

# **STRATEGIC THINKING AND BUSINESS QUALITY MANAGEMENT THROUGH BIOHACKING IN THE ERA OF DIGITAL TRANSFORMATION**

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## **ABSTRACT**

In the contemporary world of rapid digital transformation, businesses are confronted with evolving challenges and opportunities. As businesses strive to remain competitive, integrating Biohacking into their quality management strategies, offers new possibilities for business assessment and process improvements. Biohacking, characterized by optimizing human potential through technological and biological means, has the potential to stimulate innovation, motivation, and productivity.

The research aim is to explore the intersection between strategic thinking and quality management in the business environment, and biohacking as an alternative approach to enhancing effectiveness and adaptability in the corporate realm. Biohacking's practical application has the potential to completely transform decision-making processes, workforce well-being, and overall organizational procedures.

The study were used of content, data and comparative analysis in order to show the overall expected market growth potential for Biohacking (in terms of market size and adoption) as well as the best practices related to its introduction and utilization in the business areas such as quality management and additional strategic related practices and processes. Through the analysis of methods and practices, identifying opportunities for the implementation of wearable technologies, brain stimulation technologies, health monitoring, genetic modification, applications and others, biohacking can be strategically integrated into quality management practices to address the challenges arising from digital transformation in business.

Despite its potential advantages, biohacking presents a challenge due to the opacity of the boundary between experimentation and risk, making it difficult to determine where the boundaries between innovation and potential threat to individual and organizational health begins. The primary result of this study challenges conventional perceptions by demonstrating that biohacking is not limited to individual self-improvement but can be strategically used to

revolutionize the workplace. The combination of biohacking with quality management can be a powerful tool for enhancing competitiveness, adapting to new conditions, and achieving success in the modern business environment.

**Keywords:** *Biohacking, Technology, Quality, Management, Business*

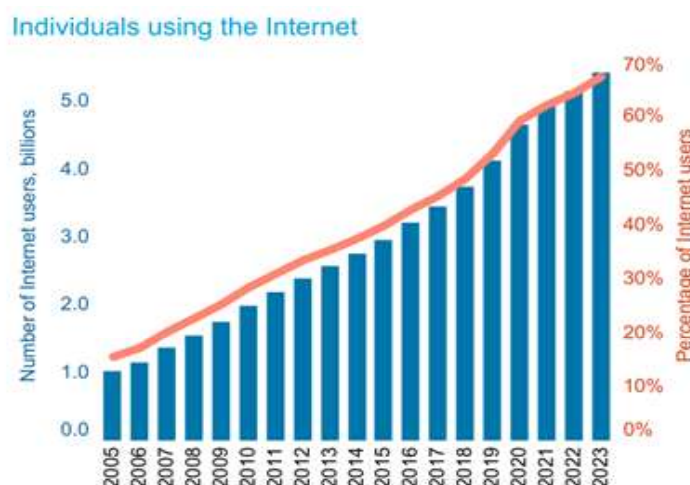
## INTRODUCTION

In today's rapidly evolving world, the use of information technology is crucial to the success of quality management in organizations. In order to remain market competitive, companies automate a range of processes and enhance their productivity through digitization. This allows for a quicker adaptation to changing market conditions and provides access to a vast amount of information that can be analyzed and used to improve managerial decision making.

The aim of the paper is to assess the impact of biotechnologies on human behavior and the management of business processes. It offers a comprehensive overview of practical applications and strategies for the successful integration and maintenance of high-quality standards. On top of the potential and opportunities that biotechnologies reveal, emphasis will also be placed on the need for careful evaluation and management of the risks that they might pose in the work environment.

## BUSINESS MODELS IN THE ERA OF DIGITAL TRANSFORMATION

Information technologies are developing at an exceptional pace, and user presence in the online space is growing significantly. According to the International Telecommunication Union (ITU) in 2018 1.7 billion people were surfing online. However, in 2023 a staggering increase of 45% meant that 5.4 billion people were using the internet, or in other words 67% of the global population. [1].



**Fig. 1.** Trends of Internet Users Growth (2005-2023)

The data from Figure 1. indicates that technology and the internet are integral parts of the modern world and will continue to transform the way we live, work, and communicate.

In the past, business models relied entirely on traditional methods, limited access to information, a linear supply chain, lack of personalization, and a small scope of influence. However, these processes are changing rapidly, impacting the way society operates and interacts within organizations. Creating or changing business models is the first step in helping organizations adapt to such changes. The introduction of new technologies, digital platforms, and evolving consumer expectations significantly influences quality control, organizational behavior, and the way people interact with technology.

In a study by Hoberg summarized in "Business Model Transformation" scientific report [2], it is revealed that approximately 90% of surveyed businesses consider digital transformation as a fundamental component of their business strategy.

Having this in mind, one can conclude that it is crucial for organizations to be flexible and innovative in adapting to these changes by integrating technology into all aspects of their business.

According to the "Digital Europe 2021-2027" report [3], projected investments of 9.2 billion euros are anticipated for digital improvement and transformation through innovative technologies.

The key areas expected to benefit from financing are Artificial Intelligence, AR/VR, Big Data, Blockchain, IoT, Robotics, Biotechnology, Nanotechnology, Micro and Nanoelectronics. Improvements, innovations, and advancements in each of these fields will have a profound impact on businesses and the workforce.

These new business models are some of the most disruptive business models of our time, developed by technology and the power of the web, such as:

1. Freemium Model (SaaS Business Model) – In this model, the basic service is provided for free, but the premium features are locked behind a paywall.
2. E-commerce model – This model involves selling physical products online.
3. Market model (equal, two-sided market) – In this digital business model, the platform connects buyers (demand) and sellers (supply) and charges a fee, membership, or other fee for each transaction.
4. Model based on usage / on demand – With that, customers pay exactly for the number of services they use.

5. Ad Supported Model (Free Model) – This model is often used by social media platforms and search engines. They offer free social networking services and use users' data to offer personalized ads.
6. Ecosystem model – A company offers a set of interconnected services that create a network effect that binds customers. They can then use the knowledge and data to upsell existing customers and acquire new customers through the vendor lock-in effect of their ecosystems.
7. Open-source framework – The software is offered at no cost, allowing anyone to modify the source code. Alternatively, the collective 'community' guarantees ongoing development of the code.
8. Model of the experience – This approach aims to elevate physical products with electronic offerings.
9. Subscription model – In this widely adopted business approach, customers contribute a recurring fee to avail a product or service.
10. Access model over ownership / sharing model – Model allows users to access goods and services for a period without owning them. This is one of the most disruptive business models because of the impact it has had on ownership and the resulting revenue you can get from a commodity.

## **PERSPECTIVES IN THE DIRECTION OF DIGITAL QUALITY-DRIVEN TECHNOLOGICAL PROGRESS: SHAPING THE FUTURE OF BUSINESS**

Continuous technological progress is redefining the boundaries of human capabilities. Biotechnologies are exerting influence on the workforce and quality management practices that are shaping the future of business.

The lines between human potential and technological advancement are blurring, giving rise to an entirely new dimension in the future of work. In this context, three innovative segments in the technological sphere - genetic modifications, technological implants, and wearable technologies - emerge as pivotal factors for enhancing human potential and work efficiency.

### **Genetic modification**

A major aspect of biotechnology is genetic modification. The report "Technological Approaches to Human Performance Enhancement" [4] mentions that genetic modification can enhance normal human conditions, as the scientific community is developing methods and techniques for performing genetic modifications in the human body.

It is possible to create genetic changes that could bestow individuals with extraordinary abilities. This advancement in genetic modifications could potentially alter the way quality management is handled in businesses.

Essential impacts can be highlighted:

- Genetic modifications can be used to direct the workforce towards more specific working conditions, such as high temperatures, high humidity, and others.
- Improved health characteristics through genetic modifications can reduce the risk of illnesses or conditions that could lead to disruptions in the production process.
- If people are genetically modified to have a stronger immune system and a lower predisposition to diseases, this could lead to a reduction in absenteeism from work due to illness and treatment.

### **Technological implants**

The work environment can be completely transformed through technological implants placed in the human body, allowing innate abilities to be enhanced. [5] An example of this is Elon Musk's company, Neuralink, which is developing a system for implanting microscopic electrodes in the brain.

According to the latest data from the global media company Forbes, the brain implant company has received "approval from an independent review board and hospital to begin its first in-human clinical trial for a chip that is implanted in one's brain to control movement" [6]. In this way, the brain-computer interface (BCI) enables monitoring of brain activity and using it to control external devices [7].

As a result, processes related to information analysis and processing can be accelerated, the time needed for decision-making can be reduced, and the way various stimuli and situations influence the human brain can be improved. By using implants, the likelihood of errors in quality management in the work process decreases. This will enable businesses to track every aspect of production with greater precision and to respond promptly in case of defects or discrepancies [8].

### **Implementation of wearable technologies and applications**

Wearables and innovative applications are a new type of technology in the form of portable devices. Those can function as accessories which can be used with the purpose of monitoring and enhancing productivity in work processes.

The wearable technology market is a crucial segment within the electronic devices industry, and its application in various fields of activity is on the rise. It encompasses a variety of devices such as Smart Watches, Smart Glasses, Sensors,

GPS Activity trackers, Mindfulness Tools, Heart Rate Variability Trackers, and others.

Wearable technologies can become an integral part of people's lives, as they can be utilized in the work process, tailored to personal preferences and needs.



**Fig. 2.** *Wearable Technology Market Size (2021-2030) [9]*

Forecasts indicate that the wearable technology market is expected to experience significant growth in the coming years. It is projected that between 2021 and 2030, the market will increase by a substantial 270.70 billion dollars. This reflects the immense interest and efforts invested in the development and introduction of new and improved wearable technologies.

In addition to the use of wearable technologies, cognitive development, working memory, neural mechanisms, and their activity can be influenced by Binaural Beats. The experiment conducted by Wernher Friedrich focused on the impact of frequencies associated with Binaural Beats on long-term memory. [10] Conducted among 58 individuals, it utilized a frequency of 40 Hz (in the gamma range) with the aim of examining its influence on long-term memory. Gamma waves are high-frequency brain waves associated with higher cognitive functions such as attention, working memory, and problem-solving. The results of the experiment suggest that the use of Binaural Beats at a frequency of 40 Hz may have a potentially positive influence on long-term memory.

By implementing biotechnologies, companies can enhance the quality management, focus, and concentration of their employees. It can assist in coping with stressful situations, boost energy levels, as well as improve creativity and overall well-being. Optimizing work hours and increasing productivity is another approach that companies can apply in their business processes. If employees are more productive and efficient in a shorter amount of time thanks to biohacking, workloads and stress related to prolonged work hours can be reduced.

## **ORGANIZATIONAL CHANGE AND OVERCOMING CHALLENGES**

The results of this study present new opportunities for businesses in the realm of rapid digital transformation. Integrating Biohacking into quality management strategies offers different perspectives for business assessment and process improvements. However, biological technologies also entail certain challenges and potential risks that need to be taken into account over the next few years.

The consequences of microchip implantation, for instance, may manifest in technical malfunctions, regular microchip software updates, data protection and cyber-attacks [8]. In order to address these challenges, companies should establish specialized data encryption algorithms, conduct regular security testing, and provide training for their employees, thereby preventing cyber-attacks and unauthorized access.

The wellbeing of employees subjected to biohacking will certainly become a priority for businesses. Such changes in the human body can lead to unexpected and unforeseen health consequences. Unauthorized biological manipulations may have adverse effects, potentially impacting both physical and mental health. To avoid such consequences, employees should be informed about the potential risks and benefits.

According to the “Technological approaches to human performance enhancement” report [4], the device manufacturers have the ability to retain control and rights over the device's software and monitor its functionality, including retaining access rights to the data. As a result, they may take action to deactivate the device if the user does not agree with new privacy policies and conditions. This could be viewed as a presumption of control over society, emphasizing the importance of implementing regulations and legislation that safeguard consumer rights in the digital space.

## **CONCLUSION**

Technological development requires a resilient strategy and careful regulation, especially when it comes to areas like biohacking. The work processes will experience a complete transformation, with employees and technologies collaborating closely to achieve business goals. Looking ahead, as these technologies continue to improve, it is necessary to find a stability between advancement of biological technologies and privacy, quality control and social impact.

Biohacking's potential impact goes far beyond personal development, serving as a catalyst for fundamental shifts in the workplace. When integrated with quality management, it becomes a powerful instrument for bolstering competitiveness,

navigating change, and ultimately, attaining success in today's dynamic business environment.

Despite the potential for enhancing our abilities, the question arises of safeguarding against potential control over our consciousness. Careful planning and measures need to be taken to ensure that these technologies serve as aids rather than tools for manipulating our minds.

In the coming years, significant technological progress and improvements are anticipated in this field. The steps through which biological technologies and applications will enter society will be subject to extensive discussion. Decisions aimed at minimizing potential risks are pivotal for their successful integration into the business sector.

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