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DIGITIZATION OF THE FINANCIAL SERVICES MARKET

Digitization is an integral and key process that provides the development of the modern world in all its spheres. The financial services market is no exception and the ability to adapt to digitization makes it possible to have significant competitive advantages among other market players.

In order to be a leader in your business you need to build and develop it based on new technological solutions or business models that have not been used before. That is why modern leading companies prefer digital technologies and e-business. But unfortunately, for Ukraine the digital economy remains an area of untapped potential.

To solve this problem, the Cabinet of Ministers of Ukraine approved the Concept of the development of digital competencies and the action plan for its implementation in 2021-2027 [1].

According to this Concept, the development of Ukraine's digital economy means to create market incentives, motivations, demand and needs for the use of digital technologies, products and services among Ukrainian sectors of industry, life, business and society for their efficiency, competitiveness and national development, growth of high-tech products and welfare of the population [1].

There are eight basic principles of digitization of Ukraine:

1. the principle of equality and accessibility allows equal access to services, information and knowledge provided on the basis of information and communication technologies to all citizens [2];
2. the principle of utility focuses on creating benefits in various aspects of everyday life, various spheres of human life and the country: improving the quality of health care, creating new jobs, business development, agriculture, transport, environmental protection and management natural resources, raising culture, helping to overcome poverty, preventing catastrophes, etc. [2];
3. the principle of economic growth that is digital transformation of existing sectors of the economy, with increasing efficiency and productivity from the use of digital technologies [2];
4. the principle of freedom and independence of information is the development of the information society, the media, the "creative" environment and the "creative" market, etc. [2];
5. the principle of openness and cooperation focuses on international, European and regional cooperation in order to integrate Ukraine into the EU, Ukraine's entry into the European and global market of e-commerce and services, banking and exchange activities, cooperation and interaction in regional markets [2];

6. the principle of standardization is the development and using of open, functionally compatible non-discriminatory international and European standards [2];

7. the principle of trust and security that is information security, cybersecurity, protection of confidentiality of personal information, users' privacy and rights [2];

8. the principle of complexity suggests that public administration should play a leading role in implementing national "digital" strategies. The state must find ways to solve the problems of overcoming barriers to the "digitization" of the country [2].

The use of FinTech technologies can be considered as a qualitative leap of Ukraine's entry into the digital age. FinTech is a set of modern technologies that allow individuals and businesses to receive financial services and perform financial transactions remotely, via electronic means (mobile applications, other software interfaces) securely and automatically, without the direct participation of a bank or other financial institution [3].

The use of FinTech technologies is more profitable and convenient for providers of such services and for their consumers.

The client receives a financial service in just a few clicks. In order to do this you must have a gadget with Internet access. This will save time on visiting a financial institution, signing a large number of contracts, waiting in line and so on.

A financial service provider does not need to make large monetary contributions to create a financial institution because it is in the "cloud". All you need to do is to develop a special application and provide a high level of security for potential customers.

However, there are a significant number of barriers to the widespread use of fintech technologies in Ukraine, which significantly reduce the number of fintech startups:

- the lack of legal regulation of digital competencies;

- difficult investment climate in Ukraine,

- poorly developed crowdfunding (the use of small amounts of capital from a large number of individuals to finance a new business venture. Crowdfunding makes use of the easy accessibility of vast networks of people through social media and crowdfunding websites to bring investors and entrepreneurs together, with the potential to increase entrepreneurship by expanding the pool of investors beyond the traditional circle of owners, relatives, and venture capitalists) [4].

Therefore, in order to promote FinTech technologies in Ukraine it is necessary to create attractive conditions for venture capital investment in such projects, create additional guarantees of investment capital protection, introduce more transparent and facilitated conditions for initial licensing of financial services provided through electronic communications, provide legal regulation in the field of development of digital skills and digital competencies.

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QUASI-RESONANT CONVERTERS IN UNMANNED AERIAL VEHICLE POWER SUPPLY SYSTEMS

Nowadays unmanned aerial vehicles (UAV), e.g. quadcopters, are widely used in different areas of public life: cargo transportation; filming of public and sport events; the wildlife observation; peoples' search and rescue; disaster assistance; the assistance to farmers and builders; the protection of state borders; fighting crime. One of the main problems of such devices is the limited flight time. Solving this problem is an actual task.

There are various ways to increase UAV flight time. The simplest method is to use a larger battery. But this will raise the cost and may increase the weight of the device, which will negatively affect other characteristics. The largest consumers of electricity on UAV board are electric motors, and the installation of lower power motors will also increase the flight time. However, this will reduce the load capacity of the vehicle and the maximum speed, which is unacceptable for some tasks performed by the UAVs.

Therefore, the best way is to improve the performance efficiency of the UAV power supply system. In modern UAVs, brushless DC (BLDC) motors are most commonly used due to their efficiency and longevity. Fig. 1 shows the structural diagram of the typical BLDC power supply system for the UAV [1], where: B – battery; DC-DC – a direct voltage converter/stabilizer (is often absent or replaced with bidirectional ones); DC-AC – an autonomous voltage inverter.

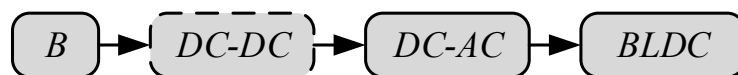


Figure 1 – Typical BLDC power supply system of the UAV

There are different ways to improve the performance of the power stage of a power supply system: the improvement of the components quality; optimization of control and energy circulation process [2]; the usage of much advanced topologies for switch-mode power supply (SMPS) units (DC-DC and DC-AC), such as quasi-resonant converters (QRC) [3] instead of the conventional hard-switched SMPS driven by a pulse-width modulation (PWM). In such converters, an additional resonant circuit is introduced, and, depending on its topology, makes possible zero-current (ZCS) or zero-voltage switching (ZVS) of the transistor.

In a ZCS-QRC, the resonant coil is connected in series with the transistor switch, and the resonant capacitor is connected in parallel to the coil and the transistor. Due to this, the transistor switching-on always occurs at zero-current, because the resonant inductance doesn't allow the current to rise sharply. Then, sinusoidal current oscillations are formed in the resonant circuit. And at the moment, when the first half-wave crosses zero, we have the opportunity to switch-off the transistor also at zero current.