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The role of information in the development of new technologies

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Abstract: When developing a new technology, a large amount of information is needed both at the beginning and during the development and at the end of the development of a new technology, there is a large amount of data everywhere, information that creates a combination of highly necessary data with data that creates noise. The evolution of a new technology starts from one initial original idea, or with the help of partial or partial solutions it approaches the conclusion of what needs to be achieved through research. Experiments and information collection reach results not only after the information part, but also after the technical-technological part. Another important source of information is quantitative data obtained from books, magazines, old planning documentation, the Internet, various repositories, as well as using artificial intelligence tools. The article is devoted to the principled attitude of obtaining information and resources that are available and that are important for the development of a new technology from the initial data at the beginning to the data that is collected during the development process.

1 Introduction

Information and communication technologies (ICT) play a significant role in all aspects of modern society. ICT have changed the way in which we communicate with each other, how we find needed information, work, conduct business, interact with government agencies, and how we manage our social lives. As ICT affect everyday lives, they also impact the macroeconomic growth, which in turn further affects society by enabling infrastructure and standard of living improvements [1].

The question is why successful companies often fail to adapt to new technologies and what lessons can be drawn from this for the development of new technologies [2].

Tech ethics is not only instrumental for governing technoscientific projects in the present but is equally instrumental for the construction of socio-technical imaginaries and the essentialization of technological futures [3].

The contrasting term, continuous innovations, refers to the normal upgrading of products that does not require us to change behaviour. The groups are distinguished from each other by their characteristic response to a discontinuous innovation based on a new technology. Each group represents a unique psychographic profile-a combination of psychology and demographics that makes its marketing responses different from those of the other groups. Understanding each profile and its relationship to its neighbours is a critical component of high-tech marketing lore [4].

Our quick doubling calculation helps us understand why progress with digital technologies feels so much faster these days and why we´ve seen so many recent examples of science fiction becoming business reality [5].

The successive shifts of key factors from mechanics to energy to information have often been taken as indicative of a trend toward decreasing emphasis on material goods. This may be wishful thinking, however, given the continued importance of mechanics and energy as the necessary substrate for information and communication [6].

The education level of the household head, the average education level of the household and the proportion of trained labour force have a significant negative impact on the improvement of grain production technology innovation. Promoting technological innovation in grain production is conducive to the rational allocation of resources and provides guarantees for food security [7].

The simultaneous tracking of program participants and a matched comparison group can enhance the evaluation of technology innovation programs by helping to isolate the effects of the government program from the host of other factors that influence the commercialization of inventions [8].

Although the technology remains unpredictable and sometimes baffling, individuals from all across the world and from all walks of life are finding it useful, supportive, and comforting, too [9].

By introducing Industry 4.0 technology into business practice, new processes are expected to be created. These processes will involve more technology and be smarter, but they will remain processes. Processes will continue to require analysis, the definition of capabilities, control to be effective and efficient, but they will also require information and the definition of new parameters that will affect them [10].

In any industry, the future belongs to products that grow with their users, adapt to new contexts, and create sustainable value over time [11].

When developing a new technology, a large amount of information is needed, both at the beginning of the research and during its course, and the output itself is a large amount of data, information that forms a certain guide, the process

of creating a new technology. The value of information during the development of a new technology, from the beginning to the end, increases. The result of the development is a set of information, the value of which increases several times and, in some cases, can be very high. When developing a new technology, from an information point of view, the procedure shown in the following figure must be followed (Figure 1).

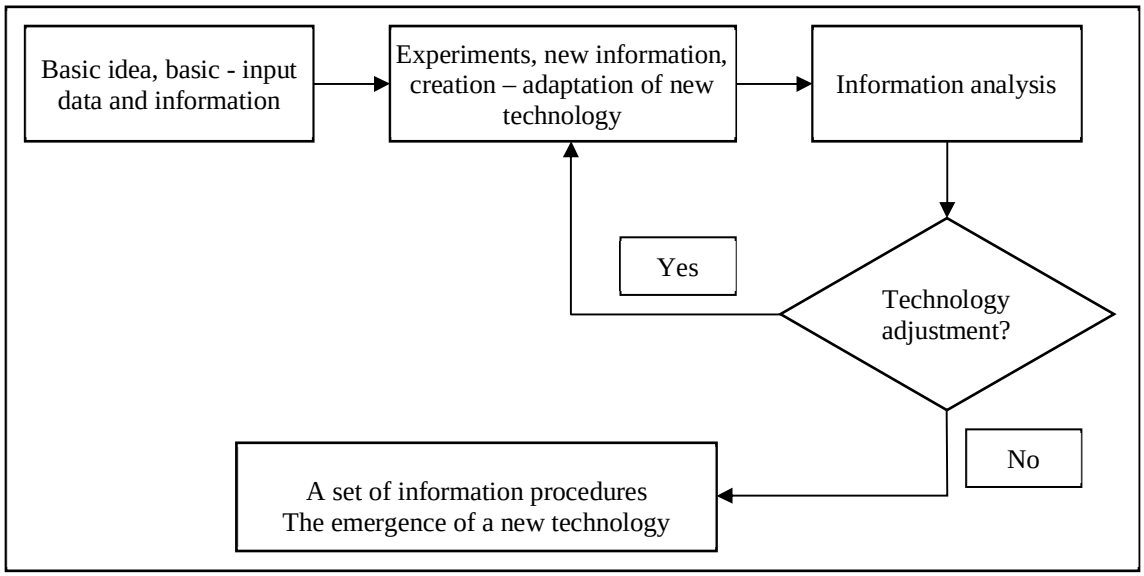

Figure 1 New technology development information system

Nowadays, technologies are developing at a rapid pace, which has a significant impact on our daily existence and affects various areas of life. Information sites on the development of new technologies play a key role in the dissemination of knowledge and news, allowing entrepreneurs, researchers and the general public to be aware of the latest trends and innovations. The aim of this information site is to provide an overview of current technologies, their development and potential applications, as well as the challenges we face in their implementation. We will focus on various aspects, such as not only technical and scientific, but also ethical and societal issues that arise in connection with the development of new technologies. We believe that this site will contribute to a better understanding and discussion of the technologies that shape our future.

2 Methodology - basic idea, input data and information

When developing a new technology, we start from the initial original idea, or with the help of partial solutions we get closer to what we want to achieve through research. Through experiments and collecting information, we will get to the result not only from the information side, but also from the technical and technological side.

Before proceeding to the experiments themselves, it is necessary to collect a large amount of data and information that enters the development process. The term information will be understood as knowledge that satisfies a specific subjective information need of its recipient. The carriers of information can be numbers, text, sound, image, information from perceptions and senses. Then we can understand information as data to which the recipient attributes meaning based on the knowledge they have. Data is information that is on carriers where we can process it automatically.

The information that enters the process can be divided into two types:

- information that directly relates to the problem being solved,
- information that solves the problems of the development of the new technology itself.

Information directly related to the development of new technology can be obtained from various sources. Where possible, primary information is obtained from the knowledge and experience of operators. Another important source of information is the amount of data obtained from books, magazines, project documentation, with the help of sensors and transducers, from the Internet, data repositories, with the help of artificial intelligence and others (Figure 2). During the development of a new technology, not only the technological side of the technology, but also the information side of the technology undergoes development.

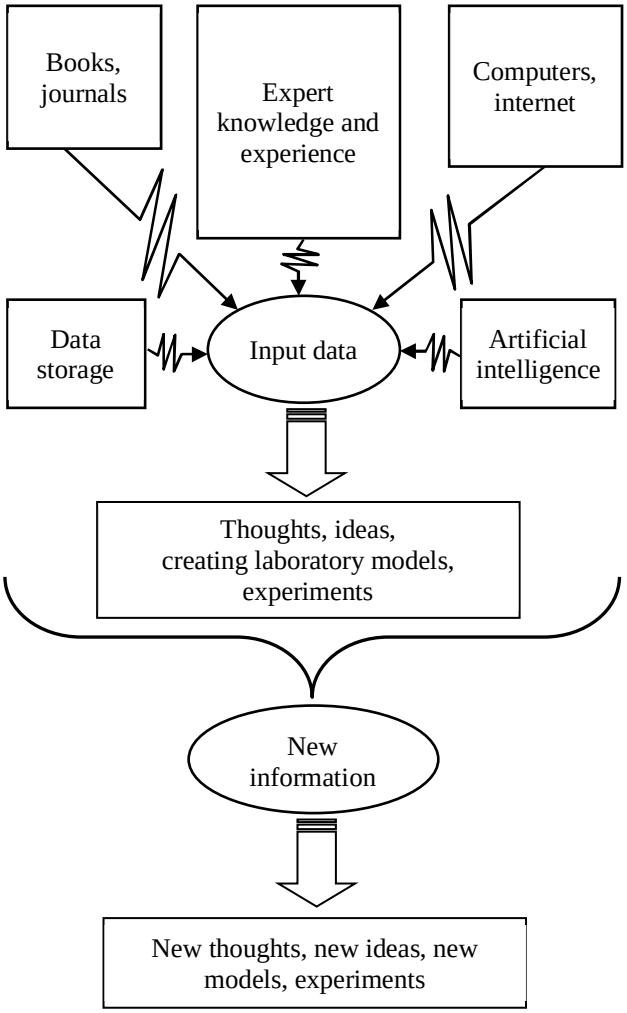

Figure 2 The information base for the emergence of new ideas

Information that solves the problems of the development of a new technology itself does not concern the solution of technological problems, but rather solves problems such as: how to secure financing for development, who will supply the necessary materials, under what conditions can a new technology be patented, what standards must a new technology meet, what standards must be observed during its development, the preparation and implementation of contracts and permits related to the development of a new technology. This information is as important for the emergence of a new technology as the information that directly concerns it. Without this information and clear answers, the research itself would be practically impossible.

2.1 Overview of technologies, developments, applications and challenges

Current technological advances offer fascinating opportunities to improve quality of life and efficiency in various areas. However, in implementing these technologies, we face many challenges that require careful consideration and collaboration between experts, governments, and society.

1. Artificial Intelligence (AI)

Development: Artificial intelligence has evolved from simple algorithms to complex machine learning and deep learning systems. Neural networks, generative adversarial networks (GANs), and image recognition have become key components.

Potential applications: Process automation, personalized recommendations, healthcare (diagnostics), customer support (chatbots), and autonomous vehicles.

Challenges: Ethical issues, privacy, algorithmic bias, and regulatory frameworks.

2. Internet of Things (IoT)

Development: IoT is expanding with the increasing number of connected devices and advances in sensors and connectivity (e.g., 5G).

Potential applications: Smart home technologies, health monitoring, efficient energy management, and smart cities.

Challenges: Security risks, device interoperability, and challenges in managing large amounts of data.

3. Blockchain

Development: Originally created for cryptocurrencies, blockchain technologies are expanding into various industries such as transaction security and transparency.

Potential applications: Financial services, supply chains, digital identities, and voting systems.

Challenges: Scalability, energy consumption, and regulatory issues.

4. Augmented and Virtual Reality (AR/VR)

Development: AR and VR technologies have improved in terms of graphics and user experience, leading to wider use.

Potential applications: Education, entertainment (video games), simulations, and therapeutic applications.

Challenges: High technology costs, need for quality content, and potential for health issues (e.g., motion sickness).

5. 5G and telecommunications technologies

Development: 5G networks offer higher speeds and low latency, enabling faster and more reliable connections.

Potential applications: Development of IoT, autonomous vehicles, smart cities, and advanced mobile services.

Challenges: Infrastructure investment, health and safety concerns, and spectrum regulation.

6. Biotechnology and Genomics

Development: Advances in DNA sequencing and CRISPR technologies have enabled faster and more precise genetic editing.

Potential applications: Personalized medicine, biotech products, and sustainable agriculture.

Challenges: Ethical dilemmas, regulatory issues, and the risk of genetic alterations in ecosystems.

2.2 The technical and scientific aspects

The technical and scientific aspects are crucial for the successful development and implementation of new technologies. Their proper consideration can significantly contribute to innovation and efficiency of technologies in various fields. The technical and scientific aspects of developing a new technology are fundamental factors that influence the process of innovation and the implementation of new solutions. Below are the key aspects to consider:

1. Basic Research and Development (R&D)

Basic Research: The identification and investigation of fundamental principles and theories that can lead to innovation. This process is usually theoretical and long-term goal-oriented.

Applied Research: Focusing on the practical application of basic research to develop specific technologies or products.

2. Technological Engineering

Prototyping: The creation and testing of prototypes that allow the functionality and effectiveness of new technologies to be verified before they are mass-produced.

Optimization: The improvement of technical parameters such as performance, efficiency, cost, and reliability.

3. Software and Hardware Development

Software Engineering: The design and implementation of software solutions that are often the basis of modern technologies such as applications, systems, and platforms.

Hardware Engineering: The development of the physical components of technologies, such as the devices and systems that are required for the software to function.

4. Interdisciplinary approach

Bridging disciplines: Nowadays, technologies increasingly draw from multiple disciplines, such as computer science, biology, physics, and engineering, and this interdisciplinary approach leads to new innovations.

5. Testing and validation

Testing: Rigorous testing of new technologies to verify their performance in real-world conditions, which may include laboratory tests, field tests, and user tests.

Validation: Confirming that the technology meets the requirements and expectations of users and the market.

6. Regulations and standards

Compliance: The development of new technologies often requires procedures to comply with regulations and standards that ensure the safety and quality of products.

Ethical and legal aspects: Consideration of ethical and legal issues, such as privacy, intellectual property, and responsibility for distributing the technology.

7. Implementation and scaling

Technology deployment: Planning and executing the implementation of the new technology, including user training and change management.

Scaling: Extending technology to larger user groups or broader applications, often requiring changes to architecture and infrastructure.

8. Evaluation and Feedback

Evaluating effectiveness: Measuring the performance of a new technology and its impact on users and society.

Gathering feedback: Incorporating user opinions and experiences to further improve and develop the technology.

2.3 The ethical and social aspects

The ethical and social aspects of developing new technology play a key role in ensuring that technologies benefit society as a whole. It is important that all stakeholders – from developers to regulators – take these aspects into account and strive to create technological solutions that are responsible, equitable and sustainable.

The ethical and social aspects of developing new technology are key factors that influence how technologies are implemented and what impact they have on society. These aspects must be taken into account throughout the technology development process to ensure that technologies benefit society and do not have negative consequences. Here are some of the most important ethical and social aspects:

1. Privacy

Data collection and management: Many new technologies, particularly in the areas of artificial intelligence and the Internet of Things (IoT), collect vast amounts of personal data. It is important to ensure that this data is managed responsibly, and that individuals' privacy is protected.

Transparency: Users should be informed about what data is being collected and how it is being used and should be able to decide whether to consent.

2. Bias and discrimination

Algorithmic bias: Technologies such as machine learning algorithms may contain biases that lead to discrimination against certain groups of users. It is important to monitor and remove these biases in the design and development of technologies.

Access to technologies: Consideration needs to be given to how technologies are distributed and whether they are accessible to all groups of the population, in order to avoid exacerbating social and economic inequalities.

3. Responsibility and transparency

Developer responsibility: Technology developers must be responsible for the potential consequences of their products. This means that they should consider ethical dilemmas and potential risks when developing technology.

Transparency of decision-making processes: Organizations should be open about how technology works and what decision-making processes are behind it in order to increase user trust.

4. Impact on employment

Automation and unemployment: The rapid development of technology can lead to the automation of many jobs, which can have a negative impact on employment. It is important to consider how to help workers by transitioning to new jobs or eliminating redundant positions.

New job opportunities: On the other hand, new technologies can create new jobs and sectors, which can have a positive impact on the economy.

5. Ethical use of technology

Misuse of technology: There is a risk that new technologies can be misused for harmful purposes, such as surveillance, manipulation or the spread of disinformation. Regulations and control mechanisms need to be developed to prevent such abuse.

Social implications: Technologies can have a wide-ranging impact on social interactions and culture. It is necessary to consider how technology can influence societal norms, values and interpersonal relationships.

6. Ecological and sustainable aspects

Environmental impact: The development of new technologies should take into account their ecological impact, as well as the possibilities for recycling and sustainable development. Taking the environmental aspect into account is important for ensuring a sustainable future.

Resource and energy intensity: Technologies should be designed with resource and energy efficiency in mind in order to minimize their ecological footprint.

3 Results, discussion - experiments, creation, adaptation of new technology, new information, analysis of information

An information website about the development of a new technology has the potential to create a significant impact on innovation, education, collaboration, and responsible access to technology. Properly designed and managed, websites can serve as a valuable resource for both professionals and the general public, while promoting positive changes in society and the economy.

After collecting the input data and analysing them, we can proceed to the preparation of laboratory equipment and the laboratory experiments themselves. Without experiments and the information, we obtain from them, the development of a new technology is practically impossible. The results of the experiments are information that relates to individual experiments and, as a whole, provide an insight into the entire technology and the further direction in the development of the new technology. The information obtained must be analysed in the research team (Figure 3).

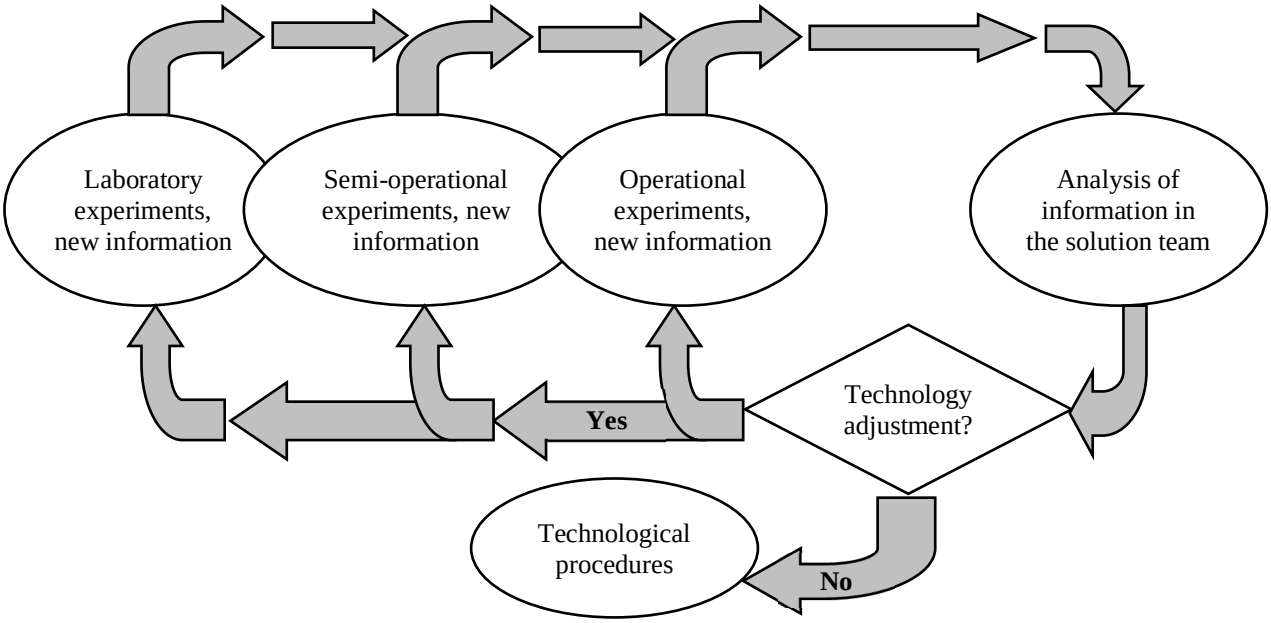

Figure 3 Information circulation during the development of new technology

After analysing the information obtained from laboratory experiments, decisions are made as to whether to make adjustments to the laboratory equipment and repeat the experiments, or whether the laboratory work and development process are completed. After the laboratory experiments are completed, we obtain output information, which is the input data for the creation of semi-operational or operational technology. Semi-operational experiments follow, from which it is possible to obtain a further amount of information that must be analysed, and the information circulation is repeated as in laboratory experiments. Output information from semi-operational experiments becomes input data for the creation of operational technology. All information obtained from experiments must be analysed in a solution team or with experts, e.g. in the form of brainstorming. The results of consultations and discussions are information that should lead to the solution of problems that arose during the experiments.

Laboratory experiments are closely linked to the development of new technology by activities that transform the phenomena obtained in experiments into informational, and therefore theoretical, form. Measuring and monitoring devices and instruments are used to obtain information from laboratory experiments or technological practice. These measuring instruments are different for different areas of research, but they all have one thing in common, namely that they provide information in numerical, textual, graphic or audio form.

The result of development activities can be some tangible element, a set of information of a certain quality and value, free from noise, know-how. If activities during the development of a technology were not recorded, it could happen that we do not know or are not able to achieve repeatedly suitable solution results and therefore that we do not know how to use or build the technology.

The path of the emergence and development of a new technology is intertwined with a lot of information that we obtain from various sources. In the process of developing a new technology, information is also developed that becomes its information content. Information content ensures the achievement of the right results anywhere and enables the further dissemination of the technology.

The results of an information site focused on the development of a new technology can take many forms and benefits. These sites serve to share information, support research and development, and provide a forum for interaction between experts and the general public. Here are some of the key results that can result from such sites:

1. Increased awareness

Current technology overview: Information sites provide users with an overview of the latest trends and innovations, helping professionals and laypeople stay informed about important issues.

Education and enlightenment: These sites can offer educational content, articles, videos, and webinars that increase knowledge about technologies and their applications.

2. Supporting innovation

Sharing research and results: Experts and researchers can share their findings and innovative ideas, encouraging collaboration and mutual inspiration.

Discussions and collaborations: Information sites can serve as a platform for discussion and exchange of ideas, which can lead to the development of new projects and partnerships.

3. Gathering feedback

Gathering user opinions: Sites can allow users to provide feedback on technologies and their applications, which can help developers improve their products.

Surveys and polls: Conducting surveys and polls provides valuable data on user preferences and needs.

4. Networking opportunities

Connecting experts: Information sites can provide a space for technology experts, researchers, entrepreneurs, and investors to connect.

Organizing events: Conferences, seminars, and webinars can be organized where experts from different fields meet and share their experiences.

5. Catalyst for regulation and ethics

Discussion on ethical aspects: Information sites can stimulate discussion on ethical issues related to new technologies, helping to shape policy and regulations.

Encouraging responsible development: Sites can reinforce the importance of an ethical and responsible approach to technology, which is important for responsible progress.

6. Supporting the community

Creating a community: An information site can unite people with common interests who focus on the same technologies or research areas.

Sharing success stories: Good practices and success stories can be shared to inspire others.

7. Economic impacts

Promoting entrepreneurship and investment: Increased awareness and knowledge sharing can support entrepreneurship, innovation and attract investment in new technologies.

4 Conclusion

In conclusion, we can conclude that information sites on the development of new technologies are an indispensable tool in the dynamically changing world of technology. They provide users with valuable information that allows them to better understand innovations, their potential benefits and the challenges we face. With constant advances in technology, it is important to keep up with the latest trends and developments, not only from a technical perspective, but also from an ethical and social perspective.

By sharing information and stimulating discussion about new technologies, we can contribute to creating a more sustainable and responsible future. Ultimately, each individual contribution to this site represents a step towards a better understanding and acceptance of technologies that have the potential to change our lives. Let this information site be a place where passion for technology is combined with hope for positive progress in our society. After collecting the input data and analyzing them, we can pro

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