изгубват своя смисъл, или се определят като категории, обуславящи краен национализъм и патриотизъм. Това произтича от критичните процеси в съвременното българско общество на затруднена интеграция и социализация, на отчужденост, на нестабилно и противоречиво отношение у младите хора към род, родина, национална принадлежност и идентичност, национално и културно самоопределение, и вследствие на това формиране на неопределено и противоречиво социално и гражданско поведение.

МЕТОДОЛОГИЯ НА ИЗСЛЕДВАНЕТО

Национална идентичност

Етимологията на понятието „идентичност“ се свързва с латинския език, където idem означава един и същ, а identitas – тъждественост или пълно съвпадение. Терминът изцяло се припокрива с разбирането, че човек непрекъснато се променя, но въпреки това остава същия. В научните среди разбирането за понятието е свързано с процес на личностно разбиране и самоопределяне. В традиционните общества идентичностите се отличават с постоянство, а в постмодерното общество – с несигурност и склонност към промяна. В процесите на глобализация и подмяна на институционалните ценности идентичността търси своето място в личността на човека сред многообразието от различни пътища и влияния. От това доколко той ще приеме моралните норми и предписания на доминиращото общество като свои, зависи „как ще разбере себе си в социалното и ще се приобщи към него“ (Върбанова 2021, с. 84). И във връзка с това идентичността е непременно свързана с ценностите. Те са от фундаментално значение за формирането на това „Кой съм аз?“, от една страна, и как един индивид възприема ценностите на другите – от друга. Понятието „ценност“ претърпява своята еволюция във времето, анализира се в различни теории, които се допълват или

взаимно се изключват. От важно значение е възприемането на ценността като морална, като ориентир за отношението на личността към заобикалящия свят и случващото се в него. Във връзка с това изследването, което Силвия Върбанова посочва в „Индивидуалността в огледалата на постмодерното време“, осъществено от Л. Спасова през 2018 г., ясно откроява драстичните разлики във възприятието на българите на двете основни категории ценности. 81% от участниците в анкетата са посочили, че поставят на първо място материалните ценности (Върбанова 2021, с. 124). И когато това е представителна извадка на обществото, лесно стигаме до извода, че „мнозинството има материалистични ценности“ (Върбанова 2021, с. 125) и „смисълът на идеалните, духовни стойности неизбежно бива разколебан“ (Върбанова 2021, с. 125). Това отразява и проблематизирането на идентичността като цяло, в това число и националната идентичност, която е тясно свързана с идеята за приемственост и родственост, както и прекъснатата връзка между поколенията, от една страна, и между миналото и настоящето – от друга.

След промените, настъпили през 1989 г., обществото ни преживява сътресение и огромна метаморфоза. Икономическата нестабилност води до социална и духовна криза, криза на идентичността, на образованието и културата. Опит за обединение на нацията ни е направен през 1997 г. с проект за Българска национална доктрина[1]. Текстовете му отразяват целите на обществото ни, а още в Общите положения е декларирано следното:

„1. Българската национална доктрина е система от официално възприети възгледи и принципи за:

а) историческите стремежи на българската нация и държава;

б) перспективите и целите на българската нация и държава;

в) пътищата и средствата, чрез които се осъществяват българския национален идеал и националните ни интереси“.

Този документ, създаден с желание да се даде основа, върху която да се развива нацията, остава само като нереализиран проект, като един несполучлив опит за връщане на държавата ни към корените, към традициите и идеалите. Демокрацията и свободата се превърнаха в трайна деградация на обществото, в липса на общочовешки ценности, идеали и национални въжделения. Причините, довели до това състояние, са важен елемент и следва да се анализират и да се постави ново начало на търсенето на себе си и на националната идентичност на всеки от нас.

В този контекст несъмнено една от опорните точки е развитието на информационните технологии и компютризацията. Обобщени данни за използването им откриваме в книгата на проф. д-р Наталия Витанова „Образование на бъдещето“. Статистиката, посочена в изданието, е от изследване, проведено от Фондация „Приложни изследвания и комуникации“ съвместно с агенция „Маркет Линкс“ през 2016 г. Според нея 97% от българските деца на възраст от 7 до 17 години използват интернет. Основните изводи на авторите на това изследване са, че у учениците се развиват основно технически умения и въпреки че те бързо откриват търсената от тях информация, трудно определят истинността ѝ. От друга страна, се наблюдава дефицит в критическото мислене и социалните умения. Това води до липса на задълбоченост и търпение в изграждането на изводи и мнения. Формирането на собствена гледна точка е затруднено. Или по-скоро е повлияно от личности, които са в интернет пространството – място без нормативна регулация, където свободно могат да се изявяват хора с липса на възпитание и всякакви задръжки, за които ценностите са се превърнали в пошли изображения и деградирала фалшива реалност.

Втора опорна точка, влияеща на съвременната национална идентичност, е отварянето на България към света. В тези процеси на глобализация „се дестабилизират традиционни практики и културни възгледи, мрежите на социални взаимодействия и значения се разширяват и усложняват“ (Върбанова 2021, с. 84). Опознаването на чуждото, така бленувано по времето на социализма, се превръща в нещо ново и интересно и по този начин се променя целият социокултурен контекст, в който личността може да бъде разбрана. Персоналната идентичност се променя вследствие на нахлуването на различни „морални предписания,

доминиращи модели в обществото и в определени социални групи“ (Върбанова 2021, с. 85). Запознаването с нови народности и техните обичаи и традиции е нещо прекрасно. Срещата с различен бит и култура води до обогатяване, до придобиване на нови знания и научаване за различни култури. Но това, което се възприема от чуждите държави, се приема като единствено и незаменимо. Превръща се в мода. И вместо свободното движение в Европа и света да е начин за популяризиране и показване на нашата, българската идентичност на останалите нации, ние се увличаме по това да я загърбим и да възхваляваме чуждото, като удобно забравяме нашето. И връщайки се към историята, като че ли пак сме в онзи момент, в който Паисий Хилендарски ни е съдил, че се срамуваме да се наречем българи, в онази част от миналото, в която Иван Вазов създава „Епопея на забравените“, за да извика силно и да бъде чут, защото никога не бива да забравяме дедите си и познавайки ги, трябва да се гордеем с това кои сме.

Това са едва две от причините за кризата на националната ни идентичност. Но точно чрез тях трябва да се адаптираме към реалността. И не да ги отричаме, а да ги използваме, за да постигнем желания от нас национален идеал. И информационните технологии, и отворените граници за свободно движение могат да бъдат път, по който да вървим, за да станем горди българи, ценени и уважавани в света, нацията, която искаме да познават чужденците, и държавата, в която да продължим да изграждаме националното си самосъзнание.

Национална идентичност и родолюбие в българското образование

Една от основните отговорности за формиране за национална идентичност и родолюбие носят образователните институции. Педагогическата наука самостоятелно не би могла да изгради у личността родолюбие, но е задължена да използва максимално капацитета си и да положи всички усилия, за да формира патриотизъм и национална идентичност още в училищна среда. Защото това е едно от местата, където се създават идеали, където се формират ценности и се вдъхва любов към това, което всеки нарича отечество.

Законът за предучилищното и училищното образование[2] определя в чл. 5, ал. 1, т. 2 като една от основните си цели „съхраняване и утвърждаване на българската национална идентичност и българското национално самосъзнание“. Тези насоки трябва да се открият и в специфичните цели, които си поставя всяка учебна дисциплина.

В разпоредбите на Наредба № 2 от 18.05.2000 година за учебното съдържание[3] откриваме съвпадение между целите на основния закон и тези на подзаконовия нормативен акт в следните учебни дисциплини в гимназиален етап на обучение: литература, история и цивилизация, философия и гражданско образование. След преглед на учебното им съдържание става ясно, че националната идентичност и родолюбието са отразени в малка част от регламентираните теми. Останалите учебни дисциплини, които се изучават в първи гимназиален етап, не посочват в съдържанието си цели, свързани с изграждане на патриотизъм и развитие на национална идентичност. Това показва, че учениците от VIII до X клас са изключително изолирани от подобни теми. Няма ясно изградени възгледи и подходи за формиране и развитие на национална идентичност. Те са хаотично разпръснати в различни учебни дисциплини, разгледани са в общ контекст, изключително повърхностно, някъде само споменати, на други места – подминати. Подходите, които се използват за формиране на родолюбие, не са концептуални и съвсем обосновано не изпълняват целите, посочени в нормативната уредба.

Втори гимназиален етап включва учениците от XI и XII клас. В този етап от средното образование се изучава гражданско образование. То е въведено като учебна дисциплина в българското училище с Наредба № 5 от 30.11.2015 г. за общообразователната подготовка.[4] Неговата необходимост се заражда тогава, когато ясно си проличава липсата на знания и компетентност, свързани с гражданската активност и формирането на самосъзнание у младите хора. Същата наредба, в чл. 2, ал. 4, регламентира и основните компетенции, които трябва да се придобият, а именно социални и граждански компетенции. Учебната дисциплина е въведена в учебните програми през 2020 г. В учебното съдържание за XI и XII клас откриваме теми, свързани с гражданите, политиката и демокрацията, правата и отговорностите им, идентичности и различия в обществото, държавата и властта, икономика и

глобални проблеми. Това ясно показва, че съдържанието, свързано с формиране и развитие на национална идентичност, е една част от заложеното в регламентираните теми. Гражданското образование е важна част от общообразователния процес за формиране на социални и граждански компетентности и както е посочено в чл. 3, ал. 2 на Наредба № 13 от 21.09.2016 година за гражданското, здравното, екологичното и интеркултурно образование[5], то е „свързано със знания за устройството на демократичното общество, за правата и задълженията на гражданина и с умения и готовност за отговорно гражданско поведение“. Но от гледна точка на патриотичното възпитание е крайно недостатъчно. И поради тази причина е задължително да съществува цялостна концепция, която да има в основата си интердисциплинния подход, за да доведе до онези резултати, които биха накарали един ученик да чувства гордост, че е част от родината си, и да се идентифицира с нея.

Философски интердисциплинни подходи

Интердисциплинният подход е включен в учебните програми чрез междупредметните връзки. Представлява метод, който интегрира знания от различни дисциплини. Този подход се стреми да преодолее ограниченията на традиционните дисциплинарни граници и да създаде по-цялостно и комплексно разбиране на сложни явления и проблеми. Той синтезира специфичните възможности на различни дисциплини за решаване на общ проблем в дадена ситуация. Но за да бъде резултатно приложен, той трябва да съществува като „цялостен модел и стил на комплексно перцептивно/познавателно/дейностно/поведенческо отношение на човека в света“ (Рашева-Мерджанова 2014, с. 70). Механизмът за интегрирането му е заложен в два противоположни подхода: възходящ, който започва с учебното съдържание, преминава през компетентностите и завършва с целите; и низходящ, който поставя на първо място целите, преминава през компетентностите и достига до съдържанието. Проф. Яна Мерджанова в своите „Базови методически подходи за трансверсални компетентности“ ни насочва към трети подход, наречен от нея „синтезен“, при който на преден план се поставят компетентностите, според които се определят целите и съдържанието (Рашева-Мерджанова 2014, с. 70). Насочен е към нов вид компетентност, която се формира – трансверсална, или компетентност на личността. А тя зависи от вътрешното осъзнаване и саморефлексия, от философското познание за света и поставянето на себе си в него. Така този подход ще бъде адекватен на настоящите процеси, на съвременните модели и по-успешно ще подкрепи развитието на личността. Ключов момент и стратегическа задача е „мирогледното философско самопромисляне“ (Рашева-Мерджанова 2023, с. 25). Поставянето на философска основа в интердисциплинността, съчетана с всички останали сфери на живота, осмисля личността и нейното приобщаване към процесите в обществото. Синергетичният принцип предполага комбинативно използване на различни страни на познанието, но и на сетивността, емоционалността и въображението. Философските теории се осмислят през всички останали учебни дисциплини, но не като факти от съдържанието им, а като ценностен модел на поведение. По този начин интердисциплинността допринася за постигането на онази цел, която чрез трансверсалните компетентности ще формира национална идентичност и родолюбие.

РЕЗУЛТАТИ

Съдържателен концептуален модел за формиране на национална идентичност и родолюбие чрез учебен курс „Философия на родолюбието“

Съдържателният концептуален модел на разработения от мен учебен курс „Философия на родолюбието“ (виж фиг. 1) е насочен към създаване на онази основа за формиране и развитие на национална идентичност и принадлежност, която толкова липсва в училищата.

Фиг. 1. Съдържателен концептуален модел на учебен курс „Философия на родолюбието“

Изграден е като съчетание от философски теории, изучавани в часовете по философия, и представяне на известни български личности и събития, с които трябва да се гордеем и които са свързани с учебните дисциплини: история, география, литература, биология, физика, химия, музика, изобразително изкуство и спорт.

Интердисциплинният подход с използването на всички останали учебни предмети води до затвърждаване на вече изучавани събития и процеси, както и до разкриване и анализ на такива, които биха допринесли за формирането на национална гордост и патриотизъм, но са забравени някъде между жълтите страници на историческата ни памет за миналото или небрежното отношение към постиженията на българите в настоящето.

Организирана по този начин, концепцията има здрава основа в лицето на учебния курс, която е концентрирана върху родолюбието и разширява кръгозора във връзка с развитие на националната ни идентичност. Използват се знанията и компетентностите, придобити от останалите учебни дисциплини, съдържанието и основната насоченост в тях се допълват и надграждат. Целта на заложеното учебно съдържание е да се запълнят празнините в патриотичното възпитание, като се акцентира върху онези аспекти от настоящето, довели до кризата на идентичността, и след като се адаптират, да се насочат в правилната посока, така че да доведат до желаните резултати. Образованието трябва да е насочено към новото, към това, което вълнува младите хора. Само тогава то ще ги докосне и ще стигне до съзнанието им. Нито авторитарното налагане на принципи и идеали, нито прекалената свобода биха имали положителен ефект.

Учебният курс „Философия на родолюбието“ се явява като бяла лястовица, която взема на крилете си онази малка клонка гордост от учебното съдържание на всяка учебна дисциплина и я разкрива в пълния ѝ блясък, в какъвто никой досега не я е виждал. Конкретни примери могат да се открият в голяма част от съдържанието на учебните дисциплини.

Темите по история ни запознават с Първата световна война. Отделена е тема за българското участие в нея и само с едно изречение се споменават имената на българските генерали. „Философия на родолюбието“ разкрива лицата на тези велики българи, разказва за делата им, среща учениците с техните потомци. И няма как да не формира патриотични чувства на гордост, когато разказва за подвига на ген. Владимир Вазов, пред когото английската армия сваля знамената си в знак на почит, а неговата стратегия и тактика влизат във всички английски военни учебници.

Темите по география включват в съдържанието си релефните процеси, дейностите на водата и вятъра, формиращи различни скални образувания, пещери и проломи. „Философия на родолюбието“ разкрива красотата и величието на българските природни феномени, като Белоградчишките скали, Искърския пролом и необятните ни пещери. Места, по които всеки чужденец се захласва и остава с широко отворени очи от възхищение.

Биологията разкрива биологичните процеси в организма, същността на органите и клетките, а „Философия на родолюбието“ представя личности като тази на световноизвестния микробиолог доктор Стамен Григоров, открил бактерията Lactobacillus bulgaricus, допринесла за популярността на българското кисело мляко по целия свят.

Физиката представя електрически вериги, механични трептения и вълни, а „Философия на родолюбието“ вдъхновява с дълбоката следа, която оставя в живота на милиони хора българинът Асен Йорданов – строителят на световната авиация, написал книгите, по които и досега се подготвят хиляди летци по света.

Музиката включва теми, свързани с България в световната музикална култура, а „Философия на родолюбието“ запознава учениците с личността на цигуларя Васко Василев – най-младия член на Кралската опера, концертмайстор, който свири по време на коронацията на държавния глава на Обединеното кралство Великобритания и Северна Ирландия – крал Чарлз III.

Физическото възпитание и спорт се грижи за здравето и двигателната култура на учениците, а „Философия на родолюбието“ ги вдъхновява с успехите на златните момичета в художествената гимнастика, завоювали първия златен олимпийски медал за България в Токио 2020 г., както и успехите на Карлос Насар и Боряна Калейн на олимпиадата в Париж, 2024 г.

Формирането на национална идентичност и родолюбие като следствие от представяне на философска теория, съчетана с известна по света българска личност, е хипотеза, която трябва да бъде проверена. Представям методологията на изследването:

Настоящото изследване е реализирано като приложно педагогическо изследване с комбиниран качествено-количествен дизайн, насочено към разработване, апробиране и оценяване на концептуален модел за формиране на национална идентичност и родолюбие в гимназиалния етап на образованието. В теоретичния етап е осъществен системен анализ на философски, педагогически и нормативни източници, включително анализ на действащата образователна рамка и учебните програми в първи и втори гимназиален етап. Използвани са методите на теоретичния анализ и синтез, сравнителен анализ на учебно съдържание и концептуално моделиране с цел конструиране на съдържателен модел на учебен курс „Философия на родолюбието“, основан върху синтезен интердисциплинарен подход.

Емпиричният етап е осъществен чрез педагогическа апробация в реална училищна среда (IX клас), при която е приложен разработен тематичен модул. Изследването има формиращ характер, тъй като въвежда ново образователно съдържание и проследява неговото въздействие върху учениците. Данните са събрани чрез анкетно проучване след провеждане на занятието, като са анализирани както количествените показатели (самооценъчни нагласи, степен на идентификационно преживяване), така и качествените отговори, подложени на съдържателен анализ. Допълнително е приложено педагогическо наблюдение с оглед регистриране на степента на ангажираност, аргументативност и рефлексивност в учебната дискусия.

Работната хипотеза предполага, че интердисциплинарното обвързване на философски теории с примери за значими български личности и постижения води до повишаване на идентификационната принадлежност и до формиране на устойчиви позитивни нагласи към националната общност. Изследването има пилотен характер поради ограничената извадка, но позволява да се направят първични изводи относно приложимостта и потенциала на предложения концептуален модел в условията на съвременното българско училище.

Подробно представям една от апробираните теми от учебния курс, която съчетава теорията на Сократ за добър живот и личността на проф. Димитър Чернев и е осъществена през 2025 г. в ПГТЕ „Хенри Форд“ пред ученици от IX клас. Основната дидактическа цел е чрез съчетаване на теорията на Сократ за справедлив живот (изучавана в часовете по философия в IX клас) и връщането на справедливостта в Африка чрез слънчевия хладилник, изобретен от проф. Димитър Чернев (интердисциплинарна препратка към учебния предмет физика и астрономия), да се формират различни компетентности и да се въздейства на афективно емоционално и когнитивно рационално равнище за формиране на национална принадлежност и идентичност. Запознаването с личността и научните постижения на българина допринася за практическо прилагане на теорията, формиране на отношение към българските научни постижения и създаване на

условия (чрез емоционално въздействие) и предпоставки за формиране на родолюбие и свързаната с него национална идентичност. Учениците са ангажирани със задача да открият други български личности, с които може да се обвърже теорията на Сократ за справедливостта. По този начин откритията на науката и големите умове стават достъпни за учениците и доказват, че познанието може да предложи справедливи и реални решения на проблемите и да направи света едно по-добро място за живеене. И ние, като българи, имаме принос за възстановяването на справедливостта там, където тя е изгубена. Апробацията изпълнява ролята на емпирично доказателство за приложимостта и устойчивостта на предложения концептуален модел в реална училищна среда.

От проследяването на гледната точка на учениците, получена чрез анкетното проучване, може да се направи заключение, че съдържанието на предложения курс, в частност представената тема, напълно съвпада с потребностите на учениците. Резултатите от обратната връзка показват категоричното желание на участниците да посещават подобни часове, които според тях в голяма степен ги карат да се чувстват горди от това, че са българи, и формират национална идентичност и принадлежност. Интердисциплинарните връзки допринасят, от една страна, за надграждане на вече изучавана материя, но представена творчески и задълбочено, и от друга, формират компетенции, свързани с високите нива от таксономията на Блум, а именно анализ и синтез. Практическото свързване на философски теории с действителни личности и събития допринася за формиране на умения за извеждане и анализ на връзките между различни процеси и явления, както и на творческо поведение за изграждане на нови структури и модели.

ИЗВОДИ

Учебният курс може да се преподава във факултативна или профилирана подготовка, като теми от занимания по интереси, но и като интердисциплинарно обучение чрез бинарни уроци. Съдържанието на всяка тема от учебния курс се съчетава философски с различни теории и има за цел дебати, анализи и разкриване на различни гледни точки у учениците. Умелото съчетание на теорията за емоционалността на философа Макс Шелер (философия) и емоцията, предизвикана от музиката на цигулката на Васко Василев (музика); или на схващането на Аристотел за щастието (философия) и озарените лица на спортистите, постигнали най-големите си мечти (физическо възпитание и спорт), е начин да се докоснат сърцата на младите хора. Чрез срещата с успели българи не само в нашата родина, а и отвъд границите и доближаването до историите им, до тяхната същност и талант, се показват добрите примери. Тези примери, които трябва да се следват, но преди това да се познават.

ЗАКЛЮЧЕНИЕ

Учебният курс „Философия на родолюбието“ запълва една празнина, нещо, което липсва, което трябва да свърже съществуването на отечеството с отношението ни към него. Онова формиране на национална идентичност и принадлежност, което ни насочва към любов към земята и дедите ни, което ни кара да бъдем отговорни, лоялни, признателни и ни дава криле да полетим и покажем, че сме потомци на един род, допринесъл много за съществуването на съвременната цивилизация.

Съдържанието на учебния курс „Философия на родолюбието“ привлича не със запаметяването на факти и понятия, а с това, че формира собствени гледни точки, изграждане на ценности, изразяване на аргументирани мнения по важни за живота на личността и държавата теми. Той е насочен към това да превърне ученика в личност, която със своите знания и умения да открие себе си сред останалите, да изгради свой индивидуален облик, да формира своя позиция и по свой начин да допринесе за общото развитие на собствената си нация и държава. И тук изключителната отговорност е на учителя, който, преподавайки съдържанието на учебния курс, да докосне у учениците онези струни, които вълнуват, които ги свързват с България по един емоционален начин и превръщат всеки от тях в добър и отговорен гражданин, носещ в сърцето си национално самосъзнание, идентичност и гордост от това, че е българин.

БЕЛЕЖКИ

1. Българска национална доктрина.
2. Закон за предучилищното и училищното образование.
3. Наредба № 2 от 18.05.2000 г. за учебното съдържание.
4. Наредба № 5 от 30.11.2015 г. за общообразователната подготовка.
5. Наредба № 13 от 21.09.2016 г. година за гражданското, здравното, екологичното и интеркултурно образование.

ЛИТЕРАТУРА

ВИТАНОВА, Н., 2020. *Образование на бъдещето*. Шумен: Университетско издателство „Епископ Константин Преславски“.
ВЪРБАНОВА, С., 2021. *Индивидуалността в огледалата на постмодерното време.* София: Университетско издателство „Св. Климент Охридски“.
РАШЕВА-МЕРДЖАНОВА, Я., 2014. *Базови методически подходи за трансверсални компетентности.* София: Университетско издателство „Св. Климент Охридски“.
РАШЕВА-МЕРДЖАНОВА, Я., 2023. *Компетемтностно иновиране в образованието*. София: Университетско издателство „Св. Климент Охридски“.
РАШЕВА-МЕРДЖАНОВА, Я., 2017. *Синергетическа философия на образованието. Синергетическа естествена педагогика. Синергично образование*. София: Университетско издателство „Св. Климент Охридски“.

REFERENCES

VITANOVA, N., 2020. *Obrazovanie na badeshteto*. Shumen: „Episkop Konstantin Preslavski“ [In Bulgarian].
VARBANOVA, S., 2021. *Individualnostta v ogledalata na postmodernoto vreme.* Sofia: Sv. Kliment Ohridski [In Bulgarian].
RASHEVA-MERDZHANOVA, Y., 2014. *Bazovi metodicheski podhodi za transversalni kompetentnosti*. Sofia: Sv. Kliment Ohridski [In Bulgarian].
RASHEVA-MERDZHANOVA, Y., 2023. *Kompetentnostno inovirane v obrazovanieto.* Sofia: Sv. Kliment Ohridski [In Bulgarian].
RASHEVA-MERDZHANOVA, Y., 2017. *Sinergeticheska filosofia na obrazovanieto. Sinergeticheska estestvena pedagogika. Synergichno obrazovanie*. Sofia: Sv. Kliment Ohridski [In Bulgarian].

FORMATION OF NATIONAL IDENTITY AND PATRIOTISM IN THE SECONDARY STAGE OF BULGARIAN EDUCATION THROUGH PHILOSOPHICAL INTERDISCIPLINARY APPROACHES

Abstract: *In the contemporary world, the concept of national identity is increasingly losing its significance. Within the processes of globalization and the transformation of institutional values, it seeks its place within the individual personality amid a multiplicity of paths and influences. Educational institutions bear a substantial responsibility for the formation of patriotism among Bulgarian students; however, a comprehensive and coherent conceptual framework in this regard is lacking. The content-based conceptual model of the academic course "Philosophy of Patriotism" is oriented toward establishing the necessary foundation for the formation and development of national identity and a sense of belonging—an aspect notably absent from contemporary school education. Philosophical theories are interpreted across all other academic disciplines, not as factual components of their curricula, but as value-oriented models of behavior. In this way, interdisciplinarity contributes to the achievement of the overarching goal: through the development of transversal competencies, it fosters national identity and patriotism.*
Keywords: *education; identity; patriotism; programs; philosophy*

Viktoriya Tsoneva, PhD candidate
Sofia University "St. Kliment Ohridski"
Sofia, Bulgaria
E-mail: victoria_c@abv.bg

АКТУАЛНО
CURRENT TOPICS

BRIDGING UNIVERSAL AND LOCAL – THE NARROW RIDGE OF GLOBAL STANDARDS WITH CULTURAL CONTEXT IN CORPORATE SOCIAL RESPONSIBILITY

Muhamet Kqiku
Sofia University St. Kliment Ohridski
https://doi.org/10.70300/NKHD7241

Abstract: *In recent years, repeated ethical scandals have led to severe reputational crises and substantial financial losses for globally operating corporations. Prominent examples such as Walmart's unsuccessful expansion into Germany, Home Depot's failed market entry in China, and the bribery allegations involving Walmex in Mexico illustrate that these setbacks cannot be explained solely by cultural misunderstandings. Rather, they reveal deficiencies in ethical governance, risk assessment, and timely managerial intervention. Multinational companies operate within complex environments where universal corporate standards intersect with diverse local norms and practices. This creates a structural tension between the aspiration to apply consistent global principles and the necessity to adapt to country-specific contexts. When organizations fail to distinguish between legitimate cultural differences and genuine ethical conflicts, the result is often misconduct, regulatory violations, and erosion of stakeholder trust.*

This article advances the concept of a comparative cross-cultural ethics assessment as a comprehensive approach to corporate social responsibility. The framework seeks to safeguard fundamental principles such as human dignity, fairness, and environmental sustainability while allowing context-sensitive implementation. It also draws a clear distinction between formal compliance motivated by fear of sanctions and authentic responsibility grounded in internalized ethical commitment, particularly in relation to global supply chains, digital ethics, and sustainable business models.
Keywords: *Corporate Social Responsibility; Business Ethics; Cross-Cultural Ethics; Stakeholder Theory; Carroll's Pyramid*

INTRODUCTION

Efficiency, success and responsibility in the globalised economy, taking ethical challenges into account

In the context of an increasingly intensifying globalization, the relevance of ethical challenges for multinational companies is also rising (Singh 2025, 4). Often, this leads to financial failures due to cultural, legal, and institutional differences. Therefore, it is not surprising that there is a connection between ethical misconduct and business losses. Take Walmart's expansion efforts, for example. The company failed in no small part because American practices such as scripted friendliness and rigid hierarchies clashed with German preferences for directness, low power distance, co-determination, and loyalty to discounters like Aldi (The Culture Factor 2025). This alienated both customers and employes who had grown up in a culture that prioritized individualization over corporate rituals, resulting in the sale of 85 stores at a loss of over billion. The same was true for Home Depot and its expansion efforts in China. In this case, the company also fell victim to cultural blindness. The DIY model of Home Depot is more associated with hobby and fun in the West, but in the context of a developing country, it signals poverty, which ultimately led to the closure of all 13 stores between 2007 and 2012 with a loss of 160 million dollars (Moffett 2019). Also in this list is the bribery scandal of Walmart in Mexico (Walmex). In this case, local managers made payments of 24 million dollars as "operating expenses" (Blodget 2012) in an environment with high market distance (Hofstede score 81) and weak oversight (Thom 2019, 9). They violated the US-FCPA, corporate policies, and whistleblower warnings until systematic governance failures were uncovered as part of a 282.7 million fine (Debter 2019).

These cases show that within the framework of increasing globalization, moral complexities among stakeholders (shareholders, customers, suppliers, etc.) are being amplified. The distinction between ethical adjustments and non-negotiable violations necessitates a comparative intercultural ethical evaluation framework. This includes four components: normative universal standards such as anti-corruption (rooted in Kant's deontology and Singer's utilitarianism) (Kant 1900, 421; Gilson 2006), cultural-institutional factors (Hofstede dimensions, local laws), organizational governance (compliance enforcement), and perceptive training for ethical awareness. In Friedman's 1970 doctrine, CSR was still limited to rule-compliant profit, but today sustainability is much more legitimized (Friedman 1970, 126). But this has changed massively. In 2018 86% of S&P 500 companies released sustainability or corporate sustainability reports, while it was just under 20% in 2011 (Gillan, Koch & Starks 2021, 1). True, autonomous responsibility according to Kant surpasses heteronomous compliance (Wright 2025).

RESEARCH METHODOLOGY

This article is based on a narrative literature review. The aim was to analyze theoretical frameworks of Corporate Social Responsibility (CSR) and cross-cultural business ethics, with particular focus on the integration of universal ethical principles in diverse regulatory and cultural contexts. The analysis draws on foundational CSR literature (Carroll's pyramid model, stakeholder theory), ethical frameworks (deontology, consequentialism), cultural dimension theory (Hofstede), and empirical case studies of multinational corporations. The literature was selected based on its relevance to the distinction between compliance-based and responsibility-based organizational approaches in global business operations.

RESULTS

Carroll's CSR pyramid: foundation, impact and evolution of corporate social responsibility

When we think of corporate social responsibility, Archie B. Carroll inevitably comes to mind as one of the first thinkers in this field. His research has significantly shaped our current understanding of the ethical obligations of companies. His article "The Pyramid of Corporate Social Responsibility: Towards the Moral Management of Organisational Stakeholders" (1991) explains an integrated model. In this model, four mutually reinforcing dimensions are at the core of CSR (Corporate Social Responsibility) research. This was of significant theoretical relevance as it questions the false dichotomy between profit and responsibility. In Carroll's pyramid, economic responsibility is the foundation. Consequently, companies have the obligation to achieve sustainable financial returns. Therefore, according to Carroll, it is essential to "produce goods and services that consumers needed and wanted to make an acceptable profit in the process." (Carroll 1991, 41). In this context, the concept of economic viability is not seen as an obstacle to social responsibility. In his view, companies should pursue all dimensions simultaneously. For this economic viability is a foundation, but not a prerequisite to start with an ethical responsibility. In his perception, this represented what society understood as legitimate business conduct. In this context, he also included various legal forms, such as labour law, environmental protection laws, and standards for fair competition. "Society has not only sanctioned business to operate according to the profit motive; at the same time business is expected to comply with the laws and regulations promulgated by federal, state, and local governments as the ground rules under which business must operate. As a partial fulfilment of the "social contract" between business and society, firms are expected to pursue their economic missions within the framework of the law." (Carroll 1991, 41). The minimal expectations for legitimate corporate behaviour are represented by legal compliance. In Carroll's framework, this responsibility is positioned as a middle level and not as the highest level. This clarifies that compliance with the law is necessary and important but does not constitute the entirety of ethical obligation. In Carroll's framework, ethical responsibility is included. In this context, companies do the right thing for their stakeholders not just because the law requires it, but because it is the right thing to do. In Carroll's definition, "At its most fundamental level, this is the obliga-

tion to do what is right, just, and fair, and to avoid or minimize harm to stakeholders (employees, consumers, the environment, and others)." (Carroll 1991, 42). It is expected by society of the company, even though it is not legally mandated. In this dimension, it is acknowledged that regulations are generally reactive and only follow societal recognition of wrongdoing, rather than proactively defining moral standards. Carroll goes a step further and sees ethical responsibility as the obligation for companies to anticipate and address stakeholder concerns before they are developed into formal legal requirements. Also to respect the dignity and rights of the people to be protected, even if that goes beyond legal minimum requirements. In this dimension, the difference between compliance-oriented and responsibility-oriented entrepreneurial thinking becomes clear. In the philanthropic dimension, voluntary contributions through which companies contribute to the well-being of the community, social progress, and cultural enrichment are addressed. It is positioned at the top of the pyramid, but it is not an optional position. It is to be understood as an entrepreneurial ability to contribute positively to the broader society once the basic responsibilities are ensured. Carroll acknowledges that this dimension is less relevant for the organisation's deliberation, even though it is often the most visible and represents the expression of corporate commitment to the common good. Carroll emphasises throughout his entire work that "CSR or stakeholder perspective would recognize these tensions as organizational realities but focus on the total pyramid as a unified whole and how the firm might engage in decisions, actions, and programs that simultaneously fulfil all its component parts." (Carroll 1991, 42–43). With this, he aims to raise awareness that lower levels must not be abandoned once higher levels are reached. These are continuous organizational commitments. Companies can be both profitable and compliant with the law, but if they do not respect the dignity of stakeholders and meet moral standards, these companies can be ethically deficient. Similarly, an organization undermines the foundation for a higher level if it pursues ethical and philanthropic goals without maintaining economic profitability or legal compliance. His framework has significantly evolved through his ongoing research. For this, his re-conceptualization from 1999 (in Business Society) is relevant. In that he argues that CSR is better understood as focusing on the relationship of the organization with its stakeholders. He claims "There is a natural fit between the idea of corporate social responsibility and an organization's stakeholders" (p. 43). Arguing that the term "social" in CSR has been seen by some as vague and lacking in specificity as to whom the corporation is responsible, I suggested that the stakeholder concept, popularized by R. Edward Freeman (1984), personalizes social or societal responsibilities by delineating the specific groups or persons business should consider in its CSR orientation and activities. Thus, the stakeholder nomenclature puts "names and faces" on the societal members or groups who are most important to business and to whom it must be responsive (p. 43)." (Carroll 1999, 290). It is therefore increasingly about recognizing real people with their own genuine concerns. This creates a dimension away from purely abstract rules to the understanding of how decisions impact people and organizations. In his latest developments, particularly his commitment to sustainability issues and his stakeholder capitalism framework, it shows that the fundamental pyramid model remains analytically robust. However, the application must be adapted to the emerging challenges of business ethics.

How to compare CSR ethics in different situations

It is inherent in things that natural conflicts exist between efficient action, business success, and ethical trust. Ethics in global business should not be seen as an insurmountable conflict of values, but rather as an opportunity for a balanced comparison of ethical standards. It is also important to distinguish between two erroneous alternatives. If we take a look at extreme moral relativism, then the definition is that "moral judgments are true or false only relative to some particular standpoint (for instance, that of a culture or a historical period) and that no standpoint is uniquely privileged over all others." (Westacott, Internet Encyclopedia of Philosophy). This implies that one should do what is promoted by one's own culture and that all ethical frameworks are equally valid. However, this assessment is problematic, as the basis for any ethical judgement would be lost if these universal moral standards did not exist. On the other hand, we have imposed universalism. This approach describes that identical procedures should be carried out everywhere without contextual

adaptation. It is important to mention here that it lacks philosophical rigour and practical feasibility. This usually leads to resistance and associated operational failures. Within the framework of the comparative cross-cultural ethics assessment, the integrated approach is helpful. Through the first component, the normative foundation, it is ensured that the core principles (human dignity, justice, environmental protection, rule of law) are culturally non-negotiable, but rather deontologically binding. The cultural-institutional approach ensures that an understanding is created that cultures differ in various aspects (such as power distance, communication, institutional maturity and economic capacity) and thus prevents both imposed universalism and false relativism (Tilley 1998, 272 –290). The organisational implementation then describes that, while the principles are the same, the processes are different. While the cost of living varies depending on the local standard of living, the condition that workers deserve a decent wage remains constant. In different countries and cultural contexts, there are various support bodies for employees (works councils in Germany, unions in the USA, community committees in developing countries), but their right to participate is the same everywhere. In this case, false relativism is prevented because it reveals that "cultural necessity" often conceals an organisational choice. If we are in the same cultural context and some companies respect the dignity of employees while others exploit them, it is not the cultural context but the organisational commitment that matters. Universal practices do not require identical practices everywhere, but contextually appropriate mechanisms to operationalise these principles.

In the fourth component, the perception of stakeholders, contextual problems that hinder implementation are identified through the involvement of local interest groups. In this context, through the cultural lens of the employees, it is understood how they perceive the universal principles. This contradicts a top-down implementation. The Walmex case, which has already been discussed here, can also be considered empirical evidence in this context. From the perspective of moral relativism, one can say that due to Mexico's power distance, bribery was considered normal (The culture factor 2025). This was seen as part of the game, which led to a significant loss of image and a high fine. But the imposed universalism approach also did not work here. There were indeed a zero-tolerance policy and a desired identical enforcement. However, this was seen by the local managers as cultural disrespect.

The idea behind it is that CSR is a part of applied ethics. This must be implemented in the everyday decisions of a company. This means that it must go beyond consequentialism (how do actions affect society?) and be implemented within the framework of deontology. Even though it would be desirable, it is also clear that each idea creates different CSR approaches, but none alone encompasses all global business ethics. Let us take an example of this. Within the framework of consequentialism, a cost reduction could be justified to help society, but fairness is excluded and ignored. Here, deontology could protect the rights of employees, and virtue ethics could foster trust through ethical behaviour without needing to determine measurable successes. Carroll's pyramid model supports companies in implementing ethical principles in practice. Its four dimensions should not be applied uniformly everywhere, but rather implement universal core values in context-dependent forms. While core principles remain constant, the details vary locally. Through sustainable value creation, companies earn money, which can support jobs, innovation, and social commitments. Of course, it strongly depends on what can be defined as sustainability. This is generally dependent on the type of economy being considered and how developed a country is. Generally, organisations must follow the rules wherever they operate. And that is exactly where the problem lies. The rules are not the same everywhere and change from place to place (labour laws, environmental standards, anti-corruption guidelines). Compared to Germany or the USA, textile manufacturers in Bangladesh face significantly weaker environmental regulations when it comes to water pollution or chemical wastewater. A tragic example of this is the collapse of Rana Plaza, in which 1,134 people lost their lives. While they operate legally in the local market, they cause massive environmental damage that would be considered violations in Germany. This is the problem with labour standards. They always tell a story of power and inequality. The fact that a worker in Southeast Asia earns one-third less than his European counterpart for the same work illustrates the extent of deliberate legal decisions rather than a natural economic law. This inequality

is a constant challenge for multinational companies. On the one hand, local labour laws must be adhered to, but at the same time, there is the problem that the laws often do not provide sufficient protection compared to the standards of the respective countries. From an ethical perspective, it is not enough to simply comply with local laws when doing business in multiple jurisdictions with very different protection standards (JIMS 2025). Ethically correct organisations actively commit to questioning whether the legal framework surrounding them truly protects the dignity of workers and ecological sustainability. The reference to the local legal situation is not sufficient for these organisations. This intrinsic commitment forms the basis of applied ethics in business. If organisations want to establish a comprehensive strategy, environmental and philanthropic responsibilities must also be anchored. In this context, approaches such as deontological duty, consequentialist harm reduction, virtue ethics, or care ethics, which "seeks to maintain relationships by contextualizing and promoting the well-being of care-givers and care-receivers in a network of social relations" (Sander-Staudt, Internet Encyclopedia of Philosophy) should also be applied in a contextualised manner. While environmental measures must be adapted to local conditions, philanthropic donations should address the specific needs of the community and respect the priorities of the stakeholders, rather than forcing an image improvement. Comparative ethics demands genuine responsibility through local adaptation and stakeholder involvement, rather than justifying cultural or contextual differences as moral relativism.

Global supply chains are becoming increasingly interconnected, leading to greater challenges for intercultural and ethical evaluation. The protection of labour dignity represents a universal moral principle based on values such as human worth and harm prevention. Wages must ensure that local living costs can be covered. At the same time, occupational safety requires that local regulations and the availability of local resources be utilised (Dahan, Lerner, Milman-Sivan 2021). For Carroll, respect is universal and not culture-dependent. In his "Orientation Towards Employee Stakeholders" he describes the Moral Management Type: "Employees are a human resource that must be treated with dignity and respect. The goal is to use a leadership style such as consultative/participative that will result in mutual confidence and trust. Commitment is a recurring theme. Employees' rights to due process, privacy, freedom of speech, and safety are maximally considered in all decisions. Management seeks out fair dealings with employees." (Caroll 1991, 46). For this, a comparison with Hofstede and his dimensions and definitions can also be relevant. His cultural dimensions, particularly power distance in this case, might explain why different participatory mechanisms have emerged that restrict the right to participate, but they certainly do not provide a justification for their abolition. In his definition power distance is defined as "the extent to which a society accepts the fact that power in institutions and organisations is distributed unequally." (Hofstede 1980, 45). In this context, employee participation can lead to significant added value in decision-making processes, resulting in greater efficiency. According to Crifo and Rebérioux, this type of co-determination has the advantages that "codetermination seems to positively impact wage and remunerations" (Crifo and Rebérioux 2024, 248) and at the same time "increased profitability (e.g. Svejnar, 1982) and lower labor fluctuations." (Crifo and Rebérioux 2024, 248).

For Hofstede, who is considered one of the most influential cultural researchers, this participation can only be successfully undertaken if culture is also considered. He emphasises "One cannot write meaningfully about organisational participation without embedding it within a national cultural context." (Hofstede 2001, 109). It is interesting that even within research, different views and definitions of how this culture manifests itself emerge. While for Hofstede it is about shared values among individuals that regulate their perceptions and behaviours as well as their social relationships (Hofstede 1980), for many other researchers, such as Kroeber and Kluckhohn it primarily concerns traditional ideas and their associated values. They refer "Culture consists of patterns, explicit and implicit, of and for behaviour acquired and transmitted by symbols, constituting the distinctive achievement of 'human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as products of action, on the other as conditioning elements of further action." (Kroeber and Kluckhohn 1952, 181).

On the topic of employee participation, a study by Valverde-Moreno, Torres-Jiminez, and Lucia-Casdemunt (2020) is also extremely interesting. In this study, the opinions of 25,000 workers from 31 European countries are presented. Here, it is particularly interesting that "the greater the indulgence of the country, the greater the direct employee PDM, and indulgence is the most influential variable with the highest standardised ß value 0.646" and that "the greater the masculinity of the country where the company is located, the lower the direct employee PDM." (Valverde-Moreno, Torres-Jiminez, Lucia-Casdemund 2020, 11). Furthermore, PDM correlates significantly with the Hofstede dimensions. The study notes in this: In the study, it says about this: "To examine whether these differences could be related to cultural values, a correlation analysis between Hofstede's dimensions and PDM was performed. Pearson's correlation coefficients (Table 4) showed that all culture indicators have a significant linear relationship with PDM." (Valverde-Moreno, Torres-Jiminez, Lucia-Casdemund 2020, 10).

In this context, it is important that the appropriate cultural system is adapted to the culture and the respective laws, and that it gives workers the opportunity to shape decisions that affect their lives. Through ignorance of contextual variations, companies create resistance and cultural alienation. Conversely, the strict adherence to local conditions is not necessarily effective either. Child labour, forced labour, exploitation, and corruption are always wrong, regardless of the local environment we find ourselves in. Companies need red lines, even if cultural differences or business needs could be used as excuses. Moral principles, such as dignity, fairness, and honesty, must be the standard to which the local context is adjusted. Here, individual flexibility plays a role. A participatory CSR approach begins with deliberative collaboration on-site and implements it with universal principles. It should be noted that stricter regulations make it more difficult to clearly distinguish between universal moral values and local implementation (Dahan, Lerner, Milman-Sivan 2021). Voluntary CSR initiatives that become binding ESG regulations make it difficult to distinguish between compliance and genuine ethical responsibility. Applied ethics is particularly important here. Companies do not use regulatory requirements merely as an obligation, but as a starting point for profound change to establish actual transformation. This can be achieved by strengthening internal controls, actively involving stakeholders, and making responsibility the foundation of the corporate strategy. In this context, the achievement of ethical change varies significantly depending on the institutional context. In this context, the stronger the rule of law and the enforcement of rights, the more NGOs and free media are present, the more likely genuine ethical changes will be promoted through MTDP mechanisms. If the conditions are not prevalent, it usually results in identical regulatory requirements merely generating documentation for compliance, while the actual practices remain unchanged. This underscores that achieving an ethical commitment depends more on organisational culture, leadership orientation, and stakeholder engagement than on mere compliance with regulations as a performance metric.

Through new technologies, the need arises to identify new dimensions and ethical considerations that are not yet considered in current CSR models. Due to the ever-increasing relevance of cybersecurity, artificial intelligence, and digital platforms, there is a need to develop new ethical questions as well as their impacts and solutions. For example, if we look at data rights and digital dignity, we recognise that different cultural and legal systems have been conceived differently in this regard. In European law, individual autonomy and privacy are placed at the centre as fundamental human rights. This leads to individuals having greater self-control over private information. In contrast, when looking at some Asian or African approaches, this individual aspect is shifted towards a collective or familial approach. This also aligns with the cultural values of these regions. And here lies the crux for internationally operating companies. For cost and efficiency reasons, they aim to establish uniform approaches, processes, and values, while they must not overlook these local variations. Applied ethics has the task of developing normative structures that incorporate data management and technological practices into universal obligations (human dignity, autonomy, etc.) while simultaneously considering the differences in cultural realisations. It helps to compare how companies in different countries understand and implement their ethical obligations. It is important here that we take this as an approach to analyse differences and not just

to excuse them. This comparative approach can enable companies to determine how organisations implement their legal and cultural obligations and are truly designed to uphold the dignity of the individual and bring about a significant improvement. For example, if a company in Vietnam allocates additional time for employees to attend to their prayers, it strengthens employee bonds and their well-being.

CONCLUSION

Companies that wish to take on genuine ethical responsibility should engage in developing a systematic ethical assessment based on four key elements. First, establish a clear framework, such as the comparative cross-cultural ethics assessment. This offers a theoretically grounded approach and prevents the erroneous separation of rigid universalism and principle-less relativism. Next, companies should clearly distinguish between implementation approaches and universal principles. It is non-negotiable what value the dignity of the worker holds, but the various possibilities of employee participation can vary from culture to culture. The same goes for environmental protection. This is non-negotiable, yet specific environmental priorities can vary depending on local conditions. We could apply the same as described in the article to the cost of living and wages. This openness in differentiation creates ethical consistency for companies without operational rigidity. Thirdly, ethical and economic success can only be achieved in harmony if stakeholders are sincerely involved. This includes the co-determination of employees in the various participation mechanisms and determining which environmental priorities and economic commitments are most relevant to them. Even research shows that employees can distinguish between genuine voice and alibi participation. While in the first case the management responds substantially, in the other case input is gathered but simply ignored.

A very interesting paper was published by Scholz and Vitols. In their 2019 published article they mention “By contrast, substantive CSR involves real changes to operations and requires the commitment of organizational resources. Codetermination strength is strongly and positively related to all three of the substantive types of CSR we examine, the adoption of targets for emissions reduction, the publication of a CSR report and commitment to employment security. This suggests that worker representatives are selective with regard to the policies they support: they appear less likely to support symbolic than substantive forms of CSR.” (Scholz and Vitolis 2019, 244). And this is even more important in today’s rapid changing world. As claimed by John Elkington “As a result, in today’s world “very few of us feel unconditional loyalty to anyone or anything” (Elkington 1998, 44) and “In the new order, it turns out, stakeholders, whether they are customers, employees, or triple bottom line campaigners, want to be (and to be treated as) partners. In fact, the same “zero defection” targets that Reichheld proposes for companies wanting to be “loyalty leaders” can be cross-applied to broader stakeholder relationships.“ (Elkington 1998, 45). In the next step, accountability mechanisms should also be established at the organizational level. These can include ethics officers, whistleblower protection measures, and a code that requires executives to act as soon as ethical obligations are violated. Only through this consistent handling will rhetorical statements become genuine ethical implementations. This ultimately leads to a long-term change not only in strategy but also in the company’s purpose. In traditional shareholder-oriented models, stakeholders are considered costs that should be minimized at best. In stakeholder-inclusive models, these are moral actors, whose dignity and interests form an important cornerstone of the organization. Comparative cross-cultural ethics assessment creates a genuine transformation within the company. This is reached by systematically integrating universal principles and contextual mechanisms and engagement. They ensure that executives and stakeholders can discuss together what the organization owes to society and how this debt is compatible with economic goals. The future is bringing interesting development through CSR and stakeholder management. Like described by Rodríguez-Fernández, Gaspar-González and Sánchez-Teba “The emerging trends detected focus on board diversity (ZubeltzuJaka, Alvarez-Etxeberria, & Ortas 2020) as well as corporate reputation along with the company’s financial performance. Also new topics that are raising interest among researchers are audit committees and board member profile analysis. Depending

on the timeline figure, terms such as women, China, information disclosure or gender diversity are preferred by researchers at this time.“ (Rodríguez-Fernández, Gaspar-González and Sánchez-Teba 2020, 10).

REFERENCES

BLODGET, H., 2012. Busted: Walmart Caught in Huge Bribery Scandal – Senior Management Knew About It and Tried to Cover It Up. *Business Insider*, available under: https://www.businessinsider.com/walmart-bribery-scandal-2012-4

CARROLL, A. B., 1991. The Pyramid of Corporate Social Responsibility: Toward the Moral Management of Organisational Stakeholders. *Business Horizons*, Volume 34, Issue 4, pp. 39–48.

CARROLL, A. B., 1991. Corporate Social Responsibility: Evolution of a Definitional Construct. *Business & Society*, Volume 38, Issue 3, pp. 268–295.

CRIFO, P.; REBÉRIOUX, A., 2024. Employee participation as a new frontier in corporate social responsibility: A review of the literature. *Journal of Participation and Employee Ownership*, 7(3), pp. 241–254.

DAHAN, Y.; LERNER, H.; MILMAN-SILVAN, F., 2021. Shared Responsibility and Labor Rights in Global Supply Chains. *Journal of Business Ethics.*

DEBTER, L., 2019. Walmart Will Cough Up $282 Million To Put Years-Long Bribery Investigation Behind It. *Forbes.* Available under: https://www.forbes.com/sites/laurendebter/2019/06/20/walmart-will-cough-up-282-million-to-put-years-long-bribery-investigation-behind-it/

ELKINGTON, J., 1998. Cannibals with Forks: The Triple Bottom Line of 21st Century Business. *Environmental Quality Management*, pp. 37–51.

FIRMEX, 2014. Seven Epic Fails by Businesses That Tried Expanding into Foreign Markets. *Firmex Resources Blog.* Available under: https://www.firmex.com/resources/blog/seven-epic-fails-by-businesses-that-tried-expanding-into-foreign-markets/

FRIEDMAN, M., 1970. The Social Responsibility of Business Is to Increase Its Profits. *New York Times Magazine*, 33, pp. 122–126.

GABRIELLELEE, 2021. The Reasons Behind Home Depot's Multimillion Dollar Failure in China. *Medium.* 01.03.2021. Available under: https://medium.com/writ-150-at-usc-fall-2020/the-reasons-behind-home-depots-multi-million-dollar-failure-in-china-699bcb76ec25

GILLAN, S. L.; KOCH, A.; STARKS, L. T., 2021. Firms and social responsibility: A review of ESG and CSR research in corporate finance. Journal of Corporate Finance, Elsevier, vol. 66(C).

GILTON, D., 2006. Chew the Right Thing. *Mother Jones*. Available under: https://www.motherjones.com/politics/2006/05/chew-right-thing/

HARRIS, J., 2015. War Story: The Wal-Mart Mexico Bribery Scandal. I*ntellex Forensics (blog).* Available under: https://intellexforensics.com/war-story-the-wal-mart-mexico-bribery-scandal/

HERTLEIN, B., 2023. Zehn Jahre Rana-Plaza-Unglück: Eine Mahnung für bessere Arbeitsbedingungen in Bangladesch. *Amnesty International*. Available under: https://www.amnesty.de/informieren/aktuell/bangladesch-zehn-jahre-rana-plaza-unglueck-textilindustrie-arbeitsbedingungen

HOFSTEDE, G., 1980. *Culture's Consequences: International Differences in Work-Related Values*. Sage.

HOFSTEDE, G., 2001. *Culture's Consequences. Comparing Values, Behaviors, Institutions, And Organizations Across Nations*. Sage (2nd Edition).

HOFSTEDE, G., 1983. National Cultures in Four Dimensions: A Research-Based Theory of Cultural Differences among Nations. *International Studies of Management & Organization,* Vol. 13, no. 1/2, pp. 46–74.

JAGANNATH INTERNATIONAL MANAGEMENT SCHOOL (JIMS), 2025. *Ethical Considerations in Cross-Cultural Business Practices.* Available under: https://www.jagannath.org/blog/ethical-considerations-in-cross-cultural-business-practices/

KANT, I., 1900-. Gesammelte Schriften. *Preussische Akademie der Wissenschaften et al*. Berlin: Akademie-Verlag, https://korpora.org/kant/aa04/421.html

KNORR, A.; ARNDT, A., 2003. Wal-Mart in Deutschland – eine verfehlte Internationalisierungsstrategie. *Materialien des Wissenschaftsschwerpunktes „Globalisierung der Weltwirtschaft*, no. 25

KROEBER, A. L.; Kluckhohn, C., 1952. *Culture: A Critical Review of Concepts and Definitions*. Cambridge, MA: Peabody Museum, p. 181.

MOFFETT, M., 2019. Why Home Depot Failed in China. *CNBC*. Available under: https://www.cnbc.com/2019/06/14/why-home-depot-failed-in-china.html

RODRÍGUEZ-FERNÁNDEZ, M.; GASPAR-GONZÁLEZ, A. I.; SÁNCHEZ-TEBA, E. M., 2020. Sustainable social responsibility through stakeholders engagement. *Corporate Social Responsibility and Environmental Management*, pp. 1–12.

SANDER-STAUDT, M. Care Ethics. *Internet Encyclopedia of Philosophy.* Available under: https://iep.utm.edu/care-ethics/#H12

SCHOLZ, R.; VITOLS, S., 2019. Board-level codetermination: A driving force for corporate social responsibility in

German companies? *European Journal of Industrial Relations*, Vol. 25, Iss. 3, pp. 233–246.
SINGH, K., 2025. How Globalization Has Redefined Business Ethics. *International Journal of Multidisciplinary Research (IJFMR)*, 7(4), pp. 1–15.
THE CULTURE FACTOR, 2025. *Country Comparison Tool*. Available under: https://www.theculturefactor.com/country-comparison-tool?countries=germany.
THOM, E., 2019. *Exploring Small Business Management in Mexico and the United States using Hofstede's Dimensions*. University Honors Theses. Paper 719.
TILLEY, J. J., 1998. The Problem for Normative Cultural Relativism. *Ration Juris*, Vol. 11. No. 3, pp. 272–290.
WESTACOTT, E. Moral Relativism. *Internet Encyclopedia of Philosophy.* Available under: https://iep.utm.edu/moral-re/
WILLIAMS, G., 2023. Kant's Account of Reason. *The Stanford Encyclopedia of Philosophy* (Summer 2024 Edition). Available under: https://plato.stanford.edu/archives/sum2024/entries/kant-reason/
WRIGHT, S. DR., 2025. *Deontic Ethics.* Available under: https://www.drstevenawright.com/deontic-ethics/

МЕЖДУ УНИВЕРСАЛНОТО И ЛОКАЛНОТО – ДЕЛИКАТНИЯТ БАЛАНС МЕЖДУ ГЛОБАЛНИТЕ СТАНДАРТИ И КУЛТУРНИЯ КОНТЕКСТ В КОРПОРАТИВНАТА СОЦИАЛНА ОТГОВОРНОСТ

Резюме: *През последните години поредица от етични скандали предизвикаха сериозни репутационни кризи и значителни финансови загуби за глобално опериращи корпорации. Примери като неуспешната експанзия на Walmart в Германия, проваления опит на Home Depot да навлезе на китайския пазар, и корупционните обвинения срещу Walmex в Мексико показват, че подобни неуспехи не могат да се обяснят единствено с културни различия. Те разкриват дефицити в етичното управление, оценката на риска и навременната управленска намеса.*

Мултинационалните компании функционират в сложна среда, в която универсалните корпоративни стандарти се пресичат с разнообразни локални норми и практики. Това поражда структурно напрежение между стремежа към прилагане на единни глобални принципи и необходимостта от адаптация към националния контекст. Когато организациите не успеят да разграничат легитимните културни особености от същинските етични конфликти, последиците често са нарушения, регулаторни санкции и ерозия на доверието на заинтересованите страни.

Статията предлага концепцията за сравнителна междукултурна етична оценка като цялостен подход към корпоративната социална отговорност. Рамката цели да гарантира основни принципи като човешко достойнство, справедливост и екологична устойчивост, като същевременно допуска контекстуално съобразено прилагане. Прави се и ясно разграничение между формалното спазване на изискванията, продиктувано от страх от санкции, и автентичната корпоративна отговорност, основана на вътрешно възприети ценности, особено в областта на глобалните вериги на доставки, дигиталната етика и устойчивите бизнес модел.

Ключови думи: *корпоративна социална отговорност; бизнес етика; междукултурна етика; теория на заинтересованите страни; пирамида на Карол*

Мухамет Кяику, докторант
ORCID ID: 0009-0005-7536-8189
Софийски университет „Св. Климент Охридски“
София, България
E-mail: muhametkqiku@gmx.de

АКТУАЛНО
CURRENT TOPICS

COMMUNICATION AND INFORMATION PROCESSES IN THE USE OF PSYCHOLOGICAL REIFICATION FOR IMPROVING PUBLIC HEALTH

Oliver Adam
University of Library Studies and Information Technologies
https://doi.org/10.70300/RDNK9789

Abstract: *Psychological reification refers to the communicative process by which dynamic mental experiences are linguistically transformed into rigid, seemingly objective "things." Although widely discussed in philosophy, sociology, and linguistic critique, reification has not yet been systematically examined as a communication-based process within clinical psychology and psychotherapy. This article proposes psychological reification as a transdiagnostically relevant phenomenon that emerges in self-descriptions and interpersonal communication and can also occur within the therapeutic relationship. It operates as a linguistic-cognitive mechanism that can foster rigid self-images, restrict psychological flexibility, and hinder change processes. From this perspective, reification is understood not merely as an individual cognitive distortion, but as a communicatively mediated mechanism shaped by linguistic conventions and shared informational frameworks. Methodologically, the article is based on a theoretical-conceptual and language-analytical approach that systematizes forms of psychological reification and illustrates them through selected clinical examples. The aim is to situate psychological reification within the field of communication and information processes in mental health contexts and to demonstrate its relevance for identifying and deconstructing dysfunctional meanings in psychotherapeutic communication.*
Keywords: *psychological reification; communication processes; information structuring; transdiagnostic approach; psychotherapeutic communication*

INTRODUCTION

"My anxiety won't let me go" – such sentences are common in psychotherapeutic practice, but reveal a problematic pattern of linguistic self-interpretation: psychological reification. This term, derived from the Latin *res* ("thing") and *facere* ("to make") (Stowasser et al. 2016), is used to describe the tendency to translate dynamic psychological processes or subjective experiences into rigid linguistic structures that disguise their changeability and give them the appearance of objective facts. In this way, a hypothetical construct that originally served as orientation becomes a seemingly real thing, an entity. It becomes something one *has, is,* or *is at the mercy of.* A feeling becomes the dominant force ("Depression has me in its grip"), a temporary state becomes a trait ("I'm just depressed").

From a communication- and information-oriented perspective, such expressions can be understood as stabilized meaning formations that emerge within everyday, professional, and institutional communication. Psychological reification does not occur in isolation within the individual mind, but is shaped and maintained through recurring linguistic patterns, shared interpretative frameworks, and socially established ways of organizing psychological information. In mental health contexts, these communicative structures become particularly relevant, as diagnostic language, self-descriptions, and therapeutic dialogue systematically translate dynamic experiences into communicable and administrable forms. Reification can thus be conceptualized as a process of communicative meaning stabilization that both enables orientation and entails the risk of rigidifying subjective experience.

The idea of reification can be traced back to medieval scholasticism, where in the universals controversy the realists considered general concepts such as "living being" or "justice" as really existing, while the conceptualists understood them as mental constructs (Loux and Crisp 2017). In modern times, Whitehead (1985) criticized the tendency to treat abstract models or scientific

concepts such as “force”, “market” or “time” as concrete realities, while Lukács (2013) examined “Verdinglichung” as part of his critique of capitalism. Berger et al. (2021) as well as Sapir (1921) and Whorf (1956) also showed how linguistic structures shape our perception and self-interpretation in such a way that dynamic processes such as “depression” or “society” appear as seemingly objective entities. The relevance of reification for clinical psychology has hardly been systematically investigated to date. Yet, according to the thesis of this article, it is central to understanding self-concepts, problematic diagnostic language and psychotherapeutic change processes.

However, psychological reification is not only understood as a linguistic phenomenon, but also as a communicatively mediated, transdiagnostically effective mechanism that can contribute to the cognitive narrowing and chronification of psychological suffering in cases of depression, anxiety, and personality disorders, for example. The aim of this article is to systematically describe this psychological phenomenon, distinguish between its different forms, and demonstrate how it can inform both diagnosis and intervention in psychotherapy.

RESEARCH METHODOLOGY

This article is based on a theoretical-conceptual approach that aims to systematically define psychological reification and to make it fruitful for psychotherapeutic practice by situating it within a communication- and information-structuring perspective. The focus lies on the analysis of linguistic and communicative processes through which psychological experience is structured, stabilized, and rendered communicable. Methodologically, this is a concept-analytical and theory-based study that does not rely on empirical data collection, but rather develops hypotheses and conceptual distinctions that can be systematically examined in future research.

Psychological reification is conceptualized as a linguistic-cognitive and communicatively mediated mechanism that transforms subjective experience and behavior into seemingly objective identity attributions. A systematic distinction – internal versus external, explicit versus implicit, and functional versus dysfunctional – is employed to develop a differentiated system of categories that captures different communicative functions of reifying language, such as attribution, stabilization, and the organization of psychological information. In addition, psychological reification is described as a transdiagnostic process that operates in a comparable manner across different mental disorders and communicative contexts. Illustrative clinical examples and selected intervention techniques are used to demonstrate potential applications of the conceptual framework, including externalization, deconstruction, and emotional processing.

RESULTS

From a communication- and information-oriented perspective, the following results outline how reification functions as a linguistic mechanism for organizing, stabilizing, and transmitting psychological meaning across different communicative contexts. The term “reification” generally refers to the tendency to treat complex phenomena linguistically as if they were objective things with their own existence. For example, although “reason” is an abstract principle of thought, it is often treated as an acting entity, as when it is said: “Reason has prevailed.” Likewise, “society” is not a tangible object but a dynamic network of relationships, norms, and interactions. However, formulations such as “society wants it this way” suggest that it is an acting entity with its own will. Another example of reification is “the wind”. From a physical point of view, wind is the movement of air molecules due to pressure differences. Nevertheless, we speak of the wind as if it were a thing that blows or whistles. Reification makes complexity manageable and promotes intersubjective understanding, but can also have negative effects in psychology. Table 1 provides a concise overview of the main distinctions between different forms of psychological reification.

Table 1. Forms of psychological reification and their communicative / psychological implications.

Dimension	Form	Core linguistic characteristic	Communicative / psychological implications
Locus	Internal	Subjective experiences are formulated as inner "things" or agents (e.g., "My anxiety controls me").	Stabilizes inner experience as object-like; reduces complexity but limits experiential differentiation and agency.
	External	Supra-individual entities or external evaluations are linguistically treated as acting forces (e.g., "Society demands this of me").	Transfers agency outward; shapes self-concept through socially shared or internalized attributions.
Explicitness	Explicit	Reified elements are explicitly named, often as grammatical subjects or metaphors (e.g., "Depression has me in its grip").	Makes reification visible and communicable, but may reinforce objectification through naming.
	Implicit	Reification is linguistically presupposed without explicit naming (e.g., "I'm just the way I am").	Stabilizes meaning covertly; restricts reflection and negotiation in interpersonal communication.
Function	Functional	Reification serves orientation, communication, or motivation (e.g., diagnostic labels, resource metaphors).	Facilitates shared understanding, emotional relief, and communicative connectivity when kept flexible.
	Dysfunctional	Reification solidifies into rigid identity attributions or perceived forces beyond control.	Restricts psychological flexibility, fosters helplessness, and contributes to symptom maintenance.

Communication of internal and external psychological reifications

Psychological reifications differ from general reifications in that they affect the individual experience and behavior of a person. Internal psychological reifications refer to those linguistic-cognitive processes in which subjective experience and behavior are linguistically transformed into rigid, object-like characteristics or identity statements and appear as actors. When people say: "My trauma haunts me" or "My anxiety won't let me go", dynamic psychological experience no longer appears as a temporary state or context-dependent experience, but as a quasi-objective, unassailable entity. This linguistic form thus creates an inner counterpart, a "something" that affects, oppresses, controls or renders helpless. From an information structuring perspective, such internal reifications reduce complex, situational experiences to stable communicative units that can be easily referenced but limit experiential differentiation.

External psychological reifications, on the other hand, can refer to supra-individual entities, such as "society" or "the others". Such reifications become psychologically relevant when they influence individual thinking, feeling and behavior, for example when a person thinks: "Society demands this of me." However, external psychological reifications also include external evaluations or labels, for example from parents, teachers, doctors or psychotherapists, which have become inner convictions through repetition and emotional significance. If, for example, a mother repeatedly said: "You are far too sensitive, everything is difficult with you", this statement can become effective in the self-image of the person concerned, often without their origin being consciously remembered. Statements such as "I'm just too sensitive" then sound like self-descriptions, but often carry the linguistic structure and content-related evaluation of another person's perspective.

Communication of explicit and implicit psychological reifications

In the case of explicit psychological reifications, the supposedly independent "things" or actors are formulated openly. Metaphorical images or nouns are then typical, such as "Depression has me firmly in its grip" or "Society demands this of me." In these cases, the reified element is often the grammatical subject of the sentence.

Implicit reifications, by contrast, involve abandoning any explicit naming of a "thing" while still linguistically presupposing one, often through static self-ascriptions. Typical examples are

statements like "I'm just the way I am." At first glance, this sounds innocuous and colloquial, yet its implicit structure embodies a reification: one's experience and behavior are simply attributed to an alleged, stable, unchangeable "way of being" that goes unexamined. If you make this explicit – say, by sharpening it to "I'm at the mercy of a thing called 'way-of-being'" – you can see how language obscures the processual nature of personality and relationship experience, transforming a diffuse, unquestioned bundle of traits implied by "the way I am" into an apparently objective entity. Through this linguistic framing, a person shifts from active subject to passive object: the "way-of-being" becomes the agent, while the person is merely "acted upon." The use of "just" reinforces this effect with a tone of resigned finality, as if the speaker wants to nip any notion of change in the bud. This form of implicit psychological reification narrows the space for change. Although it may offer temporary protection against guilt or overwhelm ("It's not *my* fault. That's *anxiety's* doing"), it can also foster learned helplessness and external control. Implicit reifications are particularly relevant from a communication-theoretical standpoint, as they stabilize meaning without being explicitly named and therefore tend to escape reflection and negotiation in interpersonal interaction.

Communication of functional and dysfunctional reifications

Functional psychological reifications can have a structuring and communication-promoting effect or also strengthen motivation and activate resources. The first category includes, for example, psychological reifications in the context of classification and diagnosis, in that they translate subjective experiences into a nameable form and thus enable clarification, orientation and emotional relief. Statements such as "I have a social anxiety disorder; now I know what's wrong with me" make it clear that this reification does not act as a fixed definition, but as a temporary interpretative framework that classifies experience and behavior and makes it workable. At the same time, such psychological reifications also promote communicative connectivity: patients, therapists and institutions such as health insurance companies speak the same language. Linguistic standardization can support the therapeutic process by creating a common frame of reference that enables treatment and counteracts the feeling of being alone with one's own suffering. The previously "unspeakable" ("What's wrong with me?") thus becomes socially shareable, which also contributes to emotional self-relief.

Motivating psychological reifications unfold their effect when they function as a symbolic designation of inner resources or coping strategies. Statements such as "The fighter in me helps me not to give up" strengthen self-efficacy and can be specifically used and deepened in therapeutic work. Metaphorical-personalized representations, such as "my inner child", can open up possibilities for emotional integration and inner dialogue without necessarily having to become a rigid attribution of identity.

Dysfunctional psychological reifications, on the other hand, transform subjective experience and behavior into rigid, seemingly objective identity attributions or powers of action to which the person feels at the mercy of. Typical formulations are those already described in the previous sections. Many psychological reifications initially have a functional effect. However, precisely because they initially provide cognitive order and emotional relief, they can easily become an integral part of the self-image or world view – and thus susceptible to a dysfunctional shift in their function. This transition is often gradual. A diagnosis such as "depression" initially has a clarifying effect ("Now I know what's wrong with me"), but becomes a solidification of the problem when it is later transformed into a statement of identity ("I'm just depressed"). In this sense, functional and dysfunctional reifications can be understood as differing modes of communicative information management that either support or constrain psychological flexibility.

Psychological reifications as a communication process in diagnostics

The impact of psychological reifications is not limited to specific disorders but cuts across diagnostic categories. Thus, reification can be understood as a transdiagnostic mechanism playing a similar functional role in various mental disorders (Harvey et al. 2004). In depressive disorders, for example, reifications frequently appear as statements like "I am worthless." Such declarations stabilize negative self-schemas, promote withdrawal tendencies, and contribute to the maintenance of

self-devaluation and hopelessness. In anxiety disorders, reification shows up in formulations such as "Anxiety rules my life." Here, the affective state is externalized and portrayed as an autonomous, overpowering force, which can intensify feelings of loss of control and foster avoidance. In the context of obsessive-compulsive symptomatology, one often encounters remarks like "I'm just a control freak." This formulation illustrates an identity fusion with rigid coping strategies: The ego merges with the controlling behavior, which is no longer experienced as a situational strategy but as a stable, dominant personality trait.

Communication and information processes in psychotherapeutic treatment

1. Recognizing reifications: The first step is to identify dysfunctional psychological reifications in the patient's verbal expression. Statements such as "I'm just the way I am" indicate reifying structures. The therapist can address them with specific questions: "What exactly does 'the way I am' mean?" Another possible therapeutic approach is the externalization of a psychological reification. The technique originally comes from narrative therapy (Dahm-Mory 2021; White and Epston 2024). The basic idea is to linguistically detach a stressful inner pattern, such as "the anxiety" or "the critic", from the self and treat it as an independent figure capable of dialog. This makes the linguistic structure of the reification visible and workable by lifting the already objectified element onto the therapeutic stage. Questions such as "If your anxiety were a separate being, what would it look like?" or "What does it want from you?" promote distance and a change of perspective and interrupt the logic of identification ("I *am* my anxiety"). What initially appears as an unquestionable reality is, in fact, a linguistically constructed figure that can now be critically examined, deconstructed, and thus dissolved – i.e., de-reified.

2. Psychoeducation and meta-linguistic reflection: A further step consists of psychoeducation, i.e. conveying a basic understanding of how language shapes experience and behavior and how reifications can have a psychological effect. Patients should be able to understand that certain linguistic patterns such as rigid self-attributions or substantivizing formulations lead to inner processes being experienced as unchangeable and identity-forming, although in reality they are subjective, situational and changeable. Simple linguistic examples can be used to explain how quickly a feeling becomes an "essence" in everyday language or a tendency becomes a rigid "trait", for example, when "I feel insecure right now" becomes the sentence "I'm just an insecure person".

3. Deconstruction: In this phase, dysfunctional psychological reifications should be de-reified. For example, the statement "I'm just a control freak" can be reformulated as: "I notice that I try to stay in control in certain situations; sometimes this helps me, but sometimes it also makes me inflexible." In this reformulation, "I am" is replaced by "I notice" and "try", which describes the experience as processual and observable. The implicit temporal fixation "always" is relativized by formulations such as "in certain situations" and "sometimes". In a further step, the relativized statement can be contextualized, for example by naming typical trigger situations such as in the statement "Especially when I am under time pressure and others are dependent on me, I notice how my need for control becomes particularly strong." But biographical aspects can also be named, for example in the statement "As a child, I often experienced that no one took responsibility, perhaps my behavior today is related to this." Linguistic markers such as the resigned "just", which implicitly excludes reflection and change, should be deliberately avoided. Through this three-stage linguistic deconstruction – relativizing, contextualizing and reformulating – the originally rigid, seemingly unchangeable self-definition is de-reified: it gives way to a differentiated description of experience, behavior, triggers, context and underlying needs, which promotes a more differentiated, flexible self-image and processes of change.

4. Dealing with functional reifications: Functional psychological reifications create meaning, bundle experiences, make complex inner experiences communicable and have a motivating effect. For therapeutic practice, this opens up the possibility of consciously working with these statements, for example by metaphorically naming inner strengths, anchoring them biographically and activating them in a targeted manner in the further course. At the same time, such functional reifications require particular vigilance, as they can tip over into dysfunctional patterns in the course of the therapeutic process. Even diagnostic reifications, which initially have a clarifying

and relieving effect, can solidify over time into rigid identity cores ("I'm just depressed"), which implicitly excludes the possibility of change. From a therapeutic perspective, it is therefore crucial not to reinforce functional reifications without reflection, but to keep them open, flexible and context-sensitive. A central question in therapeutic work should be: "Is such a statement helpful for you right now or does it restrict you?"

5. Emotional processing of dysfunctional reifications: Dysfunctional psychological reifications not only have a linguistic-cognitive effect, but also an emotional one. Statements such as "I'm just the way I am; it's always been my problem" are often associated with feelings such as shame, helplessness, fear or resignation. These emotions are often not explicitly named, but are implicitly conveyed through the linguistic structure, for example through formulations that suggest immutability or failure. In the therapeutic relationship, it is therefore important to identify these emotional implications, validate them and reflect on them together. It is not only about deconstructing dysfunctional reifications, but also about taking the emotional content associated with them seriously. Beyond its cognitive structure, a statement such as "I'm just not capable of having a relationship" can be an expression of deep disappointment, self-protection or fear of rejection. These emotional meanings need to be explored before dysfunctional reifications can be deconstructed. Beck (1976, 1999) emphasizes that language, especially in the form of automatic thoughts, is not only a means of describing emotions, but is actively involved in their development. According to Beck, the way people think about something significantly determines how they feel and how they behave. Against this background, dysfunctional psychological reifications can be understood as linguistic-cognitive constructions that not only accompany emotions such as fear, shame or guilt, but also *cause* them. De-reification is therefore not only aimed at cognitive flexibilization, but also at affective relief: If a reification is deconstructed in the therapeutic process, this can not only contribute to a more differentiated self-image, but also to the attenuation of the stressful emotions.

CONCLUSIONS

The concept of psychological reification describes a linguistic-cognitive and communicatively mediated mechanism that has received little attention to date but is potentially significant, contributing to the development and maintenance of psychological disorders and representing a concrete therapeutic starting point. By systematically differentiating internal and external, explicit and implicit, as well as functional and dysfunctional reifications, an analytical framework is established that is applicable to both clinical diagnostics and psychotherapeutic practice and that allows reification to be understood as a process of communicative meaning stabilization.

At the same time, the present work is to be understood as a theoretical-conceptual contribution whose assumptions have not yet been empirically tested. The derivation of possible mechanisms of action is based on theoretical plausibility assumptions, linguistic analyses, and clinical illustrations, but not on systematically collected data. This limits the informative value, particularly with regard to the empirical classification of psychological reification as a transdiagnostic process. Further research is therefore needed to examine how reifying language patterns and information structures operate across different communicative contexts and diagnostic categories.

In practice, de-reification, understood as the dissolution of rigid self-attributions and stabilized meaning formations, can play a key role in enabling change processes in the first place. Against the backdrop of Grawe's common-factors research (Grawe and Caspar 2012), de-reification can thus be conceptualized as an overarching common factor that facilitates the effectiveness of other factors such as problem actualization, resource activation, motivational clarification, problem mastery, and the therapeutic relationship, particularly by increasing communicative flexibility within psychotherapeutic interaction.

REFERENCES
BECK, A. T., 1976. *Cognitive therapy and the emotional disorders*. New York: International Universities Press.
BECK, A. T., 1999. *Prisoners of hate: The cognitive basis of anger, hostility, and violence*. 1st ed. New York: HarperCollins.
BERGER, P. L.; LUCKMANN, T.; PLESSNER, H., 2021. *Die gesellschaftliche Konstruktion der Wirklichkeit: Eine Theorie der Wissenssoziologie*. 28th ed. Frankfurt am Main: Fischer Taschenbuch.
DAHM-MORY, C., 2021. Externalisierung. *PiD – Psychotherapie im Dialog*, vol. 22, no. 4, pp. 11–12.
GRAWE, K.; CASPAR, F., 2012. Allgemeine Psychotherapie. In: SENF, W.; BRODA, M. (Eds.). *Praxis der Psychotherapie – Ein integratives Lehrbuch*, pp. 33–46.
HARVEY, A. G.; WATKINS, E.; MANSELL, W.; SHAFRAN, R., 2004. *Cognitive behavioral processes across psychological disorders: A transdiagnostic approach to research and treatment*. 1st ed. Oxford: Oxford University Press.
LOUX, M. J.; CRISP, T. M., 2017. *Metaphysics: A contemporary introduction*. London: Routledge.
LUKÁCS, G., 2013. *Geschichte und Klassenbewußtsein*. Bielefeld: Aisthesis Verlag.
SAPIR, E., 1921. *Language – An introduction to the study of speech*. New York: Harcourt, Brace and Company.
STOWASSER, J. M.; PETSCHENIG, M.; SKUTSCH, F., 2016. *Stowasser: Lateinisch-deutsches Schulwörterbuch*. Völlige Neubearbeitung, 1st ed. München: Oldenbourg Schulbuchverlag.
WHITE, M.; EPSTON, D., 2024. *Die Zähmung der Monster: Der narrative Ansatz in der Familientherapie*. 9th ed. Heidelberg: Carl-Auer-Verlag.
WHITEHEAD, A. N., 1985. *Process and reality: An essay in cosmology*. Corrected ed. New York: Free Press.
WHORF, B. L., 1956. *Language, thought, and reality: Selected writings of Benjamin Lee Whorf*. Cambridge, MA: The MIT Press.

КОМУНИКАЦИОННИ И ИНФОРМАЦИОННИ ПРОЦЕСИ ПРИ ИЗПОЛЗВАНЕТО НА ПСИХОЛОГИЧЕСКА РЕИФИКАЦИЯ ЗА ПОДОБРЯВАНЕ НА ОБЩЕСТВЕНОТО ЗДРАВЕ

Резюме: *Психологическата реификация се отнася до комуникативния процес, чрез който динамичните психически преживявания се трансформират езиково в статични, привидно обективни „неща“. Въпреки че е широко обсъждана във философията, социологията и лингвистичната критика, реификацията все още не е систематично изследвана като комуникационен процес в клиничната психология и психотерапията. Тази статия разглежда психологическата реификация като трансдиагностично значимо явление, което се проявява в самоописанията и междуличностната комуникация и може да възникне и в терапевтичната връзка. Тя функционира като лингвистично-когнитивен механизъм, който може да подхранва фиксирани самооценки, да ограничава психологическата гъвкавост и да възпрепятства процесите на промяна. От тази гледна точка реификацията се разглежда не само като индивидуална когнитивна деформация, но и като комуникативно опосредстван механизъм, формиран от лингвистични правила и споделени информационни рамки. Методологично статията се основава на теоретично-концептуален и езиково-аналитичен подход, който систематизира формите на психологическата реификация и ги илюстрира чрез подбрани клинични примери. Целта е психологическата реификация да се позиционира в областта на комуникационните и информационните процеси в контекста на психичното здраве и да се демонстрира нейната релевантност за идентифициране и деконструкция на нефункционални значения в психотерапевтичната комуникация.*
Ключови думи: *психологическа реификация; комуникационни процеси; информационно структуриране; трансдиагностичен подход; психотерапевтична комуникация*

Оливер Адам, докторант
Университет по библиотекознание и информационни технологии
София, България
E-mail: oliver.adam@me.com

ИЗДАТЕЛ
Академично издателство
„За буквите – О писменехъ“
Университет по библиотекознание
и информационни технологии

ДИРЕКТОР
доц. д-р Диана Стоянова
бул. „Цариградско шосе“ № 119,
ет. 2, стая 213
София 1784, България
тел.: +359 879 14 83 85
е-поща: d.stoyanova@unibit.bg

Списание „Образование, научни изследвания и иновации“ излиза четири пъти годишно.

PUBLISHER
Academic Publisher
“Za Bukvite – O Pismeneh”
University of Library Studies and
Information Technologies

DIRECTOR
Assoc. Prof. Diana Stoyanova, PhD
119, Tsarigradsko Shosse Blvd.
fl. 2, room 213
Sofia 1784, Bulgaria
tel.: +359 879 14 83 85
E-mail: d.stoyanova@unibit.bg

Journal “Education, Scientific Research and Innovations” is published four times a year.