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STRATEGIC TOOLS IN ASSESSING THE BUSINESS ENVIRONMENT OF A PAN-EUROPEAN DISTRIBUTED RESEARCH INFRASTRUCTURE

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Abstract

The purpose of this article is to showcase the strategic tools used in examining the business environment of a pan-European distributed research infrastructure (RI) with the aim of identifying the key factors that may influence its activity, identifying the emerging risks, better defining its strategy and objectives, better-addressing stakeholders' concerns. PESTLE analysis, SWOT analysis and Mendelow's stakeholder matrix are effective tools for strategic planning and decision-making. In this regard, the article conveys these tools in the case study of METROFOOD-RI, a future distributed RI operating in the ESFRI domain of Health & Food. It indicates the key factors at the macro-economic level, the main pros and cons of METROFOOD-RI, market opportunities and menaces and the relationships that should be built with various stakeholders. A clear understanding of the impact of these elements is essential in planning the creation of such large-scale RI.

Key words**:** *research infrastructure, agri-food, PESTLE, SWOT, analysis, stakeholders*

INTRODUCTION

Food continues to be the main concern of all global societies. There is a high pressure on modern agriculture and food production to withstand a fast-rising global population which requires access to safe and reliable sources of nutrition [5].

The OECD‑FAO Agricultural Outlook 2023‑2032 states that the world population is expected to grow from an average of 7.9 billion people in 2022 to 8.6 billion people in 2032 [9].

The EU's Common Agricultural Policy (CAP) underlines the strategic importance of the agri-food sector, representing about 36% of the overall budget of the EU [7]. It has also become an industrial sector competing on the global level.

The European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI), which fosters competitive and sustainable farming and forestry [1] and the European Institute of Innovation and Technology for Food (EIT Food), a large European food innovation initiative, working to make the food system more sustainable, healthy and trusted [2], emphasize the central position of the agri-food sector in Europe's industrial and innovation strategy.

The complexity of the agri-food system requires a systemic approach, promoted by Food 2030 EU initiative, to connect, scale up, and boost EU R&I and investments for providing solutions to four overarching priorities: i) nutrition for sustainable and healthy diets; ii) climate-smart and environmentally sustainable food systems; iii) circular and resource-efficient food systems; iv) food systems innovation and empowerment of communities [6]. Among them, the most related priority to food safety is "nutrition for sustainable and healthy diets". In addition to supporting the new Farm to Fork strategy, this priority also aims to contribute to further development and implementation of EU food regulation and food safety policies, the Steering Group on Health Promotion, Disease Prevention and Management of Non-Communicable

Diseases, and the relevant targets of the 17 Sustainable Development Goals: 1-Less poverty, 2-Zero hunger, 3-Good health and well-being, 8-Decent work and economic growth, 10-Reduced inequalities and 12-Responsible consumption and production [13].

Food quality and safety, authenticity and health benefits have become a focus for public concern and consumer requirements all over the world. However, there is still a significant fragmentation with regard to food control, analysis, data and research in Europe and worldwide.

ESFRI Roadmap 2018 clearly states that new infrastructure efforts are needed at the EU level in the field of food, nutrition and processing. There is a need to connect RIs across the EU and globally, and across the entire food chain [3].

In this context, the creation of METROFOOD-RI, as a pan-European distributed research infrastructure [3][4], fulfils the needs identified by ESFRI in the Health & Food domain by conducting top-level research activities in this domain through its mission to enhance quality and reliability of measurement results and make available and share data, information, and metrological tools [8][10]. The scientific offer is addressed to a broad set of users, such as researchers/academics; food business operators; policymakers, food inspection and control agencies; consumers/citizens [8].

According to the ESFRI classification of scientific domains, METROFOOD-RI belongs to "Health & Food" [11]. Nevertheless, given its wide impact, it is also connected to other ESFRI domains (Fig.1) [3], especially to the "Environment" domain.

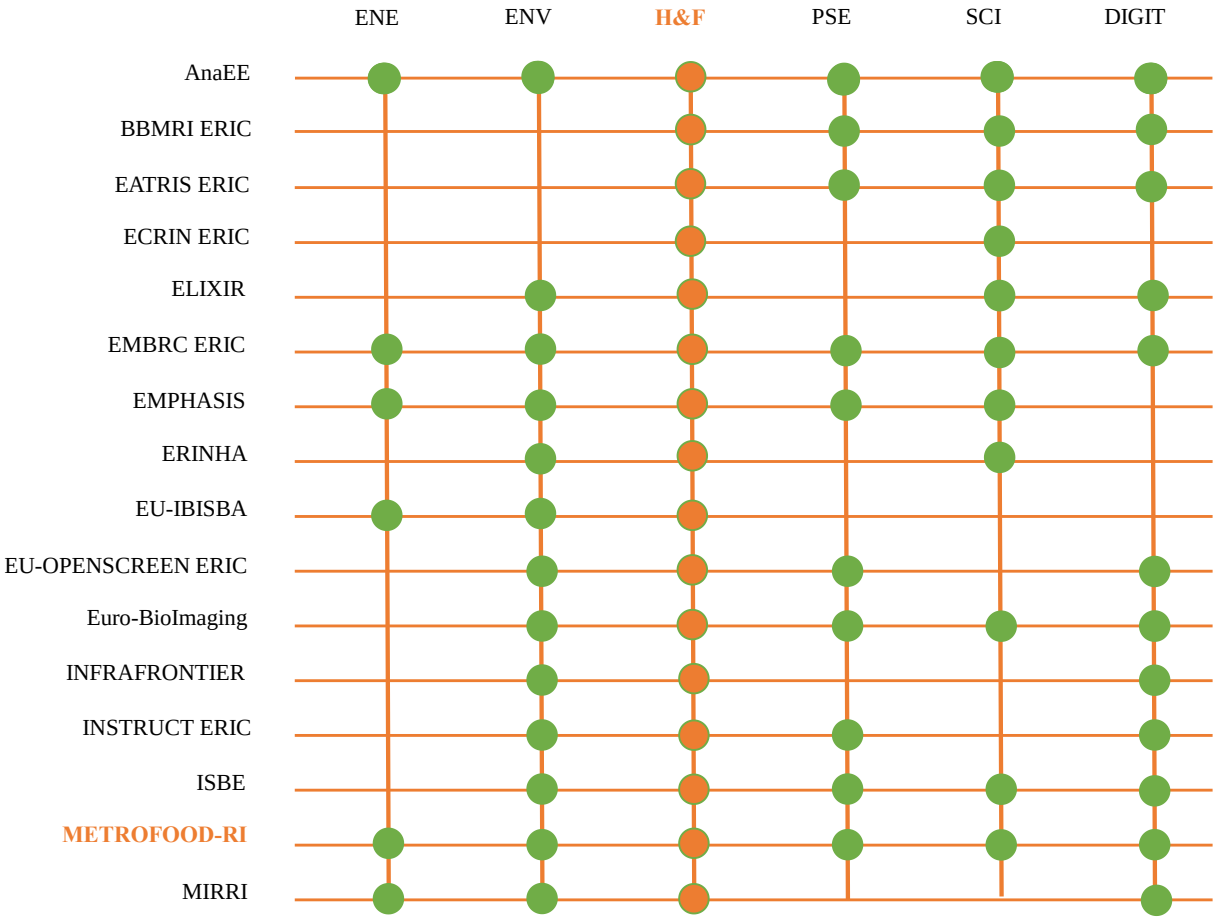

Fig.1. Interconnections between ESFRI RIs from Health & Food domain and the other scientific domains
Source: ESFRI Strategy Report on Research Infrastructures Roadmap 2018.

METROFOOD-RI completed its preparatory phase in May 2022, financed under the H2020 METROFOOD-PP project. At present, it has just received approval for additional financing

under the call HORIZON-INFRA-2023-DEV-01-02 — Early phase implementation of ESFRI Projects which entered the ESFRI Roadmap in 2018 which represents a step forward in reaching its goal of becoming a legal entity METROFOOD-ERIC.

MATERIALS AND METHODS

The PESTLE analysis was used in order to have a thorough understanding of the external factors that could influence the activity of METROFOOD-ERIC.
The SWOT analysis was performed to analyse its strengths, weaknesses, external threats and possible future developments. It was developed based on the entries from METROFOOD-RI partners via brainstorming.
The Mendelow's stakeholder matrix was prepared to assess RI's stakeholders' attitudes and expectations and their potential impact on business decisions.
Most diagrams were created in Miro platform.

RESULTS AND DISCUSSIONS

Environmental analysis
Before taking any decision regarding the implementation of METROFOOD-RI and ERIC set up, an in-depth analysis of both RI's internal and external environment was carried out in order to properly plan the implementation and operation of a large and complex RI.
The **PESTLE Analysis** was developed as METROFOOD-RI is subject to various macro-environmental factors (political, economic, social, technological, legal and environmental) that could impact its overall performance. Its business framework is broken down into the 6 key external factors posted in Fig.2.
The political environment is characterised by government, EU and ESFRI actions which by setting policies, strategies, regulations can directly and/or indirectly influence the activity of METROFOOD-ERIC or its targeted areas such as agri-food sector, food security, food quality, etc.
Moreover, it has a significant influence on METROFOOD-ERIC financial sustainability as the national governments are actively involved in this research infrastructure by offering political and/ or financial support which is paramount for its long-term existence. In addition, the EU offers major funding opportunities for the construction of such RIs [12].
Economic factors include inflation rates, salary level, market trends, national budget deficit which have a great influence on the market demand, services prices, employment conditions, and overall users' consumption. Considering particularly these tough times, the most of the EU countries face high inflation rates, increased budget deficit, a slowing down of the overall economy.
Social factors refer especially to demographic trends, population age and mobility, lifestyle, customers' tastes, education and population health. These factors can influence on one hand, for example, the mobility of researchers, their expertise, and on the other hand, the range of services offered by METROFOOD-ERIC which will be changed in line with users' needs.
Technological factors influence both physical and electronic infrastructures of METROFOOD-RI. National Nodes have to constantly invest in upgrading and/ or new research equipment, as well as to keep up the pace with aspects related to digitalisation, analytics, clouding, platforms and applications. In this way, it will ensure the provision of high-quality services and users' satisfaction.
Legal factors are also important and include the regulations specific to the ERICs, food quality and safety regulations, copyright and patent laws, data protection laws, etc.
Environmental factors do not have a direct impact on METROFOOD-RI but have a significant influence on the agri-food sector, with consequences on the Health & Food domain to which METROFOOD-RI belongs.

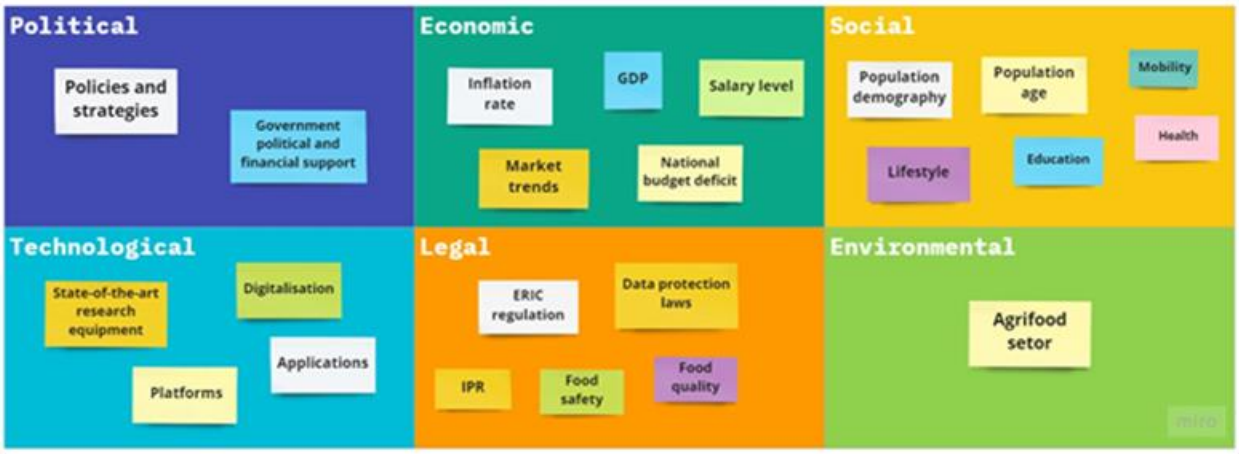

Fig.2. PESTLE Analysis
Source: Own results.

The **SWOT Analysis** (Fig.8) was performed in order to better capture METROFOOD-RI's role. The strengths, weaknesses, possible future developments and external threats have been identified and analysed.

It aimed to examine the RI's business environment for supporting the METROFOOD-RI partners in identifying the most appropriate strategies to reduce weaknesses and threats, as well as to mitigate any potential risks that may impede the smooth implementation and operation of METROFOOD-RI and the future ERIC.

Strengths and weaknesses refer to the pros and cons of METROFOOD-RI.

The main pros of METROFOOD-RI include ERIC's structure, state-of-the-art facilities, high expertise, high-qualified staff involved, multiple and integrated services provided and multiple challenges that it addresses.

The cons consist mainly of some scientific topics or areas insufficiently covered and few countries with political and economic commitments.

Opportunities and threats refer to the external features that METROFOOD-ERIC should leverage or take action. It helps in shaping current and future operations and setting strategic goals.

The opportunities refer to social opportunities given by education and professional training for new jobs that RI can offer. This will lead to an increase in overall competence. Cooperation between partners and also between European research groups with other RIs will increase the visibility of organisations at the European/global level. The measurement methods and standards developed by METROFOOD-RI partners will help to identify contaminants that affect human health and also to identify bioactive compounds necessary for a healthy diet. This is an opportunity to strengthen consumer protection and improve quality of life. Policy improvement is envisaged. METROFOOD-RI, as rapid information and dissemination and transfer of knowledge and technology tool, can improve innovation-related activities and interaction with users, becoming a major driver for innovation in food safety.

Threats arise from insufficient resources: human (brain drains) and reduced finances (poor investment in research in the last period in almost all partner countries, low-level financial support granted by public authorities). COVID-19 (or other pandemics) situation and Fake news related to food is affecting the food market from a quantitative and qualitative point of view. Incoherent national policy related to METROFOOD-RI and poor dialogue between different levels of participants on the food system and METROFOOD-RI could also be an important threat.

The key internal and external factors of METROFOOD-RI that can influence its strategy and activity are outlined in the below board.

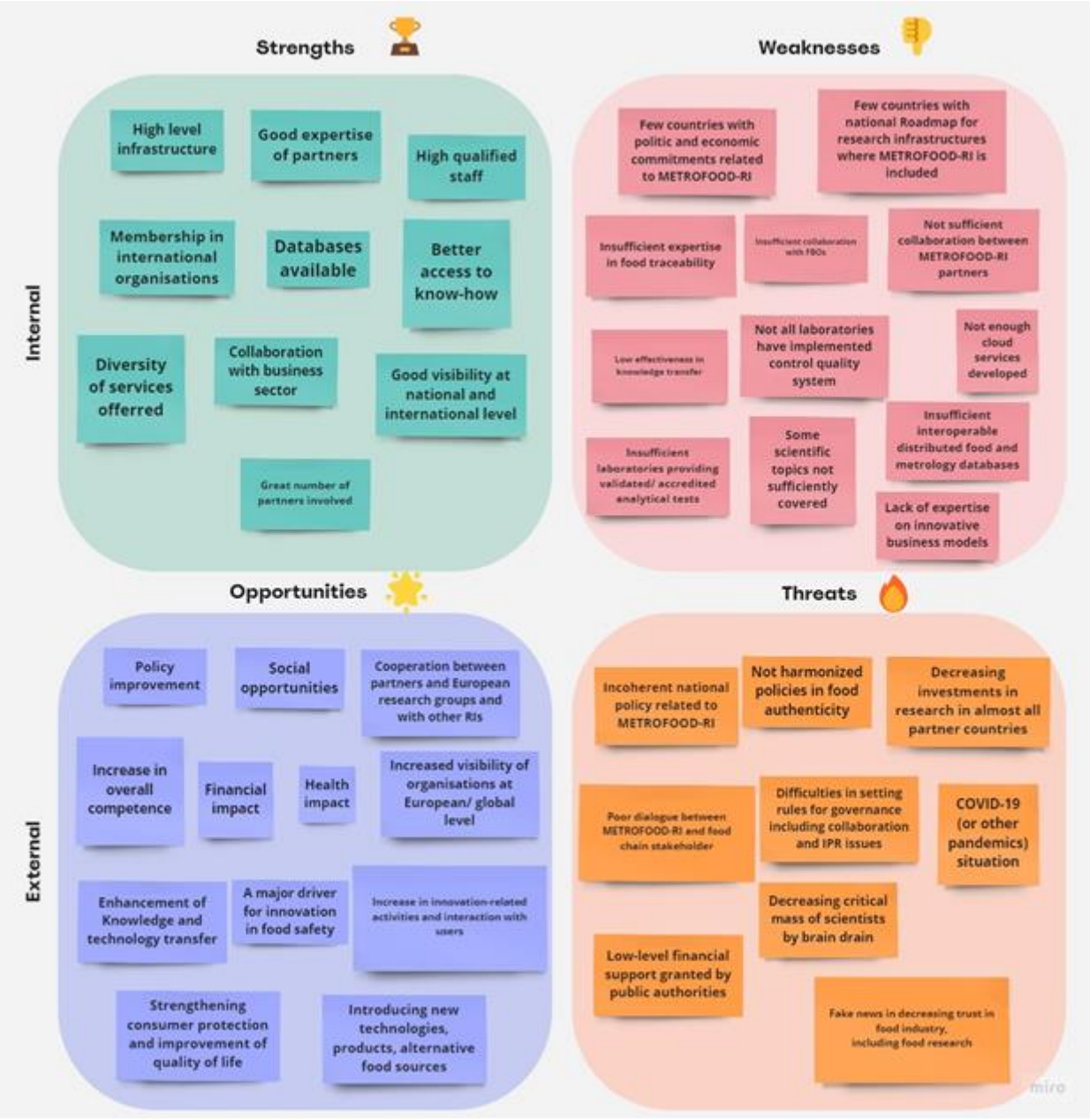

Fig. 3. SWOT analysis
Source: Adapted after METROFOOD-RI results.

Mendelow's Stakeholder Analysis of all the interested parties/ actors, whether internally or externally, that could have an interest or power in the construction and operation of METROFOOD-RI, was carried out in order to be able to take the right actions and decisions in relation to this new RI.

The analysis revealed the following aspects of stakeholders:

-The ERIC's members and observers have the highest interest and power in METROFOOD-RI, relying on the political and financial support granted by their governments. These stakeholders represent the key players as the whole infrastructure depends on their decisions.

-Users and customers of METROFOOD-RI's services should be kept satisfied and continuously monitored in order to anticipate their needs and be able to provide the right services that fit their expectations. This segment includes food business operators, policymakers, academic entities, researchers and consumers.

-EU, ESFRI, other international bodies, as well as METROFOOD-RI staff should always

be kept informed on the activities, services, changes, new perspectives of development, results and so on, depending on their area of interest in METROFOOD-RI.

-Citizens, Media, and NGOs represent the category of actors to whom, a minimal effort should be made by METROFOOD-ERIC as they can contribute to increasing METROFOOD-RI's visibility, reputation and brand.

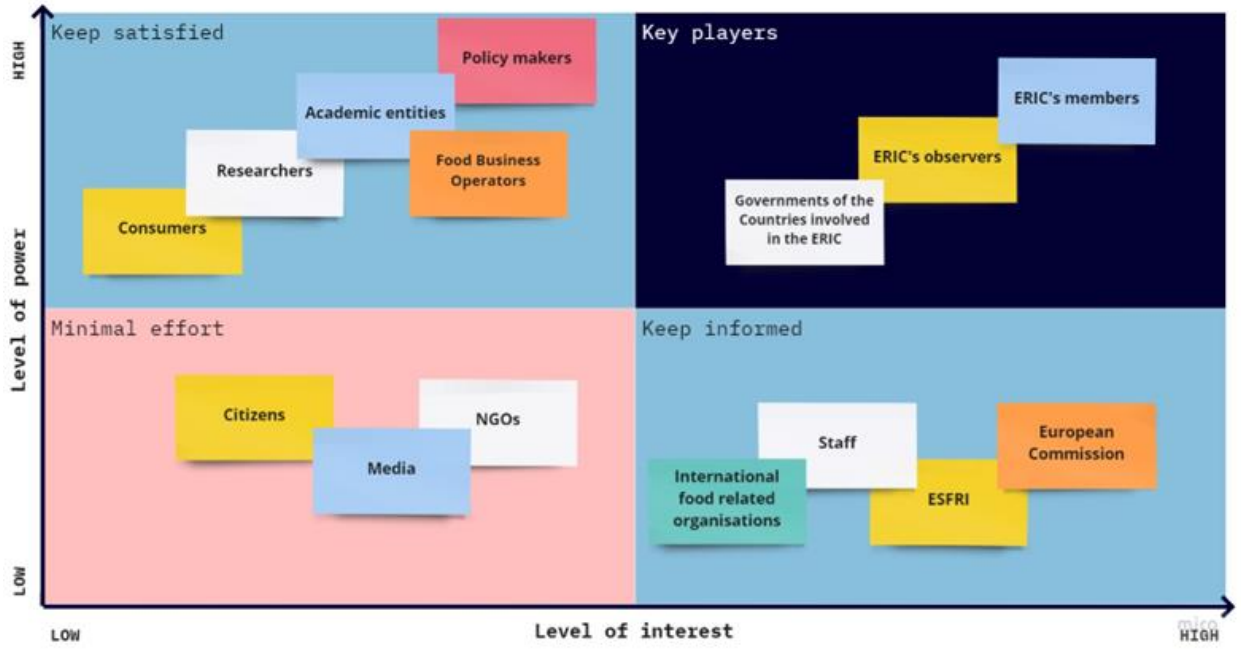

Fig.4. Mendelow's matrix
Source: Own results.

CONCLUSIONS

Besides a high increase in food production, there is also a need for more food controls and testing to pass strict regulations on food safety as new food products, new processing techniques and new environmental conditions emerge.

METROFOOD-RI, through its research activities and services, plays a key role in addressing the global challenges in respect of the food system and human health.

Based on the environmental analysis, the strategy was better defined, the risk management analysis was carried out and TOWS strategies were developed. As such, METROFOOD-RI relies on the following key factors for keeping its sustainability in the long run:

-Investing in new facilities and/or upgrading the Physical-RI and e-RI, if necessary, to keep providing high-quality services

-Strengthening the relationships and involvement of Members and Observers

-Widening the number of Members and Observers with a focus on attracting more partners as Members

-Enhancing networking with various RIs, Associations, Clusters, industry, etc.

-Enhancing the visibility of METROFOOD-RI at European and International levels by promoting its activities, services and benefits

-Maintaining high-quality standards in providing the services

-Maintaining highly-skilled staff by pursuing a continuous professional development

-Tailoring the range of services according to the users' requests

-Strengthening the wide range of expertise, tools and capacities

-Ensuring an ongoing mutual communication with stakeholders in order to keep them informed and satisfied

-Ensuring the sustainability of the RI in terms of infrastructure (P-RI and e-RI), human resources and finances.
-Rigorous cost control at the National Nodes level
-Accessing various financing opportunities in order to ensure financial sustainability in the long run
-Monitoring and assessing the impact and the KPIs.

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