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## THE PREVALENCE OF HEPATITIS B AND C SEROPOSITIVITY IN A GEORGIAN COHORT OF HIV-INFECTED PATIENTS WITH ACCOMPANYING ORAL MANIFESTATIONS

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### ABSTRACT

This study was designed to determine the prevalence of hepatitis B and C seropositivity in a Georgian cohort of HIV-infected patients with accompanying oral manifestations.

We wanted to determine:

- Prevalence of co-infection of viral hepatitis B and C among patients with HIV / AIDS.
- The incidence of disease stages during the detection of HIV infection.
- Statistical indicators of possible ways of HIV transmission and their correlation with co-infections of viral hepatitis B and C.
- Frequency and types of oral manifestations among HIV-infected persons with co-infections of viral hepatitis B and C.

In 2014 were reported 564 new HIV cases. There were:

- Men - 405 (71.96% ± 0.62%),
- Women - 154 (27.16% ± 1.64%),
- Children - 5 (0.88% ± 10.61%).

Among the registered 564 HIV-infected patients:

- 15 (2.69%±6,02%) cases were at the acute stage and in most cases co-infection was recorded in the form of hepatitis B.

- 76 (13,48%±2,53%) - were subclinical stage. These are mainly patients with epidemiological indications, pregnant women and persons with lifestyle risk factors.

- 176 (31.21% ± 1.49%) - at the symptomatic non--AIDS stage.

- 293 (51.95% ± 0.96%) - at the stage of AIDS, when the T (CD4 +) content of lymphocytes is less than 250 1mm<sup>3</sup> in blood.

- 4 (0,71% ± 11,83%) cases were not determined, because these patients refused further examinations and were included in the treatment program.

From the total number, 293 (52.32% ± 0.95%) of HIV-infected patients reported oral manifestations at different stages of the disease.

- At the acute stage - 2 (13.33% ± 2.55%) cases;

- At the subclinical stage - just 1 (1.32% ± 8.65%);

- At the pre-AIDS stage - 65 (36.93% ± 1.31%);

- At the stage of AIDS - 225 (76.79% ± 0.55%).

- The statistics of these lesions on the oral mucosa were:

- Candidiasis - 67.1% (± 0.7%);

- Herpes simplex virus - 37.2% (± 1.3%);

- Gingivitis - 6.4% (± 3.8%);

- Oral hairy leukoplakia - 6.2%(±3,9%);

- Kaposi's sarcoma - 0.18% (± 23.55%);

- Non-Hodgkin's lymphoma - 0.3% (± 18.23%).

Of the total 564 registered, just 470 (83.33%  $\pm$  0.45%) of patients were included in the survey criteria. For more accurate results, we distributed these patients into 3 groups:

1. The first group included HIV infected with co-infection of viral hepatitis B. Their number were 74 (15.75%  $\pm$  2.31%).
2. The second group included HIV infected with co-infection of viral hepatitis C. Their number were 93 (19.79%  $\pm$  2.01%).
3. In the III-rd group included HIV infected in whom both co-infections - viral hepatitis B and C were noted. They were 94 (20%  $\pm$  2%).

In the first group of 74 patients, oral manifestations were noted in 32 (43.24%  $\pm$  1.15%) cases, and from this 32 in 20 (62.5%  $\pm$  0.78%) the infection was already at the stage of AIDS.

In the second group of oral manifestations, there were more than in the first group: Of all 93 HIV-infected 52 (55.91%  $\pm$  0.89%) patients had mucosal lesions of the oral cavity and from these 52 cases 40 (76.92%  $\pm$  0, 55%) of patients were already at the stage of AIDS.

In the third group, oral manifestations were detected even more often, and from 94 patients (64.89%  $\pm$  0.74%) the oral manifestation were diagnosed 61 patients, and 50 (81.97%  $\pm$  0.47%) of them already had the stage of AIDS.

The number of HIV cases detected annually in Georgia, although small, has a rather dramatic trend. Important is also the fact that the frequency of the proposed ways of transmission of the virus has changed compared to previous years. In general, during the last period the number of patients infected with unprotected sex increased significantly.

It should also be noted that in recent years, the number of HIV-infected patients with co-infections of hepatitis B and C has increased.

The study shows statistical data on the stages of the disease in patients with HIV / AIDS and the ways of transmission of the virus in these three groups. The study of the question showed peculiar features of these groups and this confirms some correlation between these infections. Specifically, in the first group of detected HIV-infected patients, in most cases it was at the pre-AIDS stage, while in the remaining two groups the majority was at the stage of AIDS.

As for the statistics of the ways of transmission of the virus, in the first group this situation: in the majority of patients, infection was associated with unprotected sex and very rarely with the use of injecting drugs. In the second and third group the situation is the opposite. There was a very frequent infection with injecting drugs and, less often, infection with unprotected sex.

It should also be noted that concomitant oral manifestations in patients with HIV / AIDS and with co-infections of viral hepatitis B and C were more frequent than in patients with a mono-infection. In addition, these manifestations are predominantly observed in patients of the third group and with a greater frequency this was found among those who were at the stage of AIDS.

This indicates that there is a very large problem in the country due to the late detection of this infection. It is necessary for the system of primary and secondary health care institutions, including dental clinics to be informed well about the HIV infection, which will improve the situation in the country due to the timely detection of HIV-infected people and the decrease of the epidemic.

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## TECHNOPARKS IN THE CONDITIONS OF DEVELOPMENT OF THE EUROPEAN INTEGRATION

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### ABSTRACT

A technology park is a new type of multifunctional public-industrial complex, which in its development passes the stages from one building to the structure of regional scale, in which, along with fundamental scientific, industrial and commercial functions are gathered the developed public functions and those of social and public services. Considering the already implemented technology parks projects and offered ones on architectural competitions, we can conclude that the architects actively use the innovative design methods and offer unconventional compositional solutions of technopolis architecture, which in their turn, find approval and support of the jury, and later, find approval of those, who are directly working and living in them. The article describes an innovative approach to technology park architecture formation, applicable to its tripartite structure.

While a wide range of technologies can be applied in the context of sustainable development, it can be more efficiently to narrow it in application to scientific and technology parks. Some existing technology parks in the developed countries have turned to information and communication technologies (ICT-sector) and have chosen it as a main specialty. This can help to focus on the pressing problems and targeted solutions - "clean" energy technologies, environmental protection, environmentally clean production technologies, technologies of the water use efficiency improvement, agriculture and public health.

Thus, a technology park, as an innovative urban element could, in its turn, become a part of the future eco-city, which is being developed by the modern architects and scientists.

**Keywords:** technology park, development, Technopolis, architecture.

### INTRODUCTION

Technoparks are gaining ground throughout the world in consequence of dynamic innovation development in science and engineering as well as of necessity of reasonable disposition of companies, laboratories, innovative factories, and also workers involved in science absorbing industry. Ergonomics as the science studying processes of human and environment mutual interaction is quite urgent even at the stage of technoparks designing. It positions itself as a discipline joining various aspects of human life-sustaining activity studying human interaction in the "human - collective - machine - environment - society - culture - nature" structure that, in its turn, forms the ergonomic system [1].

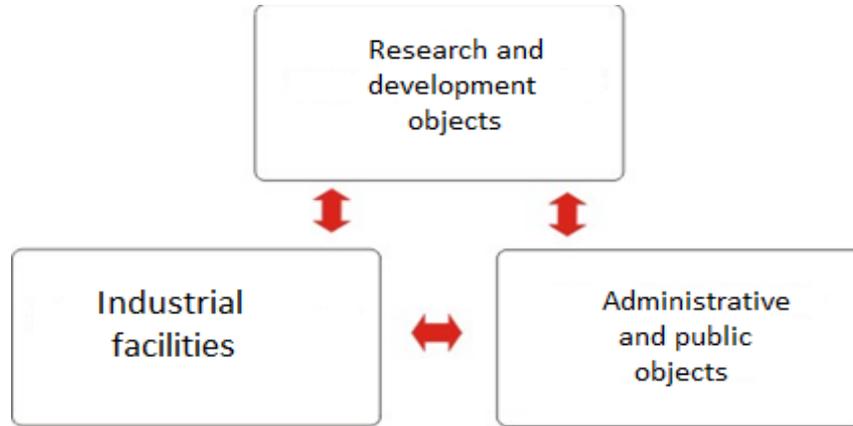
Ergonomics is naturally bound with designing, since in its essence, designing (as a process of projecting) is focused, first of all, on the development of harmonic environment taking into account human factors [2]. Rampant development of science parks was connected with the technical and economical breakthrough in the modern society as well as substantial implementation of high technologies in production as a whole. Creation of favorable working environment, moreover, and not least, and living and leisure-time activities environment for well-qualified personnel of Science Towns is impossible without applying underlying principles of ergonomics.

As a first step it is necessary to give a definition to technopark itself. In accordance with the International Association of Science Parks created on the basis of the United Kingdom Science Park Association, the term "technopark" means "initiative on establishing and growth of an enterprise with science and technological base that is formally and functionally related to the minimum one technical examination company - an organization providing the management support for its subsidiary companies" [3].

Let us consider the structure of technological parks more detailed. In accordance with the researches of Khrustalev A.A. and Dianova-Klokova I.V., being an innovative typological unit, technoparks represent complex multi-use system including, in practice, all basic typological objects of architectural engineering.

The modern complexes of technological parks consist of three major structural elements, naturally bound with each other and making unified complex:

- research and development objects;
- industrial facilities;
- administrative and public facilities (diagram 1) [11].
- research and development objects include buildings of universities, institutes, laboratories, and offices;
- industrial facilities - plants, factories, workshops;
- administrative and public facilities - hotels, exhibition pavilions, residential areas, recreational zones, sports centers, child daycare centers, stores, clubs.



**Diagram 1.** Dependency of major structural elements of technological park [4].

**The American experience.** In general, the technopark structure of the American model has been formed on the basis of innovation enterprise-lessees of different sizes and service companies. Till its establishing the plant maintenance function was carried out by the organizers themselves.

The technopark structure did not take into consideration such parameters as enterprise size, sector profile, possible ways of development. Subsequently, the organizers of technoparks faced all these questions. There are structures not having office of prime responsibility, as a rule, they are accidental formations of the innovation enterprises that acquired useless territories near the big universities or science absorbing industry.

A typical example of “research park” where on the lands of university there are no enterprises and laboratories of industrial companies as such, but there are non-commercial research institutes closely associated with industry.

**The European experience.** The occurrence of the European model was preceded by the increase of interest on the part of the government of the European Community caused by the successes of the American innovative ventures. The main objective pursued in the creation of technoparks in Europe was the transfer of technologies or, more simply, process acceleration of implementation of scientific discoveries in industry. Several distinguishing features are peculiar for the European model of technopark:

The first one is a vacant building designed for location therein newly established innovation companies (refer to incubator). It contributes to the rapid formation of small and medium-sized innovative enterprises for 2-3 years. The building of incubator is built first in the process of the technopark development project implementation, and thereafter, if the demand for services of the incubator grows, so its area will be spread.

The second feature is the improved maintenance system consisting of the complex and simple service performed by the companies that comprise the service sector relevant for the form content of innovative enterprises.

**The Asian experience.** The Japanese model of “science parks”, in contradistinction to the American one, supposes building and construction of the completely new cities - the so-called “technopolis” being focused on scientific investigations in the leading and pioneer branches and science-intensive industrial production. The “Technopolis” project - the technopolises creation project - was adopted for implementation in 1982. In technopolis there are own rules, in other words, charter everybody complies with. This technopolis contains several technoparks of different specialization and type as well as a raw of educational institutions. There are special schools for managers (there are many scientists and research engineers, but they constantly lack managers).

Moreover, there are quite well-developed infrastructure, that hardly can be found in usual technoparks. - transport, travel agencies. There are also own police, you do not even see it, but it works perfectly (judging by statistic data on criminal activities).

Analysis of the structure of existing technoparks and projects not being implemented yet showed three main groups:

- development - as a rule, initiators are big civil engineering firms and private funds as well as regional and federal governments;
- industrial - the basis is a territory of industrial area and city-forming industrial establishments with the preserved infrastructure and specialized Research and Development Establishments;
- university technoparks are established on the basis of big higher education institutions.

First technoparks in Ukraine appeared in 2000. They were established on the basis of the biggest Research and Development Establishments: two were in Kiev (TP “Semiconductor technologies and materials, optoelectronics and sensor technology” and E.O. Paton Electric welding institute), the third one is in Kharkov - TP “Institute for Single

Crystals”. Their activity is confirmed by the relevant Law of Ukraine “On Special Treatment of Investment and Innovative Activity of Technological Parks in Ukraine”.

Let us consider a spectacular example of the European technopolis where along with the development of research and development area, the residential areas were paid not less attention.

The first house of the Archipelago residential complex in Amsterdam Science Park were fully commissioned in 2007. The project of Milos domestic building (an alternative name is “Castle”) as a part of the complex was implemented by the Synchroon development company together with the HVDN Architekten bureau [6] (fig.1). Ergonomics design planning areas, engineering systems manned maintained and controlled, everyday items, work objects can be successful only then when it is supported by the steady scientific principles, modern approved means and methods [7]. The underlying ergonomics principles required for comfort living and leisure activities of its inhabitants were successfully introduced in the living environment of the complex, more specifically:

- protection against the external climatic effects, natural disasters, adverse factors of urban environment;
- ensuring comfortable conditions in functional and utility and sanitary aspects;
- creation of coziness, harmony in cultural, aesthetic and artistic terms [8].



Fig.1 General drawing of the Milos “Castle” complex, the Amsterdam Science park, Amsterdam.

Picture : Polivanova 2016

**Fig. 1** General drawing of the Milos “Castle” complex, the Amsterdam Science park, Amsterdam

Volumetric and spatial composition of the complex consists of 45-meter tower basing on 4-5-storied stylobate with patio (fig.2).

The architects faced at the construction site almost all adverse conditions for designing of residential unit. It was wind-blown land plot bordering the railway marshalling yard, with the high level of noise pollution, having, additionally, safety and ecological performance heavy restrictions. To suppress noise on the border of the land plot the protective screens were installed as well as a unique system of facade glazing was developed. All facade of the building was framed with the glass “palet”, each cell of which was turned at a shallower angle towards another. Therefore, all facade “is iridescent in the sunlight” and creates the impression of ice castle (fig.3).

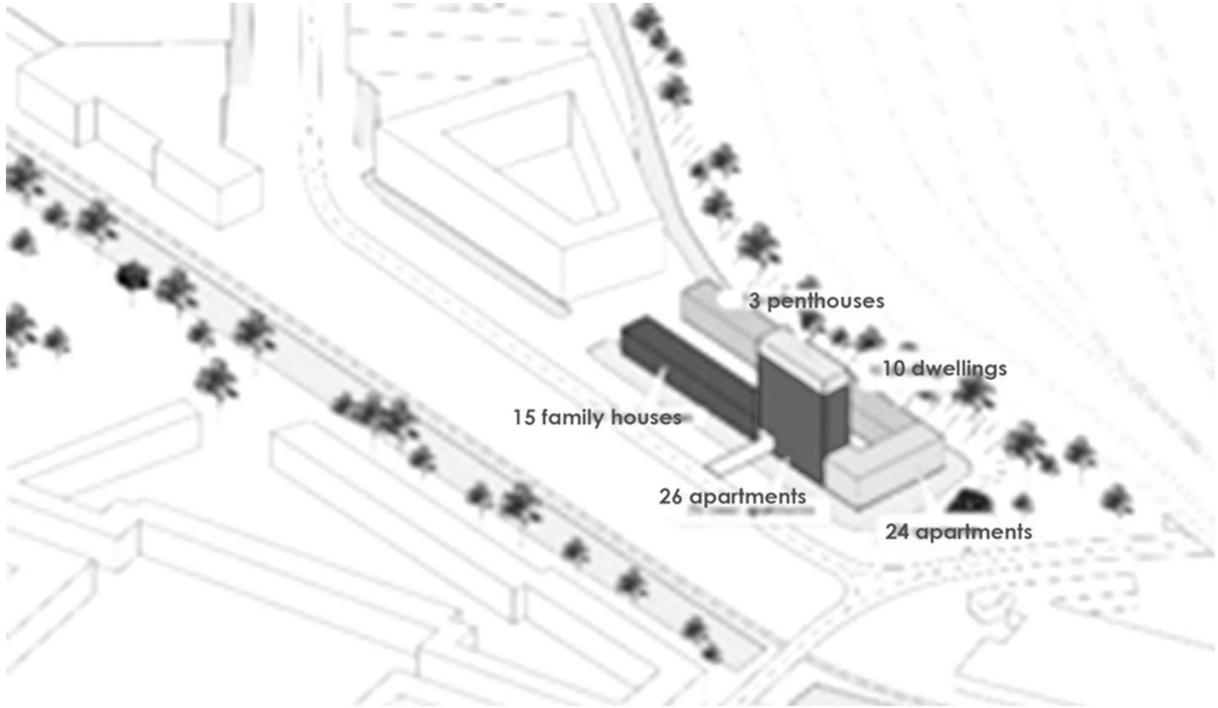


Fig.2 Volumetric and spatial model of the Milos complex.

Picture : Polivanova 2016

**Fig. 2** Volumetric and spatial model of the Milos complex.



Fig.3 One of the facades of the Milos "Castle" complex, the Amsterdam Science park, Amsterdam.

Picture: Polivanova 2016

**Fig. 3** One of the facades of the Milos "Castle" complex, the Amsterdam Science park, Amsterdam



Fig.4 Inside court of the Milos "Castle" complex, the Amsterdam Science park, Amsterdam  
Picture: Polivanova 2016

**Fig. 4** Inside court of the Milos "Castle" complex, the Amsterdam Science park, Amsterdam



Figure 1. The Cambridge Science Park. Cambridge, Great Britain.  
Picture: Polivanova 2016

**Figure 1.** The Cambridge Science Park. Cambridge, Great Britain.

The complex courtyard is the mirror image of its "cold" facades. Fully decorated with wood, with small architectural forms and green space, it is designed to create atmosphere of fireside comfort, positive mental climate. It also has utilitarian function, there is a garage thereunder for inhabitants' cars at the lower level. Therefore, the architects

of the HVDN Architekten bureau provided for a decision of parking slot issue that is frequently a huge problem in visual terms - a presence of a good many of cars near the residential unit initially excites sensations of disorder and discomfort. According to the designer Terence Conran, the concept of comfort includes not only physical sensations - that is satisfying a wide range of feelings, but also coziness, relaxation, comfort, efficiency, and simplicity [9]. Closed against the views from outside and noise of the street, comfortable inside court is favorable for all kinds of communications between the inhabitants of the complex - holding mutual events, acquaintance (fig.4).

In accordance with the researches of the scientists, ergonomics has two main vectors:

- substantiation and formulation of restrictions (recommendations);
- regarding the designing parameters of environment elements and their combination;
- generation in the area free from such restrictions of new variants of dimensional figures and their combinations dictated not so much by the utilitarian and practical as imaginative reasons.

The architects of the Milos residential complex made a successful effort to revitalize obviously uninhabitable district and to turn it not only in profitable, but architecturally and psychologically attractive zone in the structure of Amsterdam Science park.

The European model is a peculiar projection of the American experience and integration of technopark as a typological unit into the European countries. In contradistinction to the American model, the main feature of the European technoparks formation is restricted area of the universities' campuses, existing infrastructure and significant architectural environment made usually by the historical buildings.

The Cambridge Science Park established in 1970 on the basis of Trinity College in the best way possible reflects the conditions mentioned above [6; 10] (Figure 1).

In the European practice the technopark-"satellite" scheme is applied in the monocentric agglomeration as well. One of such examples is the Paris Nord II, established in 1980. (Figure 2).

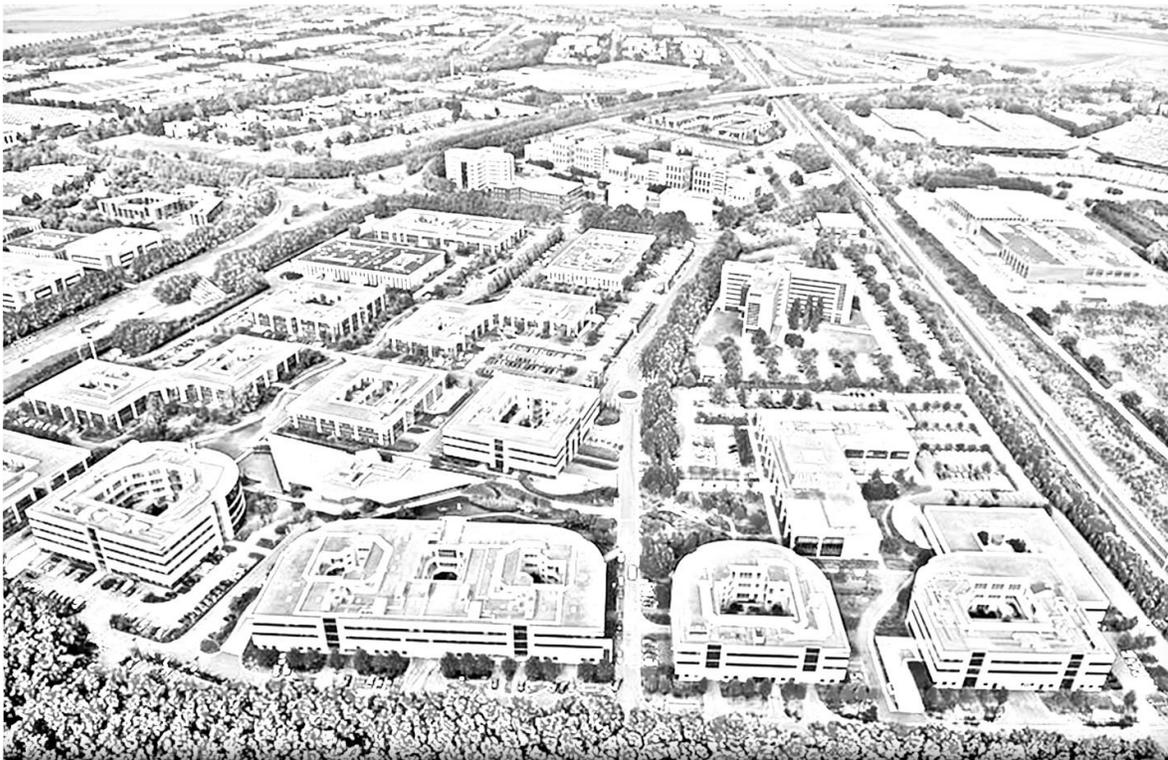


Figure 2. The Paris Nord II Technopark. Bird's eye view. Paris, France.

Picture: Polivanova 2016

**Figure 2.** The Paris Nord II Technopark. Bird's eye view. Paris, France.

The first private technological park in Europe situated on the area of 300 ha is a heart of the platform for business-tourism of Paris region. The fundamental advantages of the Paris Nord II are location within the Big Paris agglomeration, perfect transport accessibility (both for public and private transport, closeness of Charles de Gaulle Airport, the exhibition area square makes up 242 thousand sq.m., the availability of over 14000 hotel suits, conference center and 3 conference halls. One of the main peculiarities of the technopark is low storey buildings and availability of 68 ha of green

space with its flora and fauna providing the technopark with the natural and mental microclimate that is so necessary for efficient interaction of specialists who are working therein (figure 3).



Figure 3. The natural area of the Paris Nord II Technopark. Paris, France.

Picture: Polivanova 2016

**Figure 3.** The natural area of the Paris Nord II Technopark. Paris, France.

One more large-scale of the technopark project using the advanced technologies is Orona IDeO - the enhancement project of the San Sebastian Technological Park in the Basque Country, not far from Bilbao, Spain. The primary objective of the “Orona Innovative Ecological Systems” project consists in combination of various synergistic directions - business, technological centers, and university - in one big laboratory. San Sebastian city is declared the European cultural capital in 2016, that once again confirms the necessity of the similar project. At the visualization you can see the main unusual volume that is the Orona Zero building is a hollow cylinder of 90 meters in diameter and with the decline of 15 degrees (fig.3). One of its parts is risen above the main entrance into the Technological park, and another is deepened into the ground making simultaneously both entrance group into the building and facade - accessible roof area for accumulation of natural energy. As is obvious, the architecture, in particular, the building roof over again plays a leading part in using innovative technologies for ensuring the object energy efficiency.

To achieve the building energy efficiency bioclimatic designing shall rely upon the initial architectural concept of the building. The Orona Zero building stands out for its own design and extensive architectural composition. Moreover, it meets the requirements of bioclimatic design. The architects paid great attention to the inner building loads taking into account a number of visitors, workers, and hardness of electric equipment that generates heat and simultaneously requires diffused lighting. Working places consciously are turned closer to the outer envelope and to the north, while the annular circular gallery of the building is turned to the south and distributes flows of visitors revealing herewith internal space view (fig. 4). This space has more social function, more specifically, here sun light is encouraged and does not cross the work space [4].

Industrial buildings and complexes as part of the industrial science parks also are objects of innovative implementation. As an instance we can mention the electric power plant building in the Utrecht Science Park, Netherlands. To increase power of two existing power plants on the basis of the Utrecht Science Park in Uithof area the architectural company DOK architecten designed a new building with the total area of 6 thousand sq. m. The building size and construct were clearly determined in the technical design specification. The architects applied the noise elimination technology due to using corten steel as a self-supporting envelope of machine room and huge filters and damping devices

having reduced herewith the noise pollution almost to the minimum. Furthermore, original sculptural composition of the building makes the surrounding relief dynamic and, in addition, makes it attractive place for tourists (fig. 5) [5].

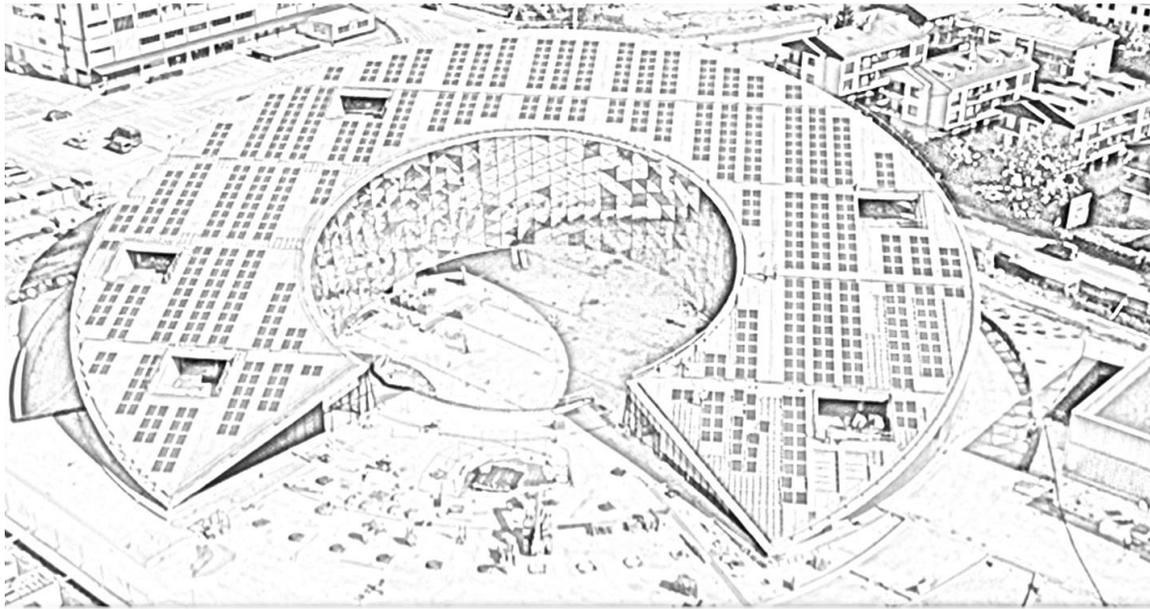


Fig. 3. The enhancement project of the San Sebastian Technological Park, Spain.  
Picture: Polivanova 2016

**Fig. 3.** The enhancement project of the San Sebastian Technological Park, Spain.

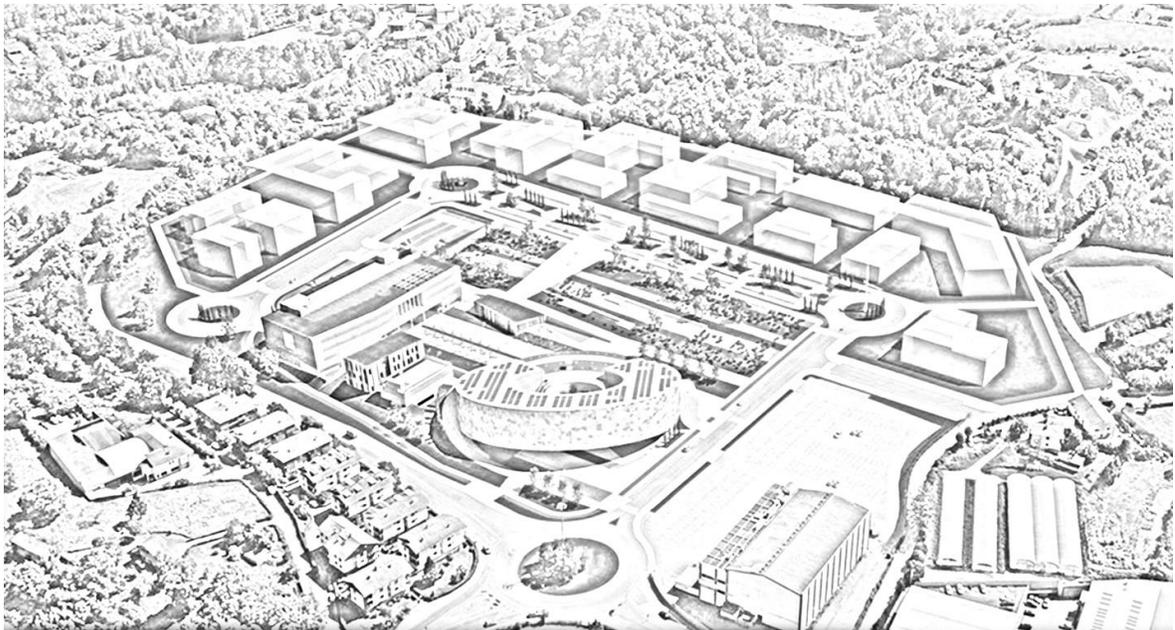


Fig. 4. The Orona Zero building in the San Sebastian Technological Park, Spain.  
Picture: Polivanova 2016

**Fig. 4.** The Orona Zero building in the San Sebastian Technological Park, Spain.

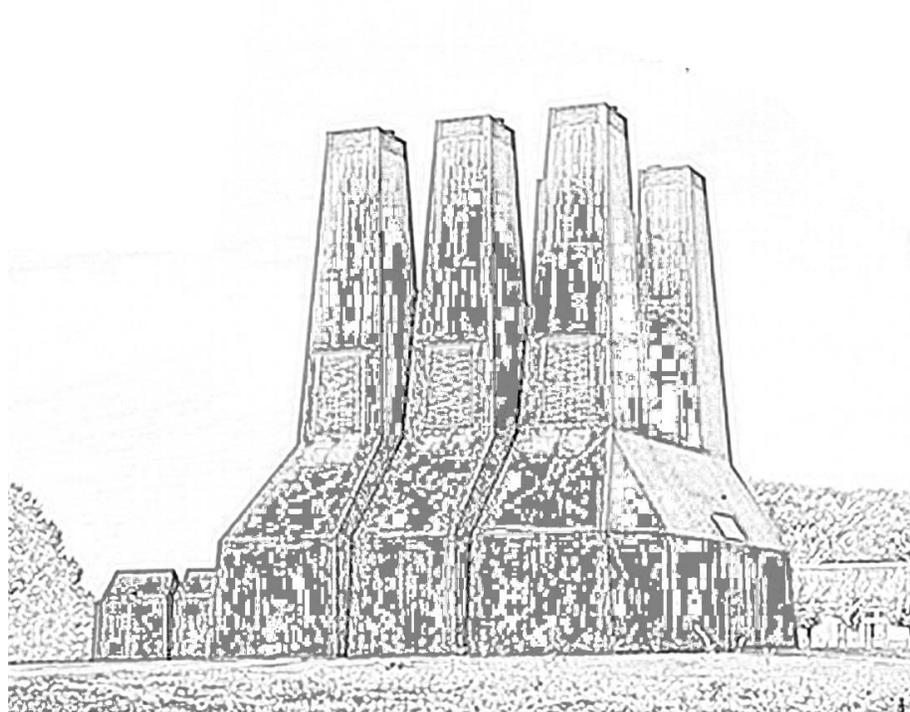


Fig. 5. The electric power plant building in the Utrecht Science Park, Netherlands. DOK architecten Picture: Polivanova 2016

**Fig. 5.** The electric power plant building in the Utrecht Science Park, Netherlands. DOK architecten

In Malaga, Spain, in 1984 the International association of scientific parks - IASP - an independent, non-governmental, non-commercial association on the basis of membership was established. Its principle mission is to be a global network of science parks (or “technoparks”) and innovation zones as well as to promote internationalization and help to work efficiently all the members of the Association. IASP activity is aimed at the coordination of high performance network of professionals who administer innovation and science and technologic parks; improvement of new business opportunities for companies and research organizations in their fields; assistance in the development and growth of new parks and similar innovation zones; increase of the international visibility for the Association members and sponsors. Since 2001 the number of the international members increased from 200 to 388 in 71 countries of the world.

## CONCLUSION

Cross-disciplinary essence of technopolis consists, first of all, in interaction of specialists of various fields of science the efficiency of which immediately depends on the social and economic and psychological conditions of their work where the favorable architectural space plays the most important role. Architecturally, in the rapidly developing world of science technopolises are one of the most efficient typological units, solving problem of unification of the large community of specialists in one conditional zone.

Therefore, we can draw a forecasting conclusion that the rapid increase of a number of the International Association Science Parks’ members confirms the interest to this kind of technic implementation zones, and dynamic development of science and innovative technology only increase its growth. Consequently, it is possible to transform somehow technoparks or technopolises towards the improvement of their space-planning and functional schemes that is subject to further studies.

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## ECOSYSTEM OF DIGITAL ECONOMY IN GEORGIA

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### ABSTRACT

Last decades, digital processes caused the transformation of society, business, and government. It has become not only a part of economic integration, but it has also performed as a digital economy. Today, the digital economy is characterized by a high growth, innovative development, and wide utilization in the different sectors of economy.

Digital economy includes markets based on digital technologies, which facilitates the trade of goods and services through e-commerce. The key factor of the economic growth is the development of digital sector.

The article discusses an ecosystem of the digital economy, evaluates a range of the digital economy, analyses an actual foundation and components of the digital economy.

The research demonstrates the influence of the digital technologies on the society's life, and citizens' digital activity.

The article presents the digital environment of Georgia, innovation activities of households and enterprises in the digital environment.

Concrete measures to be taken are suggested as a conclusion.

**Keywords:** digital economy, digital technologies, digital society, e-Government, developing countries, Georgia

### INTRODUCTION

The digital processes in the last decades have caused the transformation in the society, business and government. It has become not only an integrated part of the economy but it has also performed as a digital economy. Today, the digital economy is characterized by a high growth, innovative development, and wide utilization in the different sectors of economy.

In the article, an ecosystem of the digital economy is discussed, a range of the digital economy is evaluated, an actual foundation and components of the digital economy are analyzed.

The research was conducted on eGovernment issues in a developing country of Georgia. The research results are analyzed using statistic software SPSS for Windows. Cross-tabulation, chi-square, Anova test statistics are used. Correlation and simple linear regression are used to determine the relations between the variables.

The Pearson Correlation between the evaluation points of the Georgian civil, private and government agencies' websites, and the evaluation points of the practical introduction and maintenance of the eGovernment equals to 0.547. This means that a cause-effect relationship is above the average, which means that there is a cause-effect relationship between two above-mentioned variables above average, since the high score of one variable causes the increase of the score of another variable.

Basis of the marketing research, the favorable and unfavorable factors of developing the digital environment in Georgia, as well as potential and possible threats through SWOT analysis has been identified.

### I. Integration of Digital Technologies in the Economy

Digital economy is a vitally important sector that is an incentive for the growth of a country. The influence of the digital economy is spreading across information products and services in the other industries [1].

The digital economy refers to an economy that is based on digital technologies [2]. The digital economy is a comprehensive term that is used to describe markets focusing on digital technologies. Usually, it comprises the trade of information products and services through e-commerce.

The digital economy refers to a broad range of economic activities that include [3]:

- Using digitized information and knowledge as the key factor of production;
- Modern information networks as an important activity space;
- The effective use of information and communication technology as an important driver of productivity growth and economic structural optimization;
- Using Internet, cloud computing, big data, Internet of things, FinTech and other new digital technologies to collect, store, analyze, and share information digitally;
- Transforming social interactions. Digitized, networked and intelligent ICTs enable modern economic activities to be more flexible, agile and smart.

In the digital economy era, dimensions of life have been altered: Platforms, ecosystems, power of optimizing ecosystems, digital assets and innovation capital, laws and network effects, digital density and 'free goods', etc. [4]. Every aspects of life have been changed: Products, value chains, controlling of supply chains, physical assets and capital depreciation, GDP, as economic measurement, etc. [4].

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Under modern challenges, economists are modeling economic growth through labour power and technologies [5]. Besides, the digital economic platform is presented as an important direction in the economic platform concept, which can solve problems of business and government. Platform ecosystems play a strategic role in every business: GE, Philips, Google, Uber, Apple, Amazon, which have powerful platform ecosystems including business production assets.

The digital economy is based on three main principles: **supporting infrastructure** (hardware, software, telecoms, networks, etc.), **e-business** (processes that an organization conducts over computer-mediated networks), **e-commerce**(transfer of goods online)[1].

For analyzing an actual foundation for the digital economy, the following indicators can be discussed: the growth of the Internet, Hardware sector; Communication sector; Digital media; Electronic commerce; Digital economy threats; Global digital economy (Britton, McGonegal, 2007).

The Internet provides a platform for millions of daily online transactions and communications that make a significant contribution to individual economies. The iGDP indicator developed by the McKinsey Global Institute measures the influence of the Internet within the framework of a given economy. It uses the expenditure method of calculating GDP, totals all activities linked to the creation, and use of Internet networks and services, including: **consumption by individuals** (Internet/mobile access, hardware and software, smart phones, and e-commerce), **public expenditure** (in direction of public expenditure investment and internet consumption, hardware and software, service and infrastructure), **private investments**(business investments in the Internet technologies including in the telecom, extranet, intranet, and website infrastructure), **trade balance**(the export of business process outsourcing, e-commerce, Internet-related goods, services, equipment, excluding related import [6].

According to the research of the Global innovation-mediated paradigm shift (GIMPS), there are four main areas to be considered while determining the trends and levers of the digital economy for a country: **Technologies** is assessed on current infrastructures, structural organs, orientations, prospects and investments; **Policy** - laws, regulatory and promotion institutions; **People** - the human capacity, the Internet literacy level, socio-economic situation; **Strategy** is assessed by the national, regional and global strategies, evaluation of the challenges and perspectives of the global factors through world-system [7].

## II. Ecosystem of the Digital Economy

A potential power of the digital economy exerts influence of digital innovations on a consumer or business. Good business strategy does not begin with a product or commercial model, but it begins with the consumer, and focus on the requirements of a consumer.

The digital transformation of the economy is the grand challenge for our time [8]. For example, the digital economy has limitless opportunities for some and disruption and displacement for others. Some firms, such as Kodak, Blockbuster, Sears, and Blackberry were unable to adapt and to develop, while others were thriving. According to the research company MIT Sloal, the companies that are adapting to a digital world are 26% more profitable than their industry peers. Moreover, the companies with 50% or more of their revenues from digital ecosystems have higher revenues and higher profit margins than their industry's average [8].

The digital economy enables the trade of goods and services through electronic commerce on the Internet (OECD) [9]. Consequently, e-commerce, Internet, computing, and mobile communication have transforming impact on business success. Under influence of the digital platforms, a product or service exceeds the bounds of the information and communication sector. Furthermore, small companies need concentrated support, a long-term strategy, business methods, unprecedented cross-industry collaboration to establish supply chains [10].

In 2005, the digital economy constituted 15% of the global economy (Apple, Axel Springer, Copart, Fox Communications, IAC/Inter Active Corp, iLive, iStart Internet, Live Microsystems, Netcom Online, Netscape, PSINet, RentPath, Storage Computer Corp. Wave Corporation, Web.com) [11]. However, in 2015, the share of the digital economy was 20% [12], and the further increase is predicted to 25% by 2020.

The number of companies that are part of the digital economy has grown by 30% in the past five years. Consequently, the number of workplaces has increased by 5%. It should be noted that 9% of the enterprises that form part of the digital jobs, create 7% of the national output [13].

Market cap of top 15 Platform companies (Alibaba, Alphabet, Amazon.com, Apple, Baidu, eBay, Facebook, JD.com, LinkedIn, Netflix, Priceline.com, Salesforce, Tencent, Twitter, Yahoo!) makes up \$2.6 trillion worldwide due to the value-creating power of their ecosystems and digital assets [11].

According to the report of World Economic Forum, the overall digital economy represents an annual GDP upside of 0.43 percent and employment creation of 2.7 million jobs worldwide [14]. The researches confirm that Great Britain is a leader with 6.7% in Internet-related expenditures as percent of respective country GDP, South Korea is on the second place with 5.9%, next comes Japan (5.6%). Top 5 includes Sweden (5%) and China (4.4%), on the sixth place is the USA with 4.3%, France (4.2%) is on the seventh place before Germany (3.7%). Canada (3.4%) and Italy (2.6%) are at the end of top 10. Behind them are India (2.1%), Russia (1.9%), and Brazil (1.7%) [15].

### III. Digital Technologies and the Society

When digital technologies in business have spread widely, economic activities were classified as Digital Business that has broadened the business scope, and diversified the transaction forms. Simultaneously, information technologies have impacted the formation of a new social system, such as digital society that has enlarged the rights of the citizens, increased social power, facilitated a dynamic environment to be formed, and augmented responsibility and accountability.

The digital technologies have greatly contributed to social and economic awareness of the society, to strengthening the society and increasing welfare.

Today, the influence of the digital technologies on the society's life as well as sharing Internet information during everyday life is so passively interwoven and invisibly flowed as the electric energy. Therefore, digital activities have laid down the foundations of forming the digital citizen and digital society.

First was Mark Prensky who introduced the concept of Digital Natives in 2001. Digital natives of the first generation used all kind of digital toys and tools, which were an integral part of their life. Digital activity is like a mother tongue for them, which highlights the difference between generations, and technological acceleration of the Internet and networks [16].

Digital citizenship can be defined as the norms of appropriate, responsible behavior with regard to technology use. It includes 9 elements: Digital Access, Digital Commerce, Digital Communication, Digital Literacy, Digital Etiquette, Digital Law, Digital Rights and Responsibilities, Digital Health and Wellness, Digital Security [17].

Development phases of the digital society are as follows [18]:

- Adaptation - Internet access, Computer access, Internet infrastructure, high-speed Internet, Digital literacy, eGovernance platform, eGovernment services, eCommerce laws;
- Integration - Internet integration in the economy and society, access to e-business application, access to mobile business applications, Internet market, variety of digital products and services, legal regulation of Internet environment.

Social e-commerce technologies have provided the society with the effective tools in accordance with the interests, software, democratic and welfare instruments, dramatic increase of social multimedia, and contents generated by a consumer.

While researching the information resource of the society globally, some important factors should be taken into consideration, such as the accessibility of the Internet and mobile Internet, activities in social networks, digital activities, etc.

A typical day of a digital citizen in the digital society shows that the half of the population (50.1%) lives in the Internet, who uses daily 2.3 billion GB of web traffic (information flow), sends 207 billion emails, 4.2 billion people begin their internet activities with Google searches, and 8.8 billion citizens watch everyday YouTube videos [19].

The surveys confirm that digital technologies further the development of mobile market, which has become a driver of civil activity and social progress.

According to the researches of the international organizations - ITU and UNESCO, global mobile cellular subscriptions will exceed 7.2 billion, and mobile Internet subscribers is 3.6 billion (see table 1) [20; 21].

Table 1. Global market evaluation in 2012-2015 and 2020

	2012	2013	2014	2015	2020
Mobile cellular subscriptions (billion)	6.23	6.67	6.95	7.09	9.2
Unique mobile subscribers (billion)	---	5.2	5	5.2	---
Mobile Internet subscribers (billion)	1.55	2.1	2.69	3.46	7.7
Internet subscribers (billion)	2.49	2.71	2.94	3,675,8	98% of the world population
FacebookUsers (average daily, million)	618	757	890	936	---
Smartphonesubscribers (billion)	1.3	1.7	2.1	40% of mobile subscribers	70% of the world population
Smartphone sales	712.6 million	30% of mobiles	---	1 billion	

The data from the various resources have been used in the table.

### IV. Digital Environment of Georgia

Under the national competitiveness of the country, digital process strategically strengthens the microeconomic environment of Georgia, as well as the behavior of local entrepreneurs and firms, improves country's competitiveness, increases economy, and makes sustainable the platform of country's economic policy [22].

Today, the digital processes in developing countries, and particularly in Georgia have an important impact on government environment and governance processes, as well as on business space and models. Lately, the digital environment of the country ensures wide accessibility to new technologies, stimulates launching small and medium Internet companies, and generates digital economic growth. Digital processes incite the creation of workplaces, and effective use of capital and resources, leading to the economic growth in the country.

After the new government has taken office, the formation and development of Internet Infrastructure as a driver of digital economy is supported. Besides, measures have been taken for accessibility the Internet and Computer, for increasing the Internet speed and Internet users as well as Internet literacy of the population. The formation of digital ecosystem exerts influence on society's wellbeing and social-economic processes.

According to the report of World Economic Forum, Georgia is ranked on the 58th place at the Networked Readiness Index, on 91th place by the Economic impacts, and on 44th place by the Social impacts. It should be noted that according to this research, Georgia is on 76th place in terms of Laws Relating to ICTs. The country is placed on 79th in ICT use for business-to-business transactions, and on 94th - in Business-to-consumer Internet use. Regarding the Government usage, Georgia is on 81st place in Importance of ICTs to government vision [23].

To assess the digital environment in Georgia, the following trends should be considered: the Internet access by households is high (70.7% have access in 2016), activities related software products are average, and mobile cellular subscriptions and usage by the population is high (78.8% in 2016) (see table 2).

Table 2. Households with Internet and Computers, % (June 2016)

ICT		Georgia	City	Village
Households with the Internet		70.7	79.7	57.4
Households with computers		64.7	76.7	47.0
distribution of 15 years old and elder population by activities related to software products	1 or 2	3.9	12.2	1 .0
	3 or 4	28.7	27.4	31.6
	5 or 6	22.8	24.2	19.5
	7 or 8	13.5	15.0	10.1
	none	21.1	21.2	20.8
percentage of 6 years old and elder population who possess a mobile phone		78.8	85.4	69.5

Source: geostat.ge

Electronic communication market of Georgia is valuable, divers, and economically attractive, which is expressed in growth of company revenues, Internet users, number of websites, effectiveness of Internet companies, e-commerce incomes for Georgian companies, as well as variety of applications and content [23].

Retail revenue for Internet providers existing in the Internet space has increased from 99.4 million to 185.2 million in the 2011-2015 years [24].

The innovative activity of enterprises demonstrates that more than half of companies (51.2%) introduced new (or essentially improved) services in 2013-2015; 23% introduced new (or essentially improved) methods of logistic, supply, and distribution; 35.5% of companies introduced new (or essentially improved) supporting activities (e.g. purchase, accounting, calculating, service systems).

Furthermore, 17.1% of enterprises took part in research and development, 27.2% have purchased machinery and equipment, and software, 15.1% of companies carried out trainings regarding the innovation activity, and 11.7% introduced innovations into the market.

A high range of entrepreneurial activities has taken place in the digital space of Georgia, in particular: 24.6% of companies said that they introduced new media or technology for popularization of their products in 2013-2015 (e.g. a new advertising media, a new brand image, accumulating cards, etc.), and 19.5% of companies introduced a new channel for product placement or selling (e.g. new franchises or distribution licenses, direct sales, exclusive retail selling, new concepts for product presentation, etc.) [25].

The surveys show that at the first stage of the Internet development, the Internet was accessible only for a higher social class, social elite, educated, high income and professional individuals. This was caused by high price of a computer and Internet, inaccessibility, low computer literacy, distribution limits, and other factors.

Today, the Internet users in Georgia are young, dynamic, and divers. There is intensive urban spread, however it is conditioned by accessibility of mobile phones and mobile Internet. The Internet environment in the country is free, it is easy to launch a website or blog, and to express opinion or publish a post.

In sum, Georgia takes into account the acknowledged tenet that digital economy is becoming the economy. The strategically thinking government represents a "digital broker" who investing in digital compatibility for their people and businesses, providing incentives and supporting them as they strive to compete and integrate into the economy [26].

## V. Marketing Research of Digital Space of Georgia

The marketing research was conducted with the purpose of studying e-government and electronic business processes in Georgia, which can give clues about the same issues in other developing countries.

The research process was carried out in 6 stages: the frame of the market segmentation was determined in the first stage and target segments was selected; then a questionnaire was developed and a survey was conducted; the results were analyzed, evaluated, and interpreted, on the basis of which the marketing strategy of the Georgian e-government has been elaborated.

A research unit was ascertained and samples selected that reflected adequately the whole population.

- Population: 1.6 million people (GNCC),
- Sampling frame: 1600 people (0.1%),
- Sample: people actually participating in the survey,
- Analysis: analytical multivariate analysis.

Probability sampling technique was selected in accordance with the purpose of the study.

All elements of the sampling frame have equal chances to be selected into sample.

The probability sampling type is Simple Random Sampling (SRS).

As known, every sampling has some degree of error caused by various factors (not answering a question, inadequate answer, coding error, etc.).

Simple Random Sampling error is calculated with the following formula:

$$\Delta_{\text{error}} = \sqrt{\frac{P(1-P)}{n}}$$

Where P is a percent of a size, n is a number of respondents participating in the survey. With the confidence level of 95% the percentage of the population lies within the following interval:

$$\left[ P - 1.96\sqrt{\frac{P(1-P)}{n}} ; P + 1.96\sqrt{\frac{P(1-P)}{n}} \right]$$

The sampling error reaches its maximum for P=0.5 percentage

$$1.96\sqrt{\frac{P(1-P)}{n}} = 1.96\sqrt{\frac{0.5(1-0.5)}{1600}} = 1.3\%$$

Thus, the research error might be maximum 1.3% with the confidence level of 95%.

$$\Delta_{\text{error}} = 1.3\%$$

The questionnaire is composed by 7 block and 50 questions. The research results were analyzed through the statistical software SPSS 20. On the basis of the information, the development of the marketing strategy of the Georgian e-government has been elaborated.

Within the framework of the marketing research, consumers' attitudes towards the online services of the business sector has been studied, as well as their motives for using those services, the factors influencing the service choice. Moreover, the Georgian online media has been discussed, expenditures for receiving online services are shown, and the facilitating factors for developing online service market are presented.

According to the marketing research, information service is the most popular for 44.7% of respondents of the Georgian Internet market, 37.3% of consumers are interested in educational service, and 34.3% uses search engines. 17.9% of Internet users actively utilize financial services, and 11.5% prefers online tourism services. Moreover, online games, online applications, online exchange service, and other kind of online services are especially demanded by the Internet consumers.

The research established the factors having impact on the Internet users to make a decision about purchasing or choosing a service. The research demonstrated that 32,8% of Internet users choose online business service due to its profitability. 25,1% of the respondents prefers organizations focusing on consumer needs, and 19,4% of them make choice because of the low price. 16,8% of consumers choose Internet companies due to their effective information policy, and 16,4% are attracted of various service. 11,9% of Internet users take into consideration time saving. Furthermore, the following factors are important for the respondents while choosing online business service: anonymity (8%), quick interactive reactions by sellers (5,3%), flexible price policy (3,4%), avoiding emotional/persuasive influences (3%).

The conducted research has revealed that the development of online service organizations of the private sector is caused by the increase of the Internet users segment in Georgia, as well as the growth of global competitiveness, flexibility, production and presentation of products and services corresponding to the demands of the global market.

According to the respondents, in order to choose the online service organization from the private sector, it is important the image and popularity of the Internet-company (28/4%); 22,3% of the respondents prefer service value, and 21,9% takes into account the price and terms, and 19,9% consider of importance a recommendation of private resources (friends, family). Besides, respondents named the professionalism of the Internet companies' employees (17,8%), variety of products and services (15%), image and design of websites (8,7%), flexible price policy (6,4%).

Today, business sector is an integral part of the online media (digital media). The research confirms that a solid foundation of the business activities is based on online media, which are a valued tool and a new business model.

The Georgian online media environment is represented by various features and media channels. The research

on online media features and media channels in the country identified the following results: 50% of the respondents use Facebook and Twitter to receive news; 24.8% prefer an online television, and 18.8% read mainly online magazines; 13.3% of the consumers are focused on blogs to receive news, and 10.7% are using multimedia sharing services (Flickr, YouTube); 7.3% of the respondents read Wiki for getting news, and 3.8% choose an Internet-radio.

The respondents consider speed, objectivity, quality, and truth as a main priority for using the online media. The research has discovered that for 27.8% of the respondents the purpose for using the online media is its ability for receiving news quickly; for 27.1% it is objectivity, and 24.3% of the respondents think that online media spreads true information. 23.8% of the Internet users mean that the quality of online media is high, and 22.2% consider online media as accessible. 12.9% of the respondents choose online media due to its accuracy and keeping its balance, and 5.9% use it by recommendation of their friends / relatives. But 4.7% of the respondents are unable to assess a determining factor, and 1.1% indicates other factors.

The use of electronic payment means is characterized by growing trend in Georgia. Payment cards are popular among the payment methods. It is impressionable that in 2013, the percentage of the payment operations in the payment on account by payment cards was 49.8%, the transactions through the Internet were 24.8%, and it was 6.1% through phone/ mobile banking. Moreover, 19.3% of the payments were made by credit order, debit order, charge card, and other means.

It should be noticed that the payments made through Internet banking are leaders (with 61%) among the cashless payments in terms of amount indicators. Furthermore, the number of cards issued in Georgia is 5,948,691, which amounts 13 card per 10 citizens (National Bank of Georgia, Annual Report, 2013).

The research on electronic payment tools in Georgia has ascertained that 27.3% of the consumers prefer cash payment, 23.5% choose the transfer through bank or Internet bank, and 11.9% pay by a plastic card. 10.1% of the research participants use payment terminals. Another forms of the payments are less popular and do not exceed 4.8%.

It should be noticed that the key revenue resources of Internet companies are: revenues from subscribers of the online content, payment for allowing access to documents, revenues generated from CRM advertisement, revenues from CPC advertisement, revenues from the sponsorship of a part or content of the website, Cost Per Acquisition - CPA, revenues from Email marketing (access to the subscribers' database), revenues from the online research (smartinsights.com).

Within the framework of the marketing research, expenditure for using online trade/ service by a consumer has been revealed. The research confirms that 23.6% of the Internet users spend about 50 GEL for receiving online trade/ service, 10.3% spend between 50-100 GEL, and 18.7% - about 101 - 300GEL. The expenses for 4.4% of the respondents range from 301 GEL to 500 GEL, and for 1.7% the amount is 501 - 1000 GEL. Only 1.5% of the respondents spend more than 1000 GEL for the online market. 34.4% of the respondents refused to name their expenses for receiving online trade/ services.

The marketing research demonstrated that 32.4% of the Georgian respondents consider Internet literacy and information awareness as measures for developing the electronic service market. 26.3% of the citizens name the economic development for resolving problems; and 25.5% think that various Georgian content is needed for market development; 17% of the consumers consider as important the growth of the Internet user segment, and 15.3% - effective utilization of Internet marketing tools. Besides, the following factors were named as the facilitators for developing electronic service market: the necessity of communication and interaction policy (11.7%), guarantee mechanisms (10.7%), design of Internet stores (10.8%), government subsidies / support (9.9%). But 5.7% of the respondents have not expressed their opinions.

In order to reach the research aim, testing of the research hypotheses were planned. Cross-tabulation, chi-square, Anova test statistics through SPSS were used to test the hypotheses. These tools help in defining whether there are relations between the variables statistically valid. Correlation, and simple linear regression were also used for establishing the relations between the metric (interval) variables. It is ascertained whether the relation is statistically significant when  $\alpha=0.05$ .

Index forming mechanism:

Questions included the indicated blocks were chosen through the factor analysis.

Factor values were divided into 5 segments through multistage cluster analysis.

Weight of each question in determining the factor was ascertained through regression analysis, so that the factor was nominated  $[0;1]$  in the interval, where 0 means that all questions included in the factor get a nominal value, and 1 means that that all questions included in the factor get a maximal value.

$$Y = \frac{\sum_{i=1}^K B_i (x_i - x_{i,\min})}{\sum_{i=1}^K B_i (x_{i,\max} - x_{i,\min})}$$

$Y$  - Index value

$x_i$  - i-th question value into the block

$X_{i,min}$  - lowest value of a i-thquestion into the block

$X_{i,max}$  - highest value of a i-thquestion into the block

$B_i$  - Regression coefficient of i-thquestion into the block for factor determining

Statistical significant associations among the variables confirms Pearson Correlation, when  $\alpha=0.05$ . As it was discovered, each coefficient is significantly high in the table, which indicates to the positive relation.

The Pearson Correlation between the evaluation points of the Georgian civil, private and government agencies' websites and the evaluation points of the practical introduction and maintenance of the eGovernment equals to 0.547. This means that a cause-effect relationship is above the average, which means that there is a cause-effect relationship between two above-mentioned variables above average, since the high score of one variable causes the increase of the score of another variable.

The table below demonstrates that the highest correlation of the mentioned variable is with the variable of evaluation of the Georgian government web pages, and it is below the average with the rest of three variables (awareness on eGovernment processes, benefits of government services, evaluation of the eGovernment service system). Since the Sig 2-tailed level is 0.05, the relationship is significant and can be generalized on the general population (see Table 3).

Table 3. Pearson Correlations Coefficients

		please evaluate civil, private, and public agencies' websites in Georgia.	practical introduction and maintenance of the eGovernment	please assess your awareness index of eGovernment processes	please indicate your benefit index from the governmental services	please assess the government service system index	please assess Georgian governmental websites - index
Evaluation of Georgian civil, private and government agencies' websites	Pearson Correlation	1	0.547**	0.126**	0.198**	0.304**	0.515**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000
	N	1600	1600	1600	1600	1600	1600
Process evaluation of the practical introduction and maintenance of eGovernment	Pearson Correlation	0.547**	1	0.262**	0.255**	0.351**	0.553**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000
	N	1600	1600	1600	1600	1600	1600
Awareness index on eGovernment processes	Pearson Correlation	0.126**	0.262**	1	0.247**	0.127**	0.160**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000
	N	1600	1600	1600	1600	1600	1600
Benefits from the eGovernment services index	Pearson Correlation	0.198**	0.255**	0.247**	1	0.237**	0.229**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000
	N	1600	1600	1600	1600	1600	1600
Assessing government service system index	Pearson Correlation	0.304**	0.351**	0.127**	0.237**	1	0.424**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000
	N	1600	1600	1600	1600	1600	1600
Georgian governmental websites index	Pearson Correlation	0.515**	0.553**	0.160**	0.229**	0.424**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	1600	1600	1600	1600	1600	1600

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Linear regression analysis has been used to ascertain a solid linear relationship between the variables. Linear regression is used when there are one dependent variable and several independent variables. A determining coefficient that changes 0;1, shows that dependent variable can be explained by the independent variables (see Table 4). The determining coefficient is close to the average (0.366), but the relationship is significant. This argument confirms the Table 5, where the significance coefficient of the independent variable is less than 0.05 (see Table 5).

Table 4. Linear Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.366 <sup>a</sup>	0.134	0.125	0.13852

Each independent variable's value into dependent variable defines the Table 5, where the coefficient of awareness on eGovernment processes has the highest influence on the dependent variable, and amounts to 0.186, and the lowest influence has the coefficient of process evaluation of the practical introduction and maintenance of eGovernment. Moreover, the young group tends to the positive relationship because age influence coefficient is negative (see Table 5).

Table 5. Independent Variable Coefficient into Regression Analysis

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.245	0.038		6.512	0.000
Evaluating of practical introduction and maintenance processes of the eGovernment	0.102	0.048	0.090	2.132	0.033
Awareness on eGovernment processes	0.137	0.024	0.186	5.723	0.000
Evaluating eGovernment System	0.107	0.027	0.139	3.927	0.000
Age	-0,006	0.003	-0.064	-1.725	0.085

The factors were defined with the questions into the blocks through Factor analysis. Nine parameters of evaluation of the websites represent one factor, which has been ascertained by factor analysis. The Table 6 below shows correlation of each parameter (factor weight) with constituted factor. Factor weigh (correlation coefficient) is between -1 and +1, which means that 9 factors really represent one factor.

Table 6. Factor analysis for evaluating of Georgian civil, private and government agencies' websites (Component Matrix)

Components	Factor Weights
	1
Websites of business sector	0,612
Websites of ministries	0,770
Websites of legislative bodies	0,751
Websites of central government departments	0,758
Websites of local governments	0,599
Websites of non-governmental sector	0,658
Websites of higher and general educational institutions	0,698
Websites of civil sector	0,654
Websites of international organizations situated in Georgia	0,687

The population was divided into 5 segments through multistage cluster analysis. The table below (see Table 7) summarizes the results: Evaluation mean value, segment, standard deviation, and standard error of mean. The lowest value is 16.8%, index value is 0.44, which is not low, but comparing with the average it is still low. 16.7% of the respondents assessed below the average, and index value is 0.56. 45.76% of the respondents evaluated the index as average, and value index - 0.66, which is high comparing with the average. 15.4% of the respondents assessed above average, index - 0.77, which is very high in comparison with the average. 5.92% of the respondent assessed very high, index - 0.91, which is very high in comparison with the average.

Table 7. The evaluation of Georgian civil, private and government agencies' websites

Please evaluate Georgian civil, private and government agencies' websites	Evaluation Index	Evaluation Segment	Std. Deviation	Std. Error of Mean
1 very below the average	0,4438	16,85%	0,10	0,01
2 below the average	0,5641	16,07%	0,02	0,00
3 average	0,6620	45,76%	0,03	0,00
4 above the average	0,7760	15,40%	0,03	0,00
5 very above the average	0,9164	5,92%	0,05	0,01
<b>Total</b>	<b>0,6421</b>	<b>100,00%</b>	0,13	0,00

Dispersion analysis shows the relationship and whether the segments really differ from each other with the indexes (Website evaluations indexes).

Fisher's method was used to determine the values, which shows dispersions between and within groups. Confidence in evaluation of the Georgian civil, private and government agencies' websites is less than 0.05, confirming that the groups really differ from each other (see Table 8).

Table 8. Anova on Evaluation Index of Websites

		Sum of Squares	df	Mean Square	F	Sig.
Evaluation of the Georgian civil, private and government agencies' websites	Between Groups	13,443	4	3,361	1279,758	0,000
	Within Groups	2,340	1600	0,003		
Evaluation of the Georgian civil, private and government agencies' websites	Total	15,783	1600			

Each segment has been described using the parameters included in factor analysis.

The evaluation of the Georgian civil, private and government agencies' websites through Cross-tabulation is shown in the Table 9. Into groups below the average are those respondents who have received points average and below the average, according to the parameters. From 20% to 25% have below the average. Those respondents, who received average in one parameter, they received below the average in others. This development determined the respondents' place in the segment below the average, the number of which composed the first two groups of clusters - very below of average and average (see Table 9).

The evaluation of 14 parameters represents one factor, which has been ascertained through factor analysis. The table 10 below demonstrates correlation of each parameter (factor weight) to constituted factor. Factor weight (correlation coefficient) is between -1; +1, which means that 14 parameters really represent one factor.

Table 9. Population segments according to evaluation of the Georgian civil, private and government agencies' websites (in 5 sections)

		civil, private and government agencies' websites in Georgia (Segment)					
		1 very below the average	2 below the average	3 average	4 above the average	5 very above the average	Total
		Column N %	Column N %	Column N %	Column N %	Column N %	Column N %
Websites of business sector	1 very good	2,7%	9,1%	11,7%	26,8%	70,6%	16,0%
	2 good	9,3%	33,3%	60,6%	66,9%	21,6%	43,8%
	3 average	72,0%	51,5%	25,9%	6,3%	5,9%	35,0%
	4 bad	12,0%	5,3%	1,4%	0,0%	2,0%	4,0%
	5 very bad	4,0%	0,8%	0,4%	0,0%	0,0%	1,1%
Websites of ministries	1 very good	0,7%	4,6%	12,7%	46,0%	96,2%	20,5%
	2 good	10,6%	30,0%	73,0%	50,4%	1,9%	45,2%
	3 average	71,5%	61,5%	14,3%	2,9%	1,9%	30,3%
	4 bad	12,6%	2,3%	0,0%	0,7%	0,0%	2,9%
	5 very bad	4,6%	1,5%	0,0%	0,0%	0,0%	1,1%
Websites of legislative bodies	1 very good	0,7%	1,6%	9,8%	32,6%	90,6%	16,4%
	2 good	8,1%	26,0%	65,2%	62,9%	7,5%	42,4%
	3 average	76,4%	67,7%	24,3%	4,5%	1,9%	37,1%
	4 bad	10,1%	3,9%	0,7%	0,0%	0,0%	3,0%
	5 very bad	4,7%	0,8%	0,0%	0,0%	0,0%	1,1%
Websites of central government departments	1 very good	0,0%	2,5%	8,5%	26,0%	84,6%	14,5%
	2 good	6,7%	23,5%	57,3%	69,5%	15,4%	40,2%
	3 average	67,8%	67,2%	32,7%	3,8%	0,0%	38,1%
	4 bad	17,4%	5,0%	1,5%	0,8%	0,0%	5,2%
	5 very bad	8,1%	1,7%	0,0%	0,0%	0,0%	2,0%
Websites of local governments	1 very good	0,7%	0,0%	4,7%	6,8%	41,5%	6,1%
	2 good	1,3%	16,4%	21,5%	63,9%	35,8%	25,3%
	3 average	58,7%	54,1%	62,0%	26,3%	22,6%	50,7%
	4 bad	24,7%	23,0%	10,9%	3,0%	0,0%	13,5%
	5 very bad	14,7%	6,6%	0,7%	0,0%	0,0%	4,4%
Websites of non-governmental sector	1 very good	0,0%	3,2%	6,0%	12,3%	51,0%	8,7%
	2 good	6,8%	20,2%	40,7%	71,5%	45,1%	36,1%
	3 average	62,3%	65,3%	50,4%	14,6%	3,9%	45,5%
	4 bad	22,6%	10,5%	2,8%	1,5%	0,0%	7,9%
	5 very bad	8,2%	0,8%	0,0%	0,0%	0,0%	1,9%
Websites of higher and general educational institutions	1 very good	1,3%	4,0%	9,1%	27,1%	73,1%	14,3%
	2 good	8,0%	29,0%	62,2%	63,9%	25,0%	43,7%
	3 average	66,0%	55,6%	27,7%	9,0%	1,9%	34,8%
	4 bad	17,3%	10,5%	0,7%	0,0%	0,0%	5,4%
	5 very bad	7,3%	0,8%	0,3%	0,0%	0,0%	1,7%
Websites of civil sector	1 very good	0,7%	0,9%	3,5%	10,2%	54,9%	7,4%
	2 good	4,7%	19,7%	48,4%	74,8%	41,2%	38,5%
	3 average	69,3%	66,7%	42,2%	14,2%	3,9%	44,2%
	4 bad	17,3%	11,1%	5,0%	0,8%	0,0%	7,5%
	5 very bad	8,0%	1,7%	0,8%	0,0%	0,0%	2,3%
Websites of international organizations situated in Georgia	1 very good	0,0%	3,3%	14,9%	22,9%	86,5%	16,5%
	2 good	4,7%	36,7%	45,9%	68,7%	13,5%	37,4%
	3 average	68,7%	50,8%	36,5%	8,4%	0,0%	37,9%
	4 bad	16,7%	6,7%	1,2%	0,0%	0,0%	5,1%
	5 very bad	10,0%	2,5%	1,6%	0,0%	0,0%	3,1%

Table 10. Factor analysis on process evaluation of the practical introduction and maintenance of eGovernment

Components	Component
	1
Information rights of the citizens	0,676
Regulation of the telecommunication service	0,670
Regulation of Internet providers	0,696
Accessibility of telecommunication and Internet infrastructure for all citizens	0,616
Collaboration between the government and business sector	0,715
Collaboration between the government and non-government sector	0,672
Safe Internet environment	0,675
Effective online services of the government	0,709
Variety of online services of the government	0,687
Full computerization and Internetization of the country	0,639
Information literacy	0,670
Technological progress at a level of the country	0,682
Progress throughout at a level of the ministries	0,636
Progress at a level of the local governments	0,668

On the basis of the marketing research results, the favorable and unfavorable factors of developing the digital environment in Georgia, as well as potential and possible threats have been revealed (see Table 11).

### CONCLUSIONS AND SUGGESTIONS

The existing challenges require adapting and keeping up with the change. Governments that are obliged to ensure growth and prosperity should constantly change old models of development and strategy in order to derive benefits from digital transformation because technologies are developing [27].

The essential problem is to transfer business processes into the digital format. Under the conditions of rapid technological development, organizational and professional skills have been developed slowly. Besides, the gap between rapidly developing technologies and slowly developing human resources has increased more and more.

While discussing digital economy of Georgia it should be considered that the country today:

- adopts digital space and consequently gets benefits from the digital environment;
- develops e-commerce, supports digital integration and the growth of economic activities in digital environment;
- although it does not own an united policy towards formation of digital market, it facilitates yet in creating workplaces by the digital business environment with programs and political mechanisms; creates conditions for increasing digital technological impact on productivity of labour, efficiency, and creating new workplaces;
- technologies represent not a leading direction but the sub-direction in the 2017 state budget of Georgia, and therefore the sum total for developing this field is not enough [28].

**In sum, for building digital economy in Georgia, it is needed:**

- to study ICT influence on the society with the purpose of shortening digital inequality, and to develop strategic approaches on the basis of the research;
- to carry out supporting programs for digital inclusion;
- to implement a digital literary policy; to inform the society, teach, and actively promote, measures for increasing digital skills and competences;
- to form program infrastructure and online jobs; every governmental level should help regions, municipalities, villages (and vice versa) [28];
- to develop supporting programs for commercialization of digital innovations, laboratories of digital technologies, policy and strategy for developing digital regions;
- to create local alliances with such organizations as: start-up society, educational institutions, civil society, schools, government, local industry, small business, digital inequality activists [29];
- to intensify legal norms for increasing online social-ethical responsibility;

Table 11. Favorable and unfavorable factors of developing the digital environment in Georgia, potential and possible threats

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>▪ Tight international relations</li> <li>▪ Political will and peaceful society</li> <li>▪ Efforts to introducing eGovernment system by the government authorities</li> <li>▪ Constant growth of e-service developments by the government</li> <li>▪ Variety of applications of e-services</li> <li>▪ High level of perception of eGovernment benefits by consumers</li> <li>▪ Social expectation and desire</li> <li>▪ Concerted activities and coordinated actions between the center and regional structural units as links of the value chain</li> <li>▪ Material and technical basis</li> <li>▪ Culture and compulsory requirements of e-services</li> <li>▪ Rich local resources for identification of problems and their resolution</li> <li>▪ Correlation between effective strategic administration and e-services implementation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Incomplete service by government authorities' websites</li> <li>▪ Low awareness on e-service opportunities and features</li> <li>▪ Low intensivity of updated information on government websites</li> <li>▪ Delayed process of computerization and Internetization</li> <li>▪ Lack of branding component</li> <li>▪ Heavy socio-economic situation and high price of the Internet</li> <li>▪ Weak growth of Internet commerce</li> <li>▪ Low awareness of eGovernment services</li> <li>▪ Lack of mobile government applications</li> <li>▪ Difficulties in the legal system</li> <li>▪ Weak economic growth , dependance on foreign investments</li> <li>▪ Lack of supporting programs, infrastructure, funding research centers working on technologies and innovation progress</li> <li>▪ Regional economic and infrastructure disproportion</li> <li>▪ Lack of legal formation of digital policy and regulation initiatives</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>▪ Technological, socio-economic and political development of Georgia</li> <li>▪ New markets</li> <li>▪ Technological, and socio-economic integration with neighbour countries</li> <li>▪ Direct and indirect economic effect</li> <li>▪ Growth of Internet quality</li> <li>▪ Attractive investment environment</li> <li>▪ Flexibility of the society and government toward changes</li> <li>▪ Development of Internet service and Internet applications</li> <li>▪ Accessibility of mobile Internet network and coverage throughout 98% of the populated territory in Georgia</li> <li>▪ Administrative resource</li> <li>▪ Growth of the Internet market potential</li> <li>▪ Growth of Internetization and computerization among the population</li> <li>▪ Online accessibility in public areas (school, university, library, recreation parks, squares)</li> <li>▪ Growth of citizen interests towards e-services of the government</li> </ul>	<ul style="list-style-type: none"> <li>▪ Information occupation, information genocide, information aggression</li> <li>▪ Information as a disinformation tool</li> <li>▪ Deficit of qualified specialists in villages /towns</li> <li>▪ Vague and unorganized image of the eGovernment</li> <li>▪ Changes in socio-economic, cultural, and political environment</li> <li>▪ Global threats</li> <li>▪ Global cyber threats</li> <li>▪ Technological changes</li> <li>▪ Seismic political environment</li> <li>▪ Economic crises and cyclic fluctuation</li> <li>▪ Unstable social conditions and deep inequality</li> <li>▪ Conflict regional environment</li> </ul>

– digital processes to assist in integration and convergence of some markets. Accordingly, united functionality of digital technologies equals to ecosystem; Before convergence, different technologies operated independently of one another: telephones had one function, televisions another, radios a third; computers still another, and so on. But convergence has caused homogeneity (uniformity); The convergence of the telecommunication, broadcasting and IT sectors is reshaping the communication market; It should be also noted the convergence of fixed, mobile, terrestrial and satellite communications [30].

– to consider the creative industry (films, music, TV series, software, databases, press, literature, photographic and cinematographic instruments, etc.), the importance of keeping jobs, and contribution of the mentioned industry to GDP, while building digital economy [31].

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## CRYPTOGENIC STROKE AND PFO SIZE (CASE REPORT)

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### ABSTRACT

**Purpose:** This case have analyzed the most suitable strategy for the diagnosis and quantification of PFO, for its assessment in clinical practice. We conducted one case for demonstration PFO, as general reason of presenting transient ischemic stroke and to rule out any other condition. PFO is persistence of a embryonic defect in the intraatrial septum. In Patent foramen ovale is the most common cause of paradoxal embolism in cryptogenic stroke. Hemodynamic alteration play a major role in determining the chances of paradoxal embolization, elevated right atrial pressure will increase the chance of right-to-left shunt

**Case:** Patient,44 old women, was admitted in emergency department with coma. Brain MRT detected multifokal area of acute stroke in both hemisphere, cerebellum, brain stem, gliosis in right lobar lobe and basal ganglias. Transthoracal contrast echocardiography detected agitated saline contrast passage from right to left atrium. TEE revealed little, 1mm width and 4mm length hole of intraa trial septum (Pic.1). After agitated saline contrast injection (bubbling) via the central vein catheter was detected provision of right heart with contrast and trustworthy signs of right to left shunt. This examination has determined patent foramen ovale.

**Conclusion:** patent foramen ovale (PFO) has been implicated in the pathogenesis of cryptogenic stroke through paradoxal embolization to the cerebral circulation. This case evaluated the relationship between morphological and functional size of the PFO by echocardiography compared with cerebral infarct volume identified on MRI. small size PFO was associated with significant strokes in brain. This case also have been analyzed the most suitable strategy for the diagnosis and quantification of PFO, for its assessment in clinical practice.

**Keywords:** patent foramen ovale, paradoxal embilism, cryptogenic stroke.

### INTRODUCTION

PFO is persistence of an embryonic defect in the intraatrial septum. In Patent foramen ovale is the most common cause of paradoxal embolism in cryptogenic stroke or platypnea-orthodeoxia syndrome (postural hypoxemia with breathlessness). Paradoxal embolism from right to left passage through a patent foramen ovale is correctable cause of stroke. Hemodynamic alteration play a major role in determining the chances of paradoxal embolization, elevated right atrial pressure will increase the chance of right-to-left shunt. Paradoxal embolization is reported in PE patient.patient with right ventricular infarction or severe tricuspid regurgitation or mechanical left ventricular assist device have increased risk of right-to left shunt through a PFO.Pelvic vein thrombi are reported to be found more frequently in young patient with cryptogenic stroke.Possible treatment modalities to prevent recurrent events ,treatment with warfarin or antiplatelet agents, percutaneous PFO closure(PFO occluder) or surgical closure. This case has analyzed the most suitable strategy for the diagnosis and quantification of PFO, for its assessment in clinical practice. We conducted one case for demonstration PFO, as general reason of resenting transient ischemic stroke and to rule out any other condition.

### CASE

Patient ,44 old women ,was admitted in emergency department by ambulance,with headache, vomiting. at home ambulance detected convulsion. In history patient had episodes of sinkope. CT scan did not revealed acute intracerebral process in brain. Neurological status: spontaneous eye opening, localization of pain stimuli. Patient was intubated and was started mechanical ventilation. CSF was without sighns of infection.

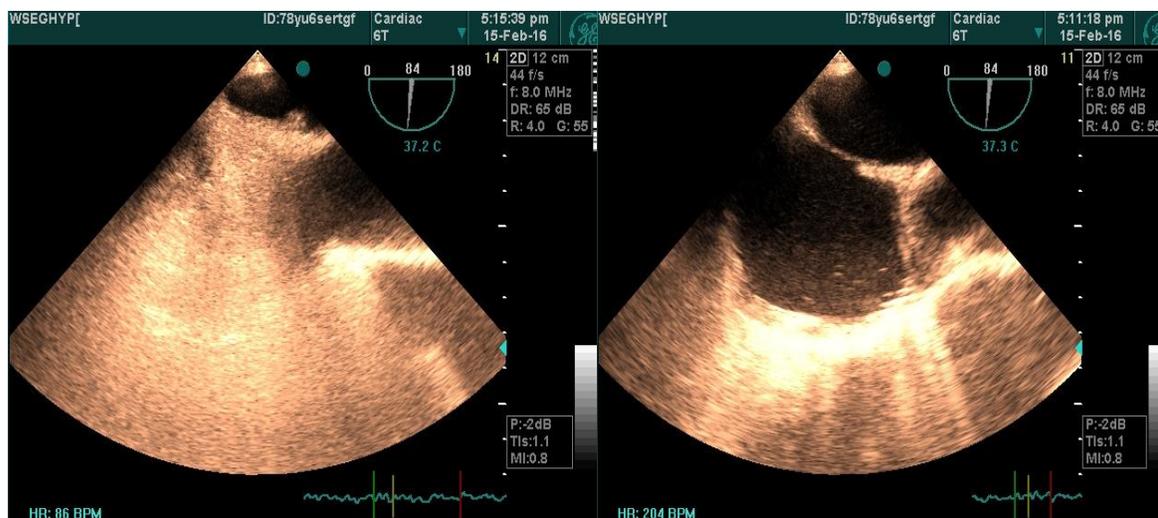
EEG revealed polymorphic dysrhythmia, with interhemisp here activity and without specific pathological activity.

Brain MRT detected multifocal area of acute stroke in both hemisphere, cerebellum, brain stem, gliosis in right lobar lobe and basal ganglias.

By Lower extremities vessel ultrasonography was detected normal blood flow in superficial and deep veins, without thrombosis.

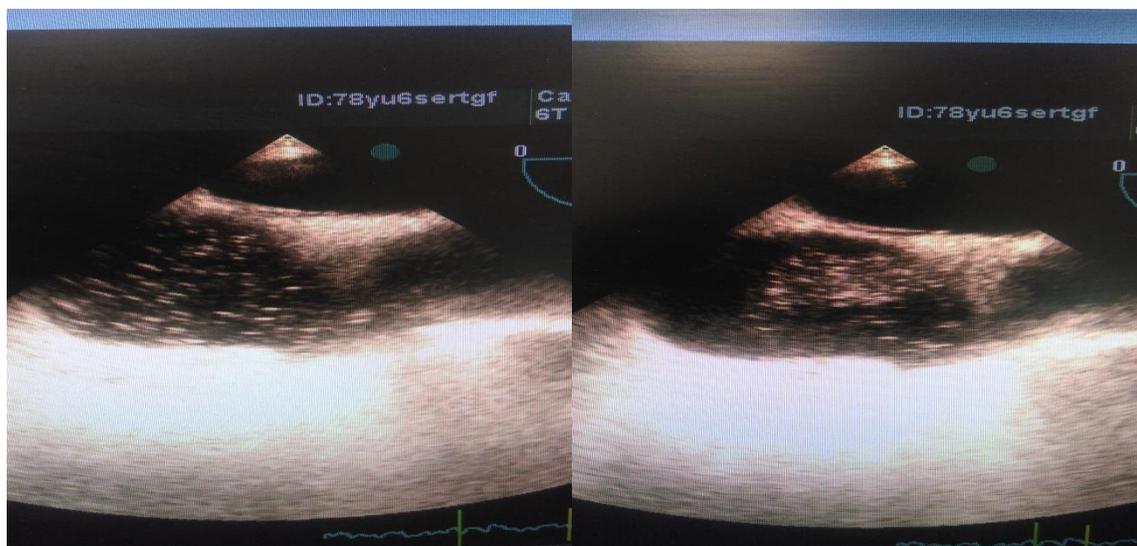
Intracranial vessels ultrasound evaluation revealed decreasion blood flow in subclavian and carotid arteries without hemodynamically important stenosis of this vessels. In brain arteries, basilar arteries, intracranial segment of vertebral arteries blood flow velocity and resistance indexes was symmetrically decreased.

Transthoracal contrast echocardiography detected agitated saline contrast passage from right to left atrium. PFO was judged after appearance of microbubbles in the left cardiac chamber. For verification of intraarterial septal defect was performed transesophageal echocardiography(TEE).



Pic. 1.TEE

The defect of intraatrial septum or intraventricular septum was not detected, but revealed little, 1mm width and 4mm length hole of intraatrial septum(Pict1). After agitated saline contrast injection (bubbling) via the central vein catheter was detected provision of right heart with contrast and trustworthy signs of right to left shunt >20 bubbles. (Pic. 2). This examination has determined patent foramen ovale. The severity of the shunt was quantified as moderate (10-20microbubbles).



Pic. 2.TEE after agitated saline

## DISCUSSION

Paradoxal embolism through a PFO was first described in 1877 during an autopsy. higher stroke rates also have been associated with the presence of an atrial septal aneurysm(ASA),dissections of the carotid and vertebral arteries ar now recognized as relatively common causes of strokes.Hyperhomocysteinemia associated with greater risk of stroke(cohort and case control studies).Venous thrombosis is believed to be the source of paradoxal embolism in cryptogenic strokes associated with PFO, higher incidence of pelvic thrombosis is identifiable causes of cryptogenic stroke, PFO as a conduit for paradoxal embolization, there are occasional case reports demonstrating venous thrombi trapped in a PFO in patients with central or systemic embolization. Nevertheless, other possible mechanisms of stroke cannot be excluded. According our example vessels ultrasonography did not detect thrombosis. Given that a PFO can be a tunnel-like structure with possibly a stagnant area of flow, in situ thrombus formation may occur. Also, patients with PFO may be susceptible to atrial arrhythmias with possible intra-atrial thrombus formation, leading to stroke.

It is logical to assume that larger PFO would be associated with an increased frequency of cryptogenic stroke, but data have been conflicting. It is possible for a large stroke to occur with a small PFO as according our case.

Transthoracic echocardiography and transesophageal echocardiography with saline contrast injection are used to detect PFO, PFO is judged to be present if any microbubble is seen in the left cardiac chamber within 3 cardiac cycles from the maximum right atrial opacification. Our evaluation of heart chambers after agitated saline injection detected right to left passage of bubbles.

Possible treatments modalities to prevent recurrent events include medical treatment with warfarin and antiplatelet agents, percutaneous PFO closure and surgical closure. Randomized studies comparing medical and percutaneous closure approaches are underway.

According to AHA/ASA guidelines 1. For patient with an ischemic stroke or TIA and a PFO, antiplatelet therapy is reasonable to prevent a recurrent event (ClassIIa, Level of Evidence B), 2.PFO closure may be considered for patient with recurrent cryptogenic stroke despite optimal medical therapy (ClassIIa, Level of Evidence C). Patient was treated with anticoagulants and antiplatelet drugs. After suitable treatment and management of all complications patient state was improved and discharged from hospital with good condition and appropriate recommendations.

## CONCLUSION

Patent foramen ovale (PFO) has been implicated in the pathogenesis of cryptogenic stroke through paradoxical embolization to the cerebral circulation. This case evaluated the relationship between morphological and functional size of the PFO by echocardiography compared with cerebral infarct volume identified on MRI. Small size PFO was associated with significant strokes in brain. This case also has been analyzed the most suitable strategy for the diagnosis and quantification of PFO, for its assessment in clinical practice.

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## DEVELOPMENT OF THE NON-PERFORMING SECTOR OF INDEPENDENT AZERBAIJAN

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### ABSTRACT

Minimizing dependence on oil, Azerbaijan uses its natural resources, gains success in diversification in economics. Main branches in the non-oil sector in Azerbaijan are agriculture, tourism, informational-communication technologies and so on. Rapid development of tourist infrastructure brings big profit in the direction of non-oil sector. Rapid development of tourist infrastructure brings big profit in the direction of non-oil sector.

At present this sector forms about 70% of GDP. This is a good index of diversification. This is a good index of diversification.

**Keywords:** economic development, non-oil sector, rivalry ability, diversification, profit, leading power, development of agrarian sector.

### INTRODUCTION

In recent years, the oil sector has played a leading role in the rapidly developing economy of Azerbaijan. In general economic growth, the non-oil sector has come to the forefront in recent years. Macroeconomic indicators of the non-oil sector in recent years are increasing day by day. The strategy, aimed at channeling oil profits to diversify the economy, justifies itself. Azerbaijan, using its natural resources, at the expense of revenues derived from the sale of these resources, succeeds in diversifying the economy and minimizing its dependence on oil. The main priority sectors in the development of the non-oil sector in Azerbaijan are agriculture, tourism, information and communication technologies, and manufacturing. International financial institutions emphasize the importance of the agricultural and tourism industries. For this reason, for the development of agriculture in the country, consistent state programs are being implemented, reforms are being implemented, and new technologies are being used. The rich tourist potential of Azerbaijan and the rapid development of the tourist infrastructure bring big revenues for the country towards the non-oil sector.

The products of the non-oil sector produced in Azerbaijan, electrical machinery and equipment, spare parts, chemical products, building materials, ready-made textile products, etc., are exported to various regions. According to the relevant decrees and decisions to implement measures to diversify the economy, the head of state adopted the following programs: "State Program for Socio-Economic Development in 2009-2013-s of Economic Regions of the Republic of Azerbaijan", "State Program for Poverty Reduction and Sustainable Development in the Republic of Azerbaijan In 2008-2015 ", " State program on the reliable provision of agricultural products to the population of the Republic of Azerbaijan in 2008-2015 "and other programs. These programs have been successfully implemented.

The non-oil economy in Azerbaijan continues to maintain a high growth rate, and for the near term, economic prospects are generally positive.

The trend of sustainable development, observed in the non-oil sector of Azerbaijan in recent years, is taken into account by international rating agencies as a basis for raising the country's rating.

One of the main factors influencing the above changes is the sustainable development of the non-oil sector. The next result of the strategy aimed at economic diversification, the development of the non-oil sector is the fact that Azerbaijan ranked 55th among the participating countries in the ranking of the World Economic Forum's competitiveness in Davos, while the first among the CIS countries.

Thus, Azerbaijan is successfully using its rich oil and gas fields to achieve long-term and sustainable economic development. The strategy of transforming "black gold" into the leading force for the development of the non-oil sector - human capital, continues to bear fruit, and by using oil and gas revenues, building a strong, competitive economy in the future independent of these incomes.

In order to ensure the sustainable development of the non-oil sector, create favorable conditions for the development of competitive industrial production on the basis of innovations and high technologies, the opening of industrial enterprises based on modern technologies, the maintenance of entrepreneurship and the expansion of employment in the production sectors, in 2011 decrees and orders of the President of Azerbaijan Republic on the creation of the Sumgait park of the chemical industry and the Balakhani industrial plant which was the beginning of a new period in the industrialization of the country.

The state pays special attention to the social and economic development of the agrarian sector of the regions. This leads not only to the growth of its share in the country's economy, but also to its transformation into one of the main profitable sectors.

"The State Program for the Development of Viticulture in the Republic of Azerbaijan in 2012-2020" provides for the accelerated development of the agrarian sector and creates favorable conditions for satisfying the population's needs for agricultural products through local production and the transformation of Azerbaijan into one of the exporters of this product.

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In the context of globalization, the pace of change in economic and economic processes, the replication of innovative innovations, their application in the production sphere with the activation of innovative activity on a qualitatively new plane is unthinkable accelerating all over the world. In fact, this is the "positively charged" effect of globalization, which allows an increasing number of countries to become involved in advances in innovation, advanced technical standards and new management practices. According to forecasts, the growth of the world economy in the near and medium-term future will occur as a result of the influence of this factor. It is expected that in the coming years world trade will grow at a faster pace than production, along with globalization, regional integration will also expand. It is expected that new standards of international trade, competition, intellectual property and the environment will be established, and the role of international organizations in this direction will increase. Global and regional competitiveness is expected to grow in countries that prefer specialization in international markets, developing production technologies and innovation potential and thus stimulating areas that create high added value. The development of industry based on innovation will become possible due to the strengthening of scientific and technological potential and the expansion of educational opportunities. It is necessary that developing countries achieve economic growth based on productivity and form new manufacturing industries with a comparative advantage.

In such conditions, the main task facing Azerbaijan is to prevent its lagging behind in the process of development of the countries of the world. And this, first of all, requires, eliminating the existing dependence on hydrocarbon resources in the economy, constantly keeping the focus on such an important issue as preventing the threat of transformation in the medium and long term into a raw material appendage and technological "outsider" of the world economy. Over the last decade, the hydrocarbon export factor has been the main driver of economic growth, but the main task at the present stage is to achieve the advanced development of the non-oil sector, to increase the efficiency and competitiveness of the economy, and to ensure its progress on an innovative basis.

Putting the appropriate requirements into the formation of the economic model leads to a radical change in the education system, the importance of such components of education as supplementary and lifelong education, and also increases the role of ICT and virtual learning, knowledge in the field of computer networks in an expanding scale every day. At the same time, the importance of intellectual property will increase, the main mission of which is to support the stimulation of creativity and innovation, market regulation.

For Azerbaijan, this opens up new opportunities from the point of view of foreign economic integration and, at the same time, sets the task in social and economic development to give priority to the universal peace context, to go beyond local regional frameworks, to benefit from participation in economic ties and markets of various economic spaces. At the present time, the share of developing economies as a destination and source of foreign direct investment is growing. It is predicted that in the post-crisis period, the economic growth rates of high-income countries will be about half that of developing countries. As a result, developing countries will become the main locomotive of global economic growth.

Azerbaijan - 2020: Strategic View and Main Priorities The main strategic view of the concept is to achieve the development stage, taking into account existing opportunities and resources, characterized by the full provision of stable economic growth and high social welfare in Azerbaijan, effective public administration and the rule of law, all human rights and freedoms, Active status of civil society in the public life of the country.

In 2020, Azerbaijan will become an economically and politically developed, competitive country. Even in the most remote villages of Azerbaijan, all communication, health and education services necessary for comfortable daily life will be provided. Azerbaijan will become a country with high incomes, minimal unemployment, highly developed human capital, a protected and healthy environment, wide opportunities for every citizen. As a result of the implementation of the measures envisaged by the concept, by the end of the period the country's GDP per capita will more than double and reach \$ 13,000.

From the point of view of economic development, the status of the Republic of Azerbaijan will be raised from the state leader of the region to a highly competitive participant in the system of international economic relations. For this purpose, taking into account the favorable geographical position and wide potential, it is planned to turn the country into a shopping center of the region, to bring the per capita export volume in the non-oil sector to \$ 1,000. The guiding principles for achieving these goals will be effective state regulation that ensures healthy competition in a market economy, transformation into a rationally energy-efficient and high-value-added export-oriented economy and an integrated approach to the development of social and economic spheres. Within the framework of the concept, the goal is to transform the country's economy as a result of increasing the overall productivity of production factors in an economy based on efficiency, and ensuring a transition to a stage characterized by a predominance of innovations. Increasing the competitiveness of the economy includes such areas as protection of macroeconomic stability, strengthening coordination of monetary and fiscal policies, improving the business environment and supporting private initiative, developing the financial services market, improving foreign trade and investment policies. During this period, it is planned to maintain inflation at an acceptable level, to implement a gradual transition to a more flexible exchange rate regime. At the same time, measures aimed at improving the structure of the economy will be carried out purposefully. The modernization of the oil and gas sector and the petrochemical industry, the diversification and development of the non-oil industry, the expansion of the use of alternative and renewable energy sources, the development of the private sector and the enhancement of food security, the expansion and development of trade and services, and the improvement of the structure of foreign trade and investment will be priority areas. The goal is that in the period covered by the concept, the average annual real GDP growth in the non-oil sector will exceed 7 percent.

Along with the rapid development of the non-oil industry, the encouragement and expansion of innovative activities, will create a fertile ground for the formation of a knowledge-based economy in the country. Full and maximum effective use of all the country's capabilities, available economic, social and political resources, creating conditions for strengthening the potential of the republic are important conditions for achieving the set goals. From this point of view, the development of energy, transport, transit and logistics infrastructure is envisaged, constant attention to the development of regions, the formation of regional development centers, taking into account the competitive advantages of each region, the development of infrastructure and social services in urban and rural areas. As one of the main priorities for the formation of Azerbaijan as a modern state, the creation of a reliable security system aimed at enhancing the use of ICT and communication services and the development of information and communication technologies, the formation of national standards will be at the center of attention.

World experience shows that countries with a strong middle layer are more stable in political, economic, social and other aspects and have a higher development potential. The quantitative and qualitative indicators of the population and its structures are the main elements of the national strength, and such issues as the preservation of the gene pool of the Azerbaijani people, migration and demography are important from the point of view of national security.

### **CONCLUSION**

The formation of an economic model based on effective state regulation and mature market relations, the achievement of the social and economic goals set within the framework of the concept stipulates the formation of an efficient economic system with a high efficiency, which has sufficient competitiveness on a global scale. Historical and modern experience shows that such a system can exist only in conditions of market relations based on an entrepreneurial initiative and free competition. At the same time, ensuring a stable high growth rate in the economic and social spheres requires an adequate organization of state regulation in a market economy and its further improvement, taking into account the latest trends and trends in the global world economy.

To stimulate the use of innovative technologies at industrial enterprises, to create specialized industrial towns and industrial towns of general purpose. The formation of industrial towns infrastructure in economic regions will be the main direction of the state investment policy for the development of non-oil processing industry.

At present, the non-oil sector accounts for almost 70% of GDP. This is a good indicator of diversification. In 2017-2018, the non-oil sector of the country's economy is awaiting a very active development.

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## IMPLEMENTATION OF FOREIGN EXPERIENCE IN REFORMING UKRAINE'S PENSION SUPPORT SYSTEM

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### ABSTRACT

The solidarity pension support system of Ukraine inherited from the Soviet Union has already been one of the main objects of criticism in the society for 26 years of independence. Ukrainian pensioners believe that their assigned pensions are too low, the working population states that their premiums are high, and oversea and European advisers have expressed their dissatisfaction with the chronic budget deficit of the Pension Fund of Ukraine (PFU) and insist on a gradual increase of the retirement age for the citizens to balance it. In recent years, the current pension system is in a state of «permanent reforming» the necessity of which is caused not only by moving to a market economy relations, but also finding new models of the pension support due to the demographic pessimistic prospects of our country in the future.

The most significant achievement of the reforms was the transition to the multi-level model of the pension support system in 2004 which was developed in the early 90s of the last century by the World Bank and has been successfully tested in many countries of Europe and the world. However, the main threat to the pension systems of most countries is the «revolution of aging» of population that covered Ukraine. Therefore, the specifics of social and economic and demographic situation in Ukraine demands the necessity of justification of fundamentally new model of multi-level pension system that best takes into account the positive international experience of reforming the pension support system, on the one hand, and on another hand the specific Ukrainian mentality, the existing state of the national economy and social moods in the modern Ukrainian society.

**The purpose of the article** is the research and generalization of foreign experience of reforming the pension support systems, identifying common and distinctive features of national pension systems in OECD member states and justification on the basis the recommendations for further reforming the national pension support system.

Having examined the features of functioning the pension systems of OECD member countries, we can distinguish their differences and similarities with the domestic pension system:

- the pension system in most of these countries (except New Zealand and Australia), as well as in Ukraine consists of three levels;
- the coexistence of mandatory and voluntary components of the accumulating funded pension system that complement each other and enable to provide a decent level of material security of citizens after their retirement;
- the promotion of development of the private pension insurance preserving a strict control for the control of non-state pension funds from the state. In some countries the government manages the resources of the accumulating funded pension system through a specially authorized institution;
- for the OECD member countries and a number of other European countries five main types of models of administering the collection of insurance premiums are characterized;
- some parity in the distribution of the fiscal burden of paying contributions for pension insurance between the employers and the employees, as well as a significant degree of differentiation of insurance premiums in individual countries;
- the retirement age in most OECD member countries is set no lower than 65 for men and 60 for women;
- early retirement is granted for 2-5 years earlier if a person meets certain requirements, including a required minimum insurance period;
- for each full or partial month (quarter, year) of the early retirement age the early pension amount is reduced by early fixed percentage;
- the deferred retirement is stimulated by its increase (the rate increase is ranging from 4.2% to 12% for every additional year of service), the term of the deferral is from 1 to 5 years with the possibility of a combination of old-age pension with the income from employment;
- narrowing the scope of the accumulating funded component of the pension system up to the complete abandonment of its use because of its unstable financial situation and the negative impact on the state budget.

Positive international experience of reforming the pension system should be used only after a thorough examination and its maximum adaptation to the local domestic conditions in order to avoid possible negative effects related primarily to the differences not only in the economic, regulatory, legal and institutional support of social processes but in the income and mentality of the population.

**Keywords:** pension system, international experience, OECD, pension reform, retirement age, insurance premiums.

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## PROPHYLAXIS AND PSYCHOCORRECTION OF INCREASED SUGGESTIBILITY IN ADOLESCENCE

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### ABSTRACT

The modern social reality requires from the individual such changes that will maximally promote the disclosure of individual and unique potential, increase of indicators of normative behavior and social adaptation to the requirements of society. Violation of social adaptation of personality closely associated with variations in depth personal development, the formation of certain complex of symptoms that give rise to propensity to various forms of addicted behavior. Such state of provision of social reality has become crucial in plan of acceptance of a set of legal instruments for educational space (the Law "On Education" Ukraine XXI Century ") and regulations aimed at the social, psychological and educational support for young people, including youth identity.

It is in the youthful age the focus of scientists focused on personal development, establishing its place in the world, the formation of ideology and its influence on cognitive activity, self-awareness and moral consciousness. In the last years scientists pay attention to the study the phenomenon of suggestibility. The writings of local and foreign researchers variously understood the role and place of suggestibility in the development of the individual. In scientific results can be traced several areas to study suggestibility as psychoanalytic (L. Shertok); socio-psychological (V. Byehtyeryev, V. Kulikov). As part personal approach, a large number of works that have limited understanding of suggestibility idea of it as a tool for psychotherapeutic effects (K. Mudzybayev, A. Slobodyanyk). In scientific studies suggestibility was described as primarily emotional phenomenon of nature, which is formed in the subconscious and is characterized by a number of specific features (V. Cossack, V. Kondrashov, M. Linetsky). Features and causes psychological dependence reflected in the works (A. Ayvazova, E. Miller); individual study and consideration of human subjects own life (L. Vygotsky); reflex theory of physiological phenomena and the study of suggestion (P. Bul); theory of settings (D. Uznadze); definition of suggestibility as an adaptive response of the individual forms of mental (O. Zaharov).

Despite the urgency of the issues studied, we can state that issues as suggestibility determinants addicted behavior, until recently studied enough in both educational and developmental psychology and social psychology.

Joining the individual in a social environment, learning behavior, moral values carried by the mechanism of suggestion. It is the mechanism of suggestion can learn growing up personality and antisocial behavior addicted (V. Kovalov, I. Manilov, A. Misko).

**Keywords:** psychology, addiction, suggestibility.

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## HAZOP STUDY ON OIL REFINERY WASTE WATER TREATMENT PLANT IN KARACHI

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### ABSTRACT

The disposal of Refinery wastewater has various hazards before and after treatment which needs to be properly analyzed by using different risk assessment tools. The main purpose of this work is to study the oily waste water from one of the biggest Refinery located in Karachi, Pakistan by applying Hazard and Operability Study (HAZOP) on it in hypothetical scenario. HAZOP is one of the best tools used in various oil Refineries globally based on guide words for all hazardous conditions with strong recommendation. For authentic HAZOP study whole process design was done on the basis of Process flow diagram (PFD), Piping and Instrumentation diagram (PID) and standard guide words. In this case study about (14) deviations were documented with (37) causes and (26) consequences. However for safer system design, the group analyze propose about 21 actions whereas most of them about (60%) will need to install new devices. This indicate that the HAZOP studies act as an efficient tool for enabling reasoning to reveal potential hazards in safety critical operations.

**Keywords:** AZOP, Wastewater Treatment, Process flow diagram (PFD), Piping and Instrumentation diagram (PID), guide words, deviations.

### INTRODUCTION

The analysis of risk associated with hazard is the main aspect of oil industry. Risk assessment or risk analysis is carried out throughout the use of many suitable methods of study. The method involves Qualitative and Quantitative Risk Assessment. Qualitative or Historical risk analysis is preliminary risk assessment, while Quantitative risk analysis i.e. HAZOP is used in severe cases in various industries [1].

A petroleum refinery provides the most needed fuels for everyday use for industrial, commercial and domestic purposes. Processing crude oil in refinery requires large percentage of oil which is contaminated and requires some level of treatment [2].

Technological development, creativity, studying “what went wrong” and “how to implement the lessons learnt” have provided a new paradigm with an approach where safety is integrated into the complex system resulting from the network of typical industrial process interactions [3].

HAZOP is a complete, systematic and relatively easy to apply technique for analyzing risks and deviations. The procedure involves evolution of waste water treatment technologies and several techniques including Primary (physical) and Secondary (biological) treatment. This study involves identification of the main systems used for the treatment and their main characteristics [4].

Safety analysis are generated after a detailed study of HAZOP worksheet results, having lists of identified deviations with their causes and effects, as well as recommendations, suggestions and comments. The HAZOP of batch procedures need time consuming or classified guidewords (Early, delayed, Before, After quickly, slowly) which can be employed by incorporating in a meticulous fault of a working procedure [5, 6].

The HAZOP has been widely used for various kinds of industry especially in oil. In the case of Brazil, started to be used from the 90's in segment the oil and natural gas. In Brazil some oil refineries has successfully implemented HAZOP and other tool for analysis of hazards [7]. In this sense the use of HAZOP in the oil business like refinery process can be applied.

As per literature review HAZOP technique is a very operational tool for identifying the causes of deviation from set parameter and to determine all major hazards and operability problems associated with these deviations, however the unexpected events does not included in the detailed HAZOP [8].

The main objective of this work is to identify the hazards only related to oily waste water treatment plant. The disposal of waste water from the refinery as per National Environmental Quality Standards (NEQS) is the very serious problem in Pakistan. Therefore oily waste water treatment facility should be hazard free before and after treatment. To make the system safer with all respect HAZOP study is necessary for all Refineries of Pakistan. The HAZOP study is carried out for safety, reliability and to optimize the instrumentation in the Refinery.

### MATERIALS AND METHODS

According to this study first of all deviation of various process variable of oil refinery waste water (RWW) unit has been identified to minimize the associated risk. After identifying deviation the next step is to check all realistic cause of this deviation. If there is, the consequences must be considered. They may be trivial or significant. If significant, they must be evaluated to see if they constitute a hazard then all the necessary action is recommended to make the process free from hazard. It is based on detailed study of the PFD (Process Flow Diagram) / P&ID's (Piping & Instrumentation) not only

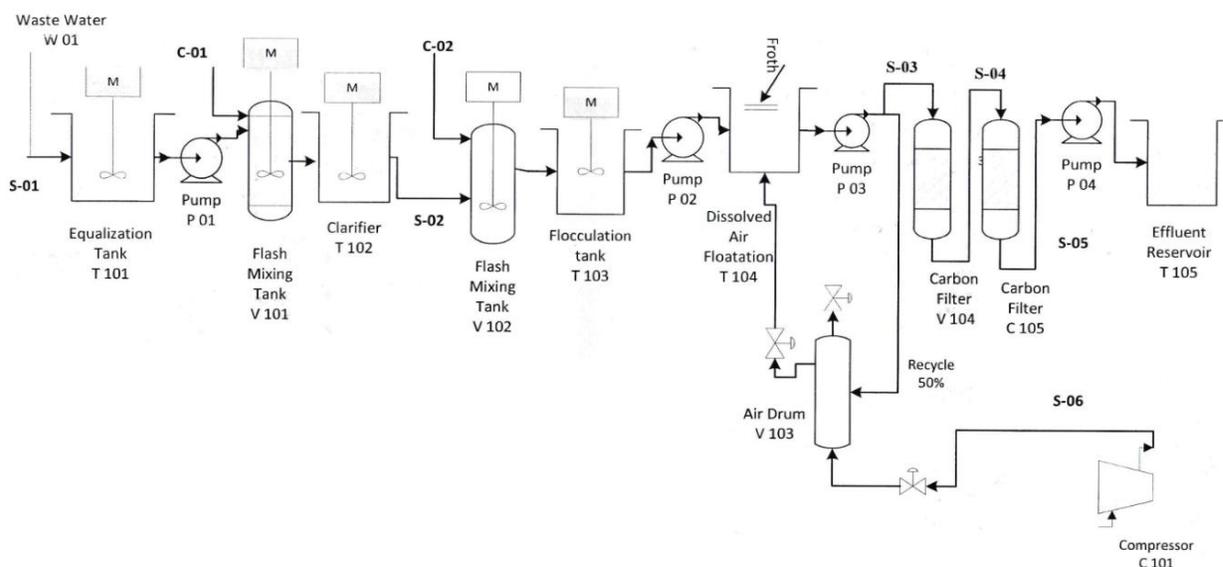
during the Design phase but after the implementation of project. In table 1 more than five guide words are given with specific function which is mostly utilized during HAZOP Study.

Table 1: Basic guide words for hazop study

Guide word	Explanation
NONE	No forward flow when there should be, i.e. no flow or reverse flow.
MORE OF	More of any relevant physical property than there should be, e.g. higher flow (rate or total quantity), higher temperature, higher pressure, higher viscosity, etc.
LESS OF	Less of any relevant physical property than there should be, e.g. lower flow (rate or total quantity), lower temperature, lower pressure, etc.
PART OF	Composition of system different from what it should be, e.g. change in ratio of components, component missing, etc.
AS WELL AS MORE THAN	More components present in the system than there should be, e.g. extra phase present (vapor, solid), impurities (air, water, acids, corrosion products), etc.
REVERSE	A parameter occurs in the opposite direction to that for which it was intended e.g. reverse flow.
OTHER THAN	Complete substitution e.g. sulphuric acid was added instead of water.
EQUIPMENT WORDS "OTHER"	What else can happen apart from normal operation, e.g. start-up, shutdown, uprating, low rate running, alternative operation mode, failure of plant services, maintenance, catalyst change, etc.

The HAZOP a qualitative survey is done for the largest oil refinery wastewater treatment plant (WWTP) of Pakistan. The capacity of the treatment plant is 90m<sup>3</sup>/hr from different areas of refinery, mostly from utilities crude oil storage tanks, blow down water from cooling tower etc. having a huge hazardous operational factors are analyzed by HAZOP technique.

Fig. 1. Process flow diagram of Oily Wastewater Treatment Plant



According to (figure 1) the effluent wastewater first process in a clarifier and DAF (Dissolved Air Flootation) for the removal of oil and other impurities as illustrated in (Table 2).

**Table-2: HAZOP features of equipment used in treatment of oily waste water of Refinery of Karachi.**

Name of Equipment	Possible HAZOPS reported by Team leader
Equalization tank	The influent is directly entering in equalization tank therefore it can create different hazards to the material and human health, which can be overcome by installing the level sensors, flow meters and temperature measuring devices.
Clarifiers	There is always a danger for oil of achieving the flash point temperature, which explodes or burns the plant and could be dangerous for human health, therefore proper vigilance is required in clarifiers.
Dissolved air floatation unit(DAF)	It has an ability to remove the 80% of oil content, that's why there is no danger of catching fire after this process. But proper vigilance monitoring & control are required in its various parts like compressor and air drum, which can rupture or blast at high pressure. Mainly employed as a second step in a WWTP in oil refineries. The process contains a physical-chemical separation. The DAF feed water is dosed with a coagulant and flocculent. According to some literature the flotation operation has efficiency ranges from 70% to 85% removal of oil and grease and 50 % to 85% of suspended solids.
Activated carbon filters	If influent stream of carbon filter contains high amount of suspended solid (SS) then there is a danger of blockages in filters, otherwise it is not hazardous. Activated carbon filtration process is a kind of adsorptive process, the oil and grease droplets are adsorbed onto the surface of carbon particles. The oil removal efficiency of activated carbon filtration is about 75% to 95%.
API Separators	It is a first primary treatment based on gravimetric. Mainly used to reduce the overloading of oil, grease and suspended solids in the subsequent downstream processes of WWTP. The removal efficiency of API separator is up to 33% to 68%. These separators are normally designed to remove oil droplet of size as small as 150 microns

To conduct the HAZOP organized by a team of the Engineers belongs to multiple disciplines. The team comprises of team leader/Chairman with complete knowledge of health, safety and environment (HSE), Maintenance, Process and Instrumentation Engineers.

The team has identified existing hazard of the WWTP then made control of entity/equipment after analyzing the consequential effects on overall system.

Revealing the fact that most of the accidents occurs due to deviation of the process variables like pressure, Temperature level from the standard level as per (Table 3).

Deviations from the set values highlighted by some specific guide words. In some cases excess pressure may exist in a line. Firstly, it must be established if there is a realistic cause of this deviation. If there is, the consequences must be considered. They may be trivial or significant. If significant, they must be evaluated to see if they constitute a hazard. In the example of line over-pressure, the excess may be within the line rating. This consequence is trivial. If the rating is exceeded, however, rupture may result. This is obviously a hazardous occurrence. The study procedure may be broken into various steps and as shown in (Table 2). Therefore the scope and selection of team is very necessary to conduct any type of HAZOP study. Finally a detailed record of the study is also necessary; but now we will consider the "Application of the Guidewords" to a particular "Section" or "Study Node".

Based on the PFD system is divided into 10 specific sections called nodes which are shown in (Fig 1).

According to Metcalf & Eddy (2003), is a flotation operation which has efficiency ranges from 85% to 90% removal of oil and grease [9]. This type of technology is present in all Brazilian's oil refinery WWTP.

## RESULT & DISCUSSION

As per process flow diagram the node starting from American Petroleum Institute(API )separator to Dissolved Oxygen Flotation Unit (DAF) then activated Carbon filter unit as per (Fig 1).The main operational problem were highlighted by HAZOP team was due to deviation in temperature in WTTTP due to which water and oil separation becomes critical. Leakages from WWTP also critical parameter identified by team. In case of NRF (Non return Valve) not operated created big hazardous problem may be created fire so it is suggested to install NRF with bypass adjustment.PH should be control within 8-9 in WWTP plant if not maintain organic and suspended solid increased. Level control within range to avoid another hazard. The whole system not pressurized from initial step to final step in case of any mal functioning /human error then heavy leakages from the line. Maintenance of WWTP is highly recommended to avoid any hazardous situation.

Table-3: Summarized Table of Hazard and Operability (HAZOP) Study of oily waste water treatment plant of Refinery of Karachi.

Deviation from operating conditions	Possible causes	Consequences	Action Required
More flow of waste water	<ol style="list-style-type: none"> <li>1. Valve malfunction</li> <li>2. Pump malfunctioning</li> <li>3. Control valve fails open.</li> <li>4. Air inlet filter damage of compressor.</li> <li>5. Production Loss.</li> <li>6. Rain/storm.</li> </ol>	Liquid carried to the Overhead section of tank. Flooding may occur. More flow to pump causing Damage to pump. High velocity may lead to Erosion. Abrasion. Carbon comes along with water in Granular Activated Carbon filter.	Regular checking and maintenance of valve Install high level liquid alarm. Install FCV. Proper monitoring of Pressure differential Across filter. Install block and Bleed arrangement at compressor. Use high abrasion number carbon in carbon filter.
No flow	<ol style="list-style-type: none"> <li>1. Inlet Line rupture.</li> <li>2. Pump malfunction</li> <li>3. Scaling in pump suction line</li> <li>4. Flow control valve before pump malfunction</li> <li>5. FIC fails closing FCV</li> <li>6. LIC fails closing LCV</li> </ol>	Pump Cavitation. Deadhead Pump Plant shutdown Pressure in line increases	Proper inspection and maintenance of line Should be implemented. Install bypass loop for feed pump. Use alarm
Less flow	<ol style="list-style-type: none"> <li>1. Inlet Valve malfunction</li> <li>2. Blockage of line</li> <li>3. Scaling or corrosion in line.</li> <li>4. Flow Transmitter malfunctions.</li> <li>4. Three way valve failure.</li> </ol>	Pump Cavitation. Damage to pump Incorrect information transmitted to FIC. Channeling in V-104 & V-105	Regular checking and maintenance of valve Connect a stand by pump and start it. Use supporting valves with LCV
High PH	Sources may contain basic Contamination	Coagulating and Flocculating agent may not work	Use pH controller
Lower PH	Sources may contain acidic contamination	Coagulating and Flocculating agent may not work	Use pH controller
Maintenance	Accumulation in tank	Resulting in corrosion	Regular inspection should be done
More Composition in Granular Activated carbon	Carbon is spent in the train of carbon filters in operation. (Either V-106 & V-107 OR V-104 & V-105)	Poor adsorption resulting in high contaminants in effluent stream CW-041.	Periodic backwashing. Using parallel train of carbon filters V-106 & V-107
More Speed	<ol style="list-style-type: none"> <li>1. Speed of agitator Increases.</li> <li>2. Motor malfunctioning</li> </ol>	Improper effect of separation Floc may destroy	use specialized metallurgy Use alarm.
Low speed	Motor malfunctioning	Floc may not form	Use alarm
More pressure	<ol style="list-style-type: none"> <li>1. Back flow occurs in pump, if pressure at discharge of pump increases</li> <li>2. PSV-101 fails.</li> <li>3. Compressor control Malfunction</li> </ol>	Voids implode and generate Intense shockwave. Damage to pump Excessive agitation, vigorous bubbling in tank T-104	Use pressure indicator and controller. Use pressure controller to shut down compressor C-101. Use alarm.
Less Pressure	<ol style="list-style-type: none"> <li>1. Inlet line choked.</li> <li>2. Compressor C-101 fails.</li> <li>3. Blockage of Air filter in compressor.</li> <li>4. FCV partially closed or malfunction</li> </ol>	Pump failure Plant shutdown No or low bubbling in tank-104. Deferred Production	Use pressure indicator and controller Proper monitoring Periodic maintenance. Use alarm
High Level	<ol style="list-style-type: none"> <li>1. LCV fails open.</li> <li>2. Increase in discharge pressure</li> <li>3. outlet valve of separator Choked.</li> </ol>	Flooding may occur. Production loss.	Install high level liquid alarm. Use LIC. Proper monitoring should be done.
Low Level	<ol style="list-style-type: none"> <li>1. Pump fails.</li> <li>2. Level gauge Malfunction.</li> </ol>	V-101 dry out. Production loss.	Use LIC to operate Pump. Proper monitoring Periodic maintenance.
More temperature	<ol style="list-style-type: none"> <li>1. FCV malfunctions causing increase in temperature of fluid entering in vessel.</li> <li>2. Compressor give gas of high temperature</li> <li>3. Too much Compression</li> <li>4. Fire case</li> </ol>	Settling efficiency may effect. Seals, gaskets of compressor Melts. Tank may Rupture.	Install temperature indicator Feed temperature should be adjusted previous before it enters the vessel. Proper monitoring Of vessel. Use proper Cooling. Use alarm.

Even though HAZOP analysis is a well-accepted tool for risk assessment in many industries very little has been published on a theoretical basis for HAZOP studies. HAZOP studies are used to identify hazard and its effects on plant. To identify hazard first the whole system is divided into its essential parts or auxiliary equipment. When process parameter change from the normal operating conditions or the design intent means the deviation from the system occurred. Then it describes the type of deviation, it causes, consequences and recommended actions required. The study relate to the goal of the system while the process represents the means for achieving these goals. Therefore it seems highly significant to develop a HAZOP assistant based upon means-ends modeling combined with whole-parts concepts to grasp the different levels of abstraction when needed. Thus models based on these concepts, such as functional models will form a suitable basis for an HAZOP assistant. The HAZOP assistant developed in this work uses a functional model to combine the system goal structure with the means to achieve these goals [10].

By severe questioning and continuous monitoring of plant possible deviations during the HAZOP study are generated then series of standard “guidewords” applied to the intended design [11]. The results of this procedure present a wide multi-dimensional view of the oil refinery plant safety. This information could directly serve to the examination of the industrial equipment safety, or may be used as a vigorous basis for a subsequent ordinary HAZOP study.

### CONCLUSION AND RECOMMENDATIONS

The major concern of the industries of developing countries including Pakistan is to emphasize on the occupational health and safety (OHS), improving worker’s productivity and increasing plant efficiency. Some common difficulties like inadequate work design, non-organized jobs, mismatch between worker skills and job which worker demands, severe environment, poor human and machine system and inappropriate management. These aspects lead to workplace threats, poor workers health, injuries and increase cost. Ergonomics or human factor can minimize or improve worker’s productivity, OHS and satisfaction. Overall performance is affected by these factors either directly or indirectly. It would very difficult for any company to attain its objectives unless it has attained the proper consideration for ergonomics.

The facility should design and monitor properly based on legal requirements, design/engineering codes, industry standards and good engineering practices.

All equipment should be well maintained, appropriate instrument and control system test procedures will be followed. Alarm and shutdown set points will not be set out of range or disconnected to avoid nuisance trips or other problems. Control valve bypasses will not be used unless the control valve is blocked out.

Recommendations include design, operating, or maintenance changes that reduce or eliminate Deviations, Causes and Consequences. Recommendations identified in a hazard analysis are considered to be preliminary in nature. Requests for additional information or study can also be recommended. After each recommendation has been reviewed, the resolution of each recommendation should be recorded in a tracking document such as a spread sheet, and kept on file.

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## AUSTRALIAN ENGLISH IN DIFFERENT FIELDS

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### ABSTRACT

It is common amongst Australians to shorten the names of places, people, companies, etc. Some of these terms are regional others are in relatively widespread use. Many terms derive from company or brand names others derive from rhyming slang or the use of diminutives.

**Keywords:** variants of English, Australian English, use of Australian English

### FOOD AND DRINK

Where foodstuffs are concerned, Australian English tends to be more closely related to the British vocabulary, for example the term *biscuit* is the traditional and common term rather than the American terms *cookie* and *cracker*. As had been the case with many terms, *cookie* is recognized and understood by Australians, and occasionally used, especially among younger generations. Australia the term *chips* is used for what Americans call *French Fries*, as with British English. In Australia *chips* is also used for what are called *crisps* in the UK, this second usage also being the American English term for crisps. The distinction is sometimes made through the adjective *hot*. The term *French Fries* is understood and sometimes used by Australians. US restaurants such as McDonalds continue to use the term *French Fries* in Australia. a few cases such as zucchini, snow pea and eggplant, Australian English uses the same terms as American English, whereas the British use the equivalent French terms *courgette*, *mangetout* and *aubergine*. This is possibly due to a fashion that emerged in mid - 19<sup>th</sup> Century Britain of adopting French nouns for foodstuffs, and hence the usage changed in Britain while the original terms were preserved in the (ex-) colonies are also occasions when Australians use words or terms which are not common in other forms of English. For example, Australia uses the botanical name *capsicum* for what the Americans would call (red or green) bell peppers and the British (red or green) peppers. Perhaps this is in order to contrast table pepper (berries of genus *Piper*) from so-called "hot peppers" (larger fruits of genus *Capsicum*). use the term *rockmelon* where North Americans would use the term *cantaloupe*, although in Victoria and Tasmania both terms are used. Australian English, dried fruits are given different names according to their variety, and generally raisins (grapes) are largest, sultanas (grapes) are intermediate, while currants are smallest. Australian English tomato sauce (often known simply as "sauce") is the name given to what is known as *ketchup* in other dialects. However, ketchup with its slightly sweeter taste, is still sold in many grocery stores and is common in fast food outlets such as McDonalds. Other sauces made from tomatoes are generally referred to by names related to their uses, such as barbecue and pasta sauce. coffee beverages are given unique descriptive names such as *flat white*, for an espresso with milk. Other terms include *short black*, (espresso) and *long black*, (espresso diluted with water, similar to an Americano in the U. S.). Since the mid-1980s other varieties of coffee have also become popular, although these have generally been known by names used in North America and/or Europe. in British English, the colourless, slightly lemon-flavoured, carbonated drink known in North America and elsewhere under brand names such as Sprite and 7 Up is called *lemonade*, while the more strongly-flavoured drink known as lemonade in North America that is typically made of lemon juice and sugar is sometimes referred to as *lemon squash*, or sometimes *traditional lemonade* or *club lemon*, particularly in carbonated form. carbonated drink commonly called sarsaparilla in Australia is a type of root beer, named after the sarsaparilla root from which root beer is made. However, the taste is quite different, to the point that they may be considered two completely different products. This may be due to a difference in the production process.

Australians also often refer to McDonald's restaurants as *Maccas*, to the point that the corporation itself refers to itself verbally as such in advertising (but not in writing)., unbranded Australian wine is called "cleanskin" wine, after the term for unbranded cattle. Cheap cask wine is often referred to as goon (diminutive slang for flagon), and the plastic cask is referred to as a "goon sack", "goon bag" or "goony". portable cooler; usually made of metal, plastic and/or polystyrene foam; is called an *esky*. This is a genericised trademark from the trade name *Esky*.

### PROCESSED PORK

A common foodstuff known in some countries as Baloney or as pork luncheon meat is known by different names in different regions of Australia.

- **Belgium sausage** - Tasmania (A beef variant is known as beef Belgium.)
- **Byron sausage** - New England.
- **Devon** - New South Wales (except Hunter Valley and New England), Tasmania, Australian Capital Territory
- **Empire sausage** - Hunter Valley
- **fritz** - South Australia and Broken Hill, New South Wales
- **German sausage** or **pork German** - Victoria and northern Tasmania

- **veal German** or **luncheon** - Queensland
- **Polony** - Western Australia
- **Round meat** - Northern Territory
- **Strasburg** or **strasbourg** or **Stras** - Victoria, Tasmania (The name is used for a spicier, wider-sliced processed meat in other areas.)
- **Wheel meat** - Tasmania
- **Windsor sausage** - North Queensland

### SPORT

To *barrack*, invariably a sporting team (typically rugby league or Australian rules football), for example, in Australian English means to *hoot* or *cheer in support of something*. Identical to the US "root". (Note that the word "root" in Australia is coarse slang for sexual intercourse.) For example: "who do you barrack for?" Almost the exact opposite of the (now rare) British usage of *barrack*, that is to *denigrate*: to jeer or hoot against something, such as a sporting team.

### CRICKET

The game of cricket is immensely popular in Australia and has contributed slang terms to Australian English. Some of this is shared with rival cricketing nations, like the English and the New Zealanders. can be *bowled over* (taken by surprise), *stumped* (nonplussed) or *clean bowled* or alternatively *hit for six* (completely defeated). When answering questions, one can *play a straight bat* (or a *dead bat*) (give a non-committal answer) or *let that one through to the keeper* or *shoulder arms* (dodge the question), particularly if they are *on a sticky wicket* (in a tight situation). The questioner in turn can *send down a bouncer*, a *googly*, a *flipper* or a *yorker* (difficult questions to varying degrees). Alternatively, the question could be a *long hop* or a *dolly* - an easy question that person being questioned can use to his or her advantage.

### FOOTBALL

The word *football* or its shortened form *footy* is used by Australians for several different codes of football or the ball used to play any of them. Australians generally fall into four camps when it comes to the use of the word.

- In the states of Victoria, Western Australia, South Australia and Tasmania, the word "football" (or more commonly, "footy") usually refers to Australian rules football (also known simply as Australian football or "Aussie Rules"). In these states there is little or no popular differentiation between the two kinds of rugby football.
- In the states of New South Wales (NSW) and Queensland, most people refer to rugby league simply as "football" or "footy" for short, or "League" (after the National Rugby League governing body). rugby union is known as "rugby", "union" or "rahhah". Australian rules is often known in these areas as "AFL" (a name which, strictly speaking, refers to the main governing body, the Australian Football League).
- In areas in which all three codes are popular, especially the Australian Capital Territory, the Northern Territory and the Riverina (south-western NSW), the word "football" is ambiguous, and the names "league", "rugby" and "AFL" (or just "rules") are used, to avoid confusion.
- Association football is generally known as soccer in Australia. In 2005, the governing body changed its name to Football Federation Australia. Other media sources (especially in New South Wales and Queensland) now also refer to the game as "football".
- In Australia, American football, which has a small following, is known as gridiron.
- Players, officials and followers of Australian rules football, have devised many unique concepts, terms, slang and nicknames. Some of these, such as footy, Grand Final and State of Origin have entered wider Australian usage, even among followers of other codes of football.

### WORK VEHICLES

In Australian English the term *ute*, short for *utility vehicle*, refers to a passenger car-like vehicle with a tray back, possibly with sides, a rear gate and/or a removable cover or any small truck. Australian-made Holden Commodore and Ford Falcon utes are based on family car chassis, and are normally much smaller than current North American pickup trucks. The term is generally consistent with pickup in most countries. However, all imported pickups are also known as utes in Australia.

*Truck* (rather than lorry) has been the only term for heavy goods vehicles in Australia since World War II. *Four-wheel drive*, which is often abbreviated in writing as *4WD*, is the usual name for the class of vehicles known elsewhere as SUVs, as well as utes with 4WD capability. In contrast to American English, neither utes nor passenger 4WD vehicles are usually regarded as being trucks in Australia. Four-wheel drives that are used only in the city and never for off-road driving are commonly given derogatory nicknames based on the names of wealthier suburbs of Australia's various state capital cities, the most common of these is *Toorak Tractors*, referring to the Melbourne suburb of Toorak. are a variety of terms for large and/or articulated trucks, depending on the type of cargo area, size/length, number of axles/wheels and so on. A single trailer articulated truck (typically with 32 wheels in Australia) is known as a *semi-trailer* or *semi* (/se. mi/ not /se. ma e/ as in the USA), an articulated truck with two trailers (typically with 50 tyres) is known as a *B-Double* (the lead trailer has a fifth wheel supporting the second trailer), or *Double Semi*. The largest of all articulated trucks are *road trains*, common on outback highways, which have at least three trailers and often more. In all articulated truck configurations, the

powered vehicle at the front is invariably known as a prime mover.

### **POLICE VEHICLES**

The panel vans used by police forces are known in most parts of Australia as *paddywagons* or as *black marias* (although this term is also used to refer to the vans used to transport prisoners between prison and courts), in accordance with international usage. However, in Melbourne as in other parts of Victoria they are often also called *divvy vans*, an abbreviation of the archaic Victoria Police jargon *divisional van*. The staccato chant of "You're going home in the back of a divvy van" (followed by clapping) can occasionally be heard when a crowd is nearby one of these vehicles, or when a person is led away by the police at a sporting or other large event. In Sydney, some people refer to similar vehicles as *bull wagons* and in the Riverina they are known as *bundy wagons*. special purpose police vans, generally on truck chassis, which have facilities to test the blood alcohol levels of suspected drunk drivers, are known as *booze buses*.

### **MILITARY SLANG**

The Australian Defence Force (ADF) is made up of the Australian Army, the Royal Australian Navy (RAN), and the Royal Australian Air Force (RAAF). Each has their own distinct traditions but share a defense force culture. This culture includes Australian military slang. Some words, such as *digger*, meaning a soldier, have become widely used by Australians in general. However, most slang used in the ADF is restricted to its personnel, or is widely understood outside Australia.

### **RHYMING SLANG**

A common feature of traditional Australian English was rhyming slang, based on Cockney rhyming slang and imported by migrants from London in the 19<sup>th</sup> century. For example "Captain Cook" rhymes with "look", so to "have a captain cook" or to "have a captain" means to "have a look". Australian rhyming slang is very localised, for example, a reference to the Sydney racetrack "Warwick Farm" (arm), or a former Melbourne radio station "3KZ" (head). slang was often used to create euphemistic terms for obscene words. In recent years this feature of Australian English has declined, once again due in part to the Americanisation of popular culture, as well as the passage of time and the impermanent nature of slang.

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## AMBIGUITY IN LANGUAGE

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### ABSTRACT

A word, phrase, or sentence is ambiguous if it has more than one meaning. The word 'light', for example, can mean not very heavy or not very dark. Words like 'light', 'note', 'bear' and 'over' are lexically ambiguous. They induce ambiguity in phrases or sentences in which they occur, such as 'light suit' and 'The duchess can't bear children'. However, phrases and sentences can be ambiguous even if none of their constituents is. The phrase 'porcelain egg container' is structurally ambiguous, as is the sentence 'The police shot the rioters with guns'. Ambiguity can have both a lexical and a structural basis, as with sentences like 'I left her behind for you' and 'He saw her duck'.

**Keywords:** ambiguity, meaning of ambiguity, types of ambiguity

**Lexical ambiguity** is more common. Everyday examples include nouns like 'chip', 'pen' and 'suit', verbs like 'call', 'draw' and 'run', and adjectives like 'deep', 'dry' and 'hard'. There are various tests for ambiguity. One test is having two unrelated antonyms, as with 'hard', which has both 'soft' and 'easy' as opposites. Another is the conjunction reduction test. Consider the sentence, 'The tailor pressed one suit in his shop and one in the municipal court'. Evidence that the word 'suit' (not to mention 'press') is ambiguous is provided by the anomaly of the 'crossed interpretation' of the sentence, on which 'suit' is used to refer to an article of clothing and 'one' to a legal action.

The above examples of ambiguity are each a case of one word with more than one meaning. However, it is not always clear when we have only one word. The verb 'desert' and the noun 'dessert', which sound the same but are spelled differently, count as distinct words (they are homonyms). So do the noun 'bear' and the verb 'bear', even though they not only sound the same but are spelled the same? These examples may be clear cases of homonymy, but what about the noun 'respect' and the verb 'respect' or the preposition 'over' and the adjective 'over'? Are the members of these pairs homonyms or different forms of the same word? There is no general consensus on how to draw the line between cases of one ambiguous word and cases of two homonymous words. Perhaps the difference is ultimately arbitrary.

Sometimes one meaning of a word is derived from another. For example, the cognitive sense of 'see' seems derived from its visual sense. The sense of 'weigh' in 'He weighed the package' is derived from its sense in 'The package weighed two pounds'. Similarly, the transitive senses of 'burn', 'fly' and 'walk' are derived from their intransitive senses. Now it could be argued that in each of these cases the derived sense does not really qualify as a second meaning of the word but is actually the result of a lexical operation on the underived sense. This argument is plausible to the extent that the phenomenon is systematic and general, rather than peculiar to particular words. Lexical semantics has the task of identifying and characterizing such systematic phenomena. It is also concerned to explain the rich and subtle semantic behavior of common and highly flexible words like the verbs 'do' and 'put' and the prepositions 'at', 'in' and 'to'. Each of these words has uses which are so numerous yet so closely related that they are often described as 'polysemous' rather than ambiguous.

**Structural ambiguity** occurs when a phrase or sentence has more than one underlying structure, such as the phrases 'Tibetan history teacher', 'a student of high moral principles' and 'short men and women', and the sentences 'The girl hit the boy with a book' and 'Visiting relatives can be boring'. These ambiguities are said to be structural because each such phrase can be represented in two structurally different ways, e.g., '[Tibetan history] teacher' and 'Tibetan [history teacher]'. Indeed, the existence of such ambiguities provides strong evidence for a level of underlying syntactic structure. Consider the structurally ambiguous sentence, 'The chicken is ready to eat', which could be used to describe either a hungry chicken or a broiled chicken. It is arguable that the operative reading depends on whether or not the implicit subject of the infinitive clause 'to eat' is tied anaphorically to the subject ('the chicken') of the main clause.

It is not always clear when we have a case of structural ambiguity. Consider, for example, the elliptical sentence, 'Perot knows a richer man than Trump'. It has two meanings, that Perot knows a man who is richer than Trump and that Perot knows man who is richer than any man Trump knows, and is therefore ambiguous. But what about the sentence 'John loves his mother and so does Bill'? It can be used to say either that John loves John's mother and Bill loves Bill's mother or that John loves John's mother and Bill loves John's mother. But is it really ambiguous? One might argue that the clause 'so does Bill' is unambiguous and may be read unequivocally as saying in the context that Bill does the same thing that John does, and although there are two different possibilities for what counts as doing the same thing, these alternatives are not fixed semantically. Hence the ambiguity is merely apparent and better described as semantic underdetermination.

Although ambiguity is fundamentally a property of linguistic expressions, people are also said to be ambiguous on occasion in how they use language. This can occur if, even when their words are unambiguous, their words do not make what they mean uniquely determinable. Strictly speaking, however, ambiguity is a semantic phenomenon, involving linguistic meaning rather than speaker meaning; 'pragmatic ambiguity' is an oxymoron. Generally when one uses ambiguous words or sentences, one does not consciously entertain their unintended meanings, although there is psycholinguistic evidence that when one hears ambiguous context of utterance words one momentarily accesses and then

rules out their irrelevant senses. When people use ambiguous language, generally its ambiguity is not intended. Occasionally, however, ambiguity is deliberate, as with an utterance of 'I'd like to see more of you' when intended to be taken in more than one way in the very same.

**Semantic ambiguity.** Sentences whose semantic contents seem to differ in different contexts, in virtue of containing expressions of such sorts as the following (there may be others):

- indexicals/demonstratives: [tense], I, today, now, here, we, you, she, they, then, there, that, those;
- relational terms: neighbor, fan, enemy, local, foreign;
- perspectival terms: left, distant, up, behind, foreground, horizon, faint, occluded, clear, obscure;
- gradable adjectives, both relative and absolute: tall, old, fast, smart; flat, empty, pure, dry;
- philosophically interesting terms: know, might, necessary, if, ought, free;
- prepositions: in, on, to, at, for, with;
- certain short verbs: put, get, go, take;
- possessive phrases, adjectival phrases, noun-noun pairs: John's car, John's hometown, John's boss, John's company; fast car, fast driver, fast tires, fast time; child abuse, drug abuse; vitamin pill, pain pill, diet pill, sleeping pill;
- implicit temporal, spatial, and quantifier domain restriction;
- weather and other environmental reports: (It is) raining, humid, noon, summer, noisy, eerie;
- ostensibly unary expressions (when used without complements) that denote binary relations: ready, late, finish, strong enough;
- "predicates of personal taste": fun, boring, tasty, cute, sexy, gross, cool;
- miscellaneous: and, or, cut, (is) green;

The problems with these content misunderstandings are as follow:

1. Contextualist platitude: Many sentences, even with all their constituents being used literally and even factoring out ambiguity, can be used to mean different things in different contexts. (This doesn't entail that there's anything context-sensitive in or about the sentence itself.)
2. Anti-compositionalism: Many (declarative) sentences semantically express propositions that are not completely determined by the semantic contents of their constituents and their syntactic structure.
3. Unarticulated Constituentism: Many sentences semantically express propositions some of whose constituents are not the semantic contents of any of the sentence's constituents.
4. Anti-propositionalism: Many sentences do not semantically express propositions, even in contexts (because of lexical underspecificity, phrasal underdetermination, or propositional incompleteness).
5. Psychological Anti-semanticism: The compositionally determined semantic content of a sentence, whether or not fully propositional, plays no role in the psychological processes involved in communication (on either the speaker's or the hearer's side).
6. Outright Anti-semanticism: Many sentences do not have (compositionally determined) semantic contents at all.
7. Utterance "Contextualism": The semantic content of almost any given sentence, whether or not it is fully propositional, falls short of the "intuitive content" of a likely utterance of the sentence because its semantic content is too sketchy, abstract, or otherwise nonspecific to be what the speaker means.

Three forms of semantic contents (each can be stronger or weaker as to range of application and role of context, and perhaps different versions apply to different classes of expressions):

1. Indexical Contextualism: The semantic contents of many sentences vary because they contain "non-obvious" indexical expressions whose contents are determined by context.
2. Variable Contextualism: The semantic contents of many sentences vary because they contain expressions that have variables associated with them whose values are determined by context.
3. Modulational Contextualism: The semantic contents of many sentences vary because they contain expressions whose senses (and/or phrases whose modes of composition) are "modulated" by context.

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## TYPES OF SUBORDINATE CLAUSES

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### ABSTRACT

The subject clause is the only one used in the function of a primary part of the sentence. The peculiarity of the subject clause is its inalienability from the principal clause. Thus in the sentence *What you mean is clear* the subordinate clause *What you mean* is used as the subject. If it is cut off from the rest of the sentence, what remains (*is clear*) cannot be treated as a clause either in meaning or in structure. It is synsemantic 1 in the sense that it can be understood only in combination with its subordinate part.

**Keywords:** clause, subordinate clause, types of subordinate clause

### Subject Clauses

Subject clauses are introduced by conjunctions (*if, whether, that*), conjunctive pro-nouns (*who, which, what, whose, whichever, whoever, whatever, etc.*) and pro-adverbs (*how, when, where, why*). *Why she left him is a mystery.* (Jerome).

### Complement Clauses

#### a) Predicative Clauses

The sentence *The question is where he can be found* consists of the principal clause *the question is* and the predicative clause *where he can be found*. The predicative complement, as usual, is at the same time the notional predicate.

Predicative clauses are introduced by the same conjunctions and pronouns as subject clauses. They are mostly attached to the link-verb to be in the principal clause, though they may occur with *to look, to feel* and some other links.

He felt as if something in him were collapsing. (Heym).

Each little household looked as though it were picnicking in its own back room. (Oxenham).

Predicative clauses sometimes function as objective predicatives, as in *You'll make her what you like, she is pliable enough.* (Braddon).

#### b) Object Clauses

They are introduced by the same conjunctions and connective pronouns as subject and predicative clauses. They are often joined to their principal clauses *asyndetically*.

Object subordinate clauses may be either *prepositionless* or *prepositional*.

Now tell me what happened at the meeting. (Shaw).

Cusins. Barbara: I am going to accept this offer.

Barbara: I thought you would. (Ib.).

I was thinking of what the Third Reich had done and said so. (Snow).

An object clause (like an object in a simple sentence) may be preceded by the anticipatory object *it* as in *I think it very significant that he refused to communicate with the Sheltons.* (Braddon).

The usual place of an object clause is after the principal clause, though it may be placed before the principal clause for the purpose of connecting two thoughts, the object clause denoting something familiar, mentioned previously, what we proceed from.

Why he declined that offer I can't tell. (Black).

Whether she had been wise in this she was utterly unable to decide. (Galsworthy).

#### c) Adverbial Clauses

Adverbial clauses serve to express a variety of adverbial relations and, consequently, they are introduced by a great number of subordinating conjunctions. *Asyndetic* subordination is not typical of adverbial clauses (barring those of condition) since it is mainly the conjunction that differentiates one kind of adverbial clause from another.

Cf. *When he was young... Though he was young... Because he was young...*

Of the three types of adverbial complements – *qualitative, quantitative and circumstantial* – adverbial clauses mostly function as the last mentioned, as *adverbials of situation or external conditions*.

However, we take issue with L.S. Barkhudarov and D.A. Shteling over their statement that adverbial clauses are used exclusively as adverbial complements of external conditions.

The very examples they produce contradict this statement.

In the sentence *Mike acted as though nothing had happened* (Hemingway) the adverbial clause shows how he acted, in what manner he acted. Consequently, it shows the inner nature of the action, its quality.

The meaning of manner is mostly interwoven with that of comparison.

All hovels should serve it and love it as he did. (Randall).

Adverbial clauses may occupy different places in the complex sentence. They occur before their principal clause, after it, and even within it, which shows that the position of adverbial clauses (like that of adverbial complements in simple sentences) is less fixed and rigid than that of other subordinate clauses functioning as secondary parts.

E. g. I advise you, if you cherish your private life, not to let him frighten you. (Randall).

If he had glanced upwards, he would never have suspected that she was the grim bluestocking he awaited, (lb.).

You'll get along too if you take us as you find us. (lb.).

In accordance with their relations to the principal clause, mostly expressed by the conjunction or connective pronoun they are introduced by, adverbial clauses are classified into those of place (introduced by where, wherever), time (introduced by when, while, till, until, as, since, before, after, once, as soon as, etc.), cause (conjunctions – because, as, since) purpose (conjunctions – that, so that, in order that, lest), condition (conjunctions – if, in case, provided, unless, suppose, supposing), concession (conjunctions – though, although, as, conjunctive pronouns whatever, whoever, whichever), manner, or comparison (conjunctives—as if, as though).

He trudged doggedly on until he reached the flat. (Dreiser).

Because Carrie was pretty, the gentleman selected her photo, (lb.).

Madame Lamotte would see, if Annette didn't. (Galsworthy).

Though he was «the limit», he was yet her property. (lb.).

### Attribute clauses

Attributive clauses are postpositive adjuncts of nouns. They are commonly divided into relative and appositive clauses. Relative clauses are introduced by pronouns (or asyndetically). They are usually subdivided into restrictive and descriptive. The former serve to restrict the meaning of the antecedent, so that when the restrictive clause is left out, the sense of the sentence is seriously impaired.

I don't like girls who can't hold their tongues. (Black). Then we had that raid when Uncle Ned was killed. (Gilbert).

I know the stories you have been feeding him. (lb.).

Descriptive clauses serve to supply some additional information which does not restrict or specify the meaning of the antecedent.

E. g. The following day, which was Wednesday, we went to a solicitor. (Jerome).

What about dining at the Embassy at Chawley, where they still brewed beer. (Gilbert).

A variety of attributive clauses is the appositive clause, which formally differs from an attributive clause in being introduced by a conjunction (that, if, whether).

The awful fact that I might never have met her is rather appalling. (Openheim).

He married you for the romantic reason that he had fallen in love with you. (Gilbert),

Appositive subordinate clauses mostly occur after abstract nouns such as idea, thought, feeling, fact, impression, reason, doubt, question, etc.

### Extension clauses

Extension clauses are postpositive adjuncts of adjectives, adverbs and adlinks.

E. g. *It is indeed doubtful how he had become aware that Roger was being buried that day.* (Galsworthy).

The subordinate clause is an extension of the adlink aware.

I am happy that everything went off so nicely.

The subordinate clause is an extension of the adjective happy.

She is so pretty that all our boys are mad about her. (Heyer).

The subordinate clause is an extension of the pro-adverb so.

His head was still in such a whirl that he felt confused. (Dreiser).

The subordinate clause is an extension of the pro-adjective such.

The subordinate clauses in the last two sentences have a distinct consecutive meaning, and may be called 'extensions of result' (instead of the traditional 'adverbial clauses of result').

### Parenthetical Clauses

Most authors who do not regard parenthetical elements as parts of the sentence treat *It is past ten, I think* as a simple sentence. We do not find this view convincing.

1. If *I think* is not some part of the sentence, it must be regarded as an independent sentence. But it is not independent. Its intonation, position and meaning show that it is connected with *It is past ten*, to which it is appended and on which it depends.

2. The sentence discussed is not simple because it contains two predications. This becomes especially evident when we compare *It is past ten, I think* with *I think it is past ten*.

3. Since we regard parenthetical elements as parts of the sentence we must treat *It is past ten, I think* as a complex sentence, i.e. a sentence having one of its parts (parenthetical element) expressed by a clause (a parenthetical clause).

In most cases parenthetical clauses are introduced asyndetically, though now and again the conjunctions *as, if*, etc. are used.

He is, as I told you, their only son. (Dickens).

The happiness was a private, if you like, a happy one. (Snow).

Like parenthetical words and word-combinations they express the speaker's attitude towards the contents of the sentence or they show the relation of the given thought to some thought previously mentioned or to the source of information.

Nursing a wounded heart, he thought cynically, would not lead to happiness. (Randall).

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## EFFECTIVENESS OF FGS (FOURNIER'S GANGRENE SEVERITY INDEX) DETERMINATION IN A SCROTAL NECROTIZING FASCIITIS PATIENTS

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### აბსტრაქტი

ფურნიეს განგრენა (ფგ) არის ელვისებური ინფექცია, რომელიც მოიცავს პერიანალურ და გენიტალურ მიდამოს, არის ფატალური და გვხვდება ყველა ასაკის და სქესის პირებში. მას ახასიათებს სწრაფი პროგრესირება რბილ ქსოვილებში და იწვევს ქსოვილების ნეკროზსა და დესტრუქციას. Loar- მა და თანაავტორებმა აღწერეს ფურნიეს განგრენის სიმწვავის ინდექსი, რომელიც არის დაავადების პროგნოზის კარგი მაჩვენებელი. ეს არის ციფრებში გამოხატული ქულა, რომელიც იანგარიშება პაციენტის ჰოსპიტალში მოთავსების დროს მისი ფიზიოლოგიური პარამეტრების გათვალისწინებით (სხეულის ტემპერატურა, გულისცემის სიხშირე, სუნთქვის სიხშირე, ნატრიუმი, კალიუმი, კრეატინინი, ლეიკოციტები, ჰემატოკრიტი და ბიკარბონატები). როცა ინდექსის მაჩვენებელი 9-ზე მეტია, არის სენსიტიური და სპეციფიური მარკერი დაავადების მიმდებარე გამოსავლის, ხოლო 9-ზე ნაკლები ქულის დროს 78%-ში დაავადების გამოსავალი კეთილსამიქლოა.

ჩვენ რეტროსპექტიულად შევისწავლეთ თსუ პირველი საუნივერსიტეტო კლინიკის უროლოგიურ დეპარტამენტში ფურნიეს განგრენის დიაგნოზით მოთავსებული პაციენტების ფიზიოლოგიური პარამეტრები სიმწვავის ინდექსის დაანგარიშების მიზნით და დავადებინეთ, რომ თითოეულ შემთხვევაში მიღებული ქულა შეესაბამებოდა დაავადების სიმწვავეს და გამოსავალს.

**საკვანძო სიტყვები:** ფურნიეს განგრენა, ნეკროზული ფასციიტი, ქულა.

### ABSTRACT

Fournier's Gangrene (FG) is a fulminant infection, including necrotising fasciitis of the genital, perineal and/or perianal regions. This condition is potentially fatal, affects any age and gender, is characterised by rapid progression of infection in soft tissue, caused by the synergistic action of several agencies that extend along fascial planes, causing necrosis of these tissues and destruction. Loar *et al.* have described gangrene severity index of Fournier (FGSI), which is useful for evaluating the prognosis and to stratify risks in these patients. FGSI is a numerical score obtained from a combination of physiological hospital admission parameters that include temperature, heart rate, respiration rate, sodium, potassium, creatinine, leukocytes, haematocrit and bicarbonate. They stabilized that an FGSI score above 9 is sensitive and specific as a mortality predictor in FG patients. A score of less than 9 is associated with 78% probability of survival.

In this study, we identify various predicting factors for the mortality in FG patients, with special reference to FGSI score system. The severity of the disease and outcome correlated with the number of Fournier's gangrene severity index.

**Keywords:** Fournier's gangrene, necrotizing fasciitis, score

### INTRODUCTION

Fournier's gangrene characterized by fulminant necrotizing fasciitis of the perineal, genital or perianal regions, is generally caused by aerobic and anaerobic bacteria. Although it is thought to be an idiopathic process, Fournier's gangrene has been shown to have a predilection for patients with diabetes mellitus is reported to be present in 20– 70% and chronic alcoholism in 25–50% patients and immunocompromised patients%. [1; 2; 3]. The focus of infection is usually located in the genitourinary tract (20-40%), lower gastrointestinal tract (30-50%) or skin (20%). The development and progression of the gangrene is often fulminating and can rapidly lead to multiple organ failures and death (7.5-50%). [4; 5; 6]. Actually both aerobes and anaerobes are present in the tissues but anaerobes are less frequent isolated because these samples are more difficult to preserv [7; 8] Loar *et al.* have described gangrene severity index of Fournier (FGSI) [Table1], which is useful for evaluating the prognosis and to stratify risks in these patients [9]. FGSI is a numerical score obtained from a combination of physiological hospital admission parameters that include temperature, heart rate, respiration rate, sodium, potassium, creatinine, leukocytes, haematocrit and bicarbonate. They stabilised that an FGSI score above 9 is sensitive and specific as a mortality predictor in FG patients. A score of less than 9 is associated with 78% probability of survival.

In this study, we used the Fournier's gangrene severity index score system.

**Table 1**

Physiological variables	High abnormal values			Normal values		
	Min	Max	Mean	Min	Max	Mean
Arterial number of systole	4-92	24-102.9	-	20-92-99.9	24-102.9	24-102.9
Temperature °C	36-38	37-40.7	37.5	36-38	37-39	37.5
Respiration rate	12-20	16-27	16.5	12-20	16-18	16.5
Heart rate (b/min)	60-100	60-110	70	60-100	60-100	70
Systemic arterial blood pressure (mmHg)	90-120	90-130	100	90-120	90-120	100
Systemic venous pressure (mmHg)	0-12	0-15	5	0-12	0-12	5
Central venous pressure (mmHg)	0-12	0-15	5	0-12	0-12	5
Urea nitrogen (mg/dl)	0-20	0-25	10	0-20	0-20	10
Creatinine (mg/dl)	0-1.2	0-1.5	0.8	0-1.2	0-1.2	0.8
Glucose (mg/dl)	70-100	70-110	85	70-100	70-100	85
White blood cell count (WBC)	4,000-10,000	4,000-15,000	7,000	4,000-10,000	4,000-10,000	7,000
Neutrophils (%)	50-70	50-80	65	50-70	50-70	65

Fournier's gangrene severity index score systems

reference to FGSi

### AIM OF THE RESEARCH

Our aim was to find out how informative is Fournier's Gangrene severity index (FGSI) to predict mortality.

### Materials and methods

A retrospectively review of the medical charts of 4 patients treated at the Department of Urology of The First University Clinic of TSMU with diagnosis of Fournier's Gangrene, was carried out. All of them were male. Age varied from 41 up to 60 years. In all cases there was scrotal region. 3 patients up to 4 had diagnoses of diabetes mellitus, which is a predisposing factor of Fournier's gangrene.

The bacteriological study of the intraoperatively obtained material, showed the following results: monomicrobial growth was detected in 3 cases with gram-positive *Staphylococcus aureus* 10<sup>8</sup>/ml, *Peptostreptococcus* spp 10<sup>7</sup>/ml and gram-negative *Escherichia coli* 10<sup>8</sup>/ml. Polimicrobial growth was in 1 case : *Klebsiella pneumoniae* 10<sup>5</sup>/ml and *Candida albicans* 10<sup>8</sup>/ml.

We determined Fournier's Gangrene severity index according to the physiological hospital admission parameters.

### RECEIVED RESULTS

According our results, the score of Fournier's gangrene severity index for 2 patients were 5 points , for 1 patient-3 and for 1 patient -8. In all of these cases, operative exploration findings morphological study of the intraoperative material confirmed the diagnosis of Fournier's gangrene. The severity of the disease and outcome correlated with the number of Fournier's gangrene severity index.

### CONCLUSION

Despite the lack of material, our results suggest that determination of the Fournier's gangrene severity index (FGSI) is the simple, informative, inexpensive method for evaluating the prognosis and to stratify risks in these patients. It takes a little time to be made and can be carried out in all clinics and gives the possibility to predict progressing of the disease and its outcome.

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## CANDIDA ALBICANS AND STOMACH ULCER PERFORATION IN IMMUNOCOMPETENT PATIENT

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### ABSTRACT

Candida infections have become a common and serious problem in non-neutropenic general surgical patients. Fungal microorganisms as a cause of peritonitis due to gastric perforation, is very rare. We are reporting a case of 55 years old female who underwent emergency surgery because of gastric ulcer perforation with peritonitis. The presence of only Candida in the abdominal fluid was found. Due to timely and adequate treatment with Fluconazole, there was no progression of peritonitis.

**Keywords:** perforation, ulcer, Candida albicans.

### აბსტრაქტი

Candida-ს გვარის სოკოთი გამოწვეული ინფექციები ხშირი და სერიოზული პრობლემა გახდა იმუნოკომპეტენტურ პირებში. სოკო, როგორც კუჭის წყლულის პერფორაციის გამომწვევი ეტიოლოგიური აგენტი არის ძალიან იშვიათი. უმეტეს შემთხვევაში კუჭის წყლულის პერფორაცია გვხვდება როგორც წყლულოვანი დაავადების გართულება, ასევე რისკის ჯგუფს მიეკუთვნებიან ის პირები, რომლებიც ხანგრძლივად იღებდნენ ანთების საწინააღმდეგო არასტეროიდულ პრეპარატებს, სიმსივნური პაციენტები და ა. შ. ჩვენ წარმოგიდგინთ 55 წლის ქალის კლინიკურ შემთხვევას, რომელსაც აღენიშნებოდა ძლიერი მუცლის ტკივილი, ლებინება, საერთო სისუსტე. ინტრაოპერაციული დიაგნოზი იყო კუჭის წყლული გართულებული პერფორაციით. სასწრაფო ლაპარატომია იყო წარმოებული. ინტრაპერიტონიული სითხიდან ამოითესა Candida-ს გვარის სოკო. დროული და ადეკვატური დანიშნული მკურნალობის გამო ფლუკონაზოლით არ მოხდა პერიტონიტის პროგრესირება.

**საკვანძო სიტყვები:** პერფორაცია, წყლული, Candida albicans.

### INTRODUCTION

Candida is a ubiquitous fungus, even in the gut of healthy individuals. However, it is rarely pathogenic in the gut. Under normal circumstances, the level of the Candida are controlled by beneficial bacteria. However, if the bacterial-fungal balance is upset by the usage of antibiotics, for example, or if the immune system is compromised, an overgrowth of Candida can occur, resulting in an infection(1,2). The Candida infections in the gut occur mostly in immunocompromised patients, in patients who are on steroid therapy, in those with diabetes mellitus and HIV infection, in patients who are on chemotherapy, etc and very rarely, Candida infections of the gut occurs in healthy persons(3,4). A fungal overgrowth in the gut is encouraged by certain pH levels and by the availability of sugar (glucose)(5,6). The patients who regularly use antacids and those with hyperglycemia are at an increased risk. Candida infection of gastrointestinal (GI) tract is frequent in an immunocompromised patient and rare in an otherwise healthy person. In the GI tract, it frequently involves the esophagus and rarely involves the stomach and small bowel (7,8). There are only few reports of Candida involving stomach. Candida infection of the stomach can occur in persons who ingest corrosive chemicals, such as concentrated sulfuric acid and thiocyanates. Candida colonies are normal commensals of the gastrointestinal tract. Gastric perforation which is caused by Candida infections is very rare and it is seen mostly in immunocompromised and debilitated patients(9). In nonneutropenic patients, relatively short therapy appears effective.

We are reporting the case of a 55 year old female. She had no predisposing factors or history of stomach ulcer nor had taken non-steroidal anti-inflammatory drugs (NSAIDs).

### CASE RAPORT

A 55-year-old woman was admitted to the Emergency Department of the First University Clinic of TSMU, (Tbilisi, Georgia) with complaints of sudden, severe pain in the epigastric region, followed by the spread of pain throughout the abdomen. Her past history was not significant. On examination, her pulse rate was 91/min and blood pressure 177/90mm, oxygen saturation was 91%. There was tenderness and guarding all over the abdomen and a liver dullness was absent. X Ray examination revealed free air under the diaphragm. The serological tests which were done for HIV, hepatitis B and C

were negative. An emergency laparotomy was performed. Perforation of prepyloric part of the stomach and peritonitis was diagnosed. The peritoneal fluid was sent for culture. Bacteriological investigations were including isolation of poor culture, identifying microbes with rapid identification system (API20E, API Staph, API Strep, API Ana, APIC aux, bioMerieux). Rapid tests for identification of oxidase and catalase were also used. Intra abdominal effusion was cultured in aerobic and anaerobic atmosphere (Gen-Bag biomerieux) on the enrichment and differential-diagnostic medium: bloody agar (TSA 5% with sheep blood) , Endo agar (for Enterobacteriaceae family) and Sabouraud dextrose agar (for fungus). The peritoneal fluid culture revealed colonies of *Candida albicans*. Antifungal treatment was started with Fluconazole. She responded to the treatment very well. Sudden acute myocardial infarction was developed and patient was placed in Department of Therapy and Cardiology.

### CONCLUSION

This case emphasized the rare fungal peritonitis after gastric perforation. Due to adequate treatment, there was no progression of peritonitis. The fungal peritonitis should always be thought in case of peritonitis due to gastric perforation, even in healthy patients, to reduce the significant mortality which is associated with this disease, early detection is necessary to treat the *Candida* infections.

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## CYTOMEGALOVIRUS REACTIVATION IN ICU PATIENT (CASE RAPORT)

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### ABSTRACT

The role of cytomegalovirus infection in contributing to outcomes In critically ill immunocompetent patient has not been fully defined. Active infection is observed in ICU patients and in more the 20% of ICU patient - positive serology. More studies are needed to identify factors that could predict the risk of developing a CMV reactivation, mechanism causing CMV pathogenicity and predisposing immunologic conditions associated with the development of CMV reactivation. Clinically significant CMV disease (reactivation of previously latent infection or newly acquired infection) frequently develops in immunocompromised patients. Cytomegalovirus can cause a wide spectrum of infection in immunocompetent hosts and multisystem involvement (fever of unknown origin). The case of cytomegalovirus activation in immuno competent patient is presented. The case highlights challenges surrounding diagnosis and identification of CMV and patient management.

**Keywords:** Cytomegalovirus, immunocompetent patient, treatment.

### აბსტრაქტი

ციტომეგალოვირუსი (ცმვ) ინფექცია უკიდურესად მძიმე ჯანმრთელობის მქონე იმუნოკომპეტენტურ პაციენტებში არ არის ბოლომდე შესწავლილი. აქტიური ინფექცია გვხვდება რეანიმაციის პაციენტებში და 20% -ზე მეტი სეროპოზიტიურია. მრავალი კვლევის ჩატარებაა საჭირო, რომ დადგინდეს ის რისკის ფაქტორები, რომლებმაც შეიძლება გამოიწვიონ ციტომეგალოვირუსის რეაქტივაცია. ცმვ-ის კლინიკური გამოვლინება (ლატენტური ინფექციის რეაქტივაცია ან ახლად შეძენილი ინფექცია) ხშირად გვხვდება იმუნოკომპრომისულ პირებში.

ციტომეგალოვირუსს შეუძლია გამოიწვიოს მულტისისტემური ინფექცია იმუნოკომპეტენტურ პირებში (დაუდგენელი ეტიოლოგიის ცხელება). ჩვენ წარმოგიდგინთ ციტომეგალოვირუსის რეაქტივაციის შემთხვევას 32 წლის იმუნოკომპეტენტური მამაკაცის მაგალითზე, რომელიც სასწრაფო დახმარების მანქანით მოთავსებულ იქნა თსუ პირველი საუნივერსიტეტო კლინიკის რეანიმაციის განყოფილებაში ავტოკატასტროფის გამო თავის ქალის ტრამვით. ეს კლინიკური შემთხვევა არის რეაქტივირებული ციტომეგალოვირუსული ინფექციის იდენტიფიკაციის და ანტივირუსული პრეპარატით განციკლოვირით მკურნალობის წარმატებული შემთხვევა.

**საკვანძო სიტყვები:** ციტომეგალოვირუსი, იმუნოკომპეტენტური პაციენტი, მკურნალობა.

### INTRODUCTION

Cytomegalovirus is maior  $\beta$  herpes virus a human pathogen a double-stranded DNA virus and a member of the Herpesviridae family. The other family members include herpes simplex virus type 1 and herpes simplex virus type 2, varicella zoster virus (VZV), human herpes virus (HHV)-6, HHV-7, and HHV-8.

Clinically significant CMV disease (reactivation of previously latent infection or newly acquired infection) frequently develops in patients immunocompromised by HIV infection, solid-organ transplantation, or bone marrow transplantation, as well as in those receiving high-dose steroids, tumor necrosis antagonists, or other immunosuppressing medications for conditions such as systemic lupus erythematosus rheumatoid arthritis, Crohn disease, or psoriasis, among others.

CMV can cause a wide spectrum of infection in immunocompetent hosts, severe community-acquired viral pneumonia, liver (transaminitis), spleen (splenomegaly), GI tract (colitis), CNS (encephalitis), hematologic system (cytopenias), and multisystem involvement (fever of unknown origin). Uncommon sites of CMV infections in immunocompetent individuals include the kidneys, adrenals, salivary glands, pancreas, and esophagus.

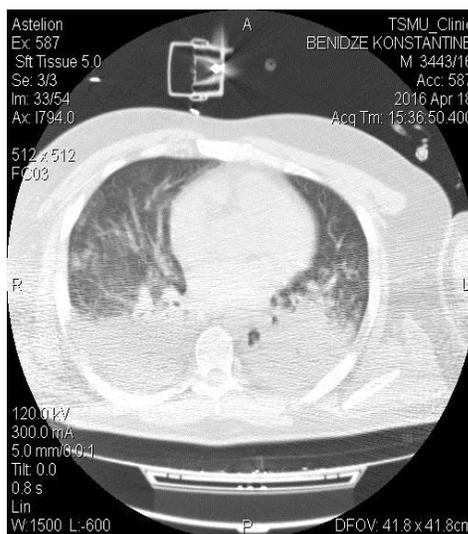
The lung is maior organ involved in active CMV infection with end organ disease. There are no specific clinical signs. There is no radiological specificity. Sepsis, blood transfusion, corticosteroids, ARDS have been associated with the risk of CMV reactivation.

CMV pneumonia is defined as signs and symptoms of pulmonary disease in combination with detection of CMV in bronchoalveolar fluid or lung tissue. CMV detection should be performed via culture, histopathology, immunohistochemical analysis, CMV DNA PCR testing alone is too sensitive for diagnosing CMV pneumonia.

### CASE REPORT

32 year old man. Caucasian, was admitted in ICU after vehicle accident. Diagnosis: polytrauma, head closed trauma, brain contusion, acute subarachnoid haemorrhage, scalped wound in temporal and parietal area. Closed chest trauma, lung contusion, fracture of shoulder bone, multiple and open fracture of shin bone. Excoriation of chest, abdomen, pelvic, both extremities area, multiple subcutaneous hematomas.

At admission patient was in coma (GCS 4-5), hemodynamia was unstable and was used norepinephrine infusion. In operating room have been performed scalped wound surgical treatment and left shin osteosynthesis. Chest CT revealed bilateral lung contusion. From second day of admission developed hyperthermia >39-40°C, leucocytosis ( $20 \times 10^9/l$ ) and rash on full body surface. After one week. On second CT scan of chest revealed bilateral, dorsal infiltration in lung parenchyma. (picture N1).



Picture N1

On seven day after admission was identified **Nocardia spp.  $10^5/l$**  in sputum. Blood culture analysis revealed **Staphylococcus aureus  $10^8/l$** . From phlegmon of femoral soft tissue also was identified **Nocardia spp.  $10^5/l$** . Sputum, urine, wound culture detected hospital pathogens on different time, pseudomonas aeruginosa and others.

Antibacterial treatment was based on datas of susceptibilty test. Regardless of suitable treatment, patient state was worsened. Developed respiratory distress syndrom, hepatic disfunction, acute renal failure, permanent hyperthermia. On twentieth day after admission was investigated blood for CMV detection. By CMV DNA PCR quantitative testing was revealed **CMV - 950 copies/ml**.

Patient was treated with ganciclovir 5mg/kg twice a day within 2 week. From fifth day after treatment patient state was improved, temperature decreased, respiratory parameters was normalized.

### CONCLUSION

In case of 32 years old man the diagnosis of CMV reactivation was established by blood investigation. Cytomegalovirus can be pathogenic by decreasing host defences, against other microorganisms, enhancing inflammatory response. There is dilemma to treat or not to treat? Some randomized controlled trials evaluated the effectiveness of an antiviral therapy and one study to show increased the number of day free of mechanical ventilation.

The case surrounding diagnosis is an identification of CMV, patient management and effectiveness of an antiviral therapy in improving outcomes.

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## SOLAR GRID INTEGRATION ISSUE: OVERVOLTAGE DILEMMA

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### ABSTRACT

In this modern era of technology where, electricity is the life line for human needs. There exists two main approaches for electricity namely conventional and non-conventional. Despite of unfriendly behavior of conventional power plants (CPP), almost 77 percent of global electricity (GE) being generated by CPP and unfortunately only 23 percent of GE is generated by most environmental friendly way, non-conventional power plants (NCP) [1]. No doubt that the world is now seriously looking for NCP to generate electricity to reduce the impact on environment and to ensure safe energy with reliability but there required lot of study before its full functionality. From the many sources of NCP, the Solar Power is one of the major source of electricity in the world. This paper is based on the study of the one of the major issue "overvoltage protection scheme" which is occur when solar power is added at a power grid [2]. To illustrate this issue a well-known electrical software named "Electrical Transient Analysis Program" is used. This study is based on the simulation in ETAP with different parameters of power system. On and offline power system has been developed and simulated successfully according to the data obtained from authentic sources at different times during day light. The obtained results of the load flow study are based upon Newton-Raphson Power flow solution.

**Keywords:** CPP, GE, NCP, ETAP, Power System, Newton-Raphson Power flow solution, Load flow, Introduction

### I. INTRODUCTION

In recent year the rapid growth in technology and industrialization led the world towards the development and consumption of electricity in every possible ways. Although nonconventional sources for electricity is very popular at the beginning because of its fast production and abundance of fuel but now due to its long lasting side effects on the environment and their declining resources in the world, many countries now working on renewable energy resources which are not only environmental friendly but also readily available.

Renewable energy resources have many types i.e. solar, wind, tidal, geothermal, etc. Due to their large availability and high efficiency; solar and wind resources of energy is famous among all renewable energy resources. Additionally, in Asia and Australia solar power is dominant among other types of renewable energy. This is due to constant availability of sunlight throughout the year and can be exercise and convert into electrical power for consumption.

No doubt that renewable energy is the source of clean energy but it has some negative impacts on the grid when it is injected on the grid [2]. This is due to the difference in mode of generation. Solar and wind are generated in DC and Hydal and other sources of electricity i.e. non-conventional are generated in AC, therefore making it not possible to added directly on a same grid. It requires AC to DC conversion or DC to AC conversion before adding on the grid. Due to which we face problems in synchronizing the different sources of electricity. [3]

Another impact is when we added large scale power on the grid, the protection and transmission schemes of the grid must be change to allow huge amount of energy on the grid. For that purpose the protection and transmission schemes needs to be investigated. [4] Furthermore the generation of other resources of energy must be reduce in order to compensate the addition of renewable energy on the grid; for which we have to investigate and plan the generation, timing and schedules of the other resources of electricity before adding renewable energy on the grid. [5]

For the investigation and simulation of above predicted problems, a powerful tool of electrical engineering, ETAP Software is used. In this research work we underlined the operative use of ETAP software for the analysis and monitoring of electrical power system which include an offline power grid, solar panels and one Hydal Generator. This paper expresses the effects of the addition of solar power on a power grid which already operating on Hydal Power using ETAP with the help of single line diagram. The load flow study is carried out on the basis of Newton-Raphson Power Flow Study. The system is analyzed under three conditions at full load which are summarizing as: (i) when no solar power is added on the power system. (ii) When small scale solar power is added on the power system. (iii) When large amount of solar power is added on the power system.

Moreover, this paper is divided into four sections. Section 1 focuses on the introduction of the research paper and Section 2 comprises on the brief description of the designed power system in ETAP. Section 3 discusses the single line diagram of the system under concern and studied results based on Newton-Raphson Power Flow Study. Section 4 comprises on conclusion and endorsement of this research paper.

## II. BRIEF IDEA OF DESIGNED POWER SYSTEM IN ETAP

What is a Power System? [6]

A Power System can be defined as “An electric power system is a network of electrical components used to supply, transfer and use electric power.” An overview is shown in the following figure.

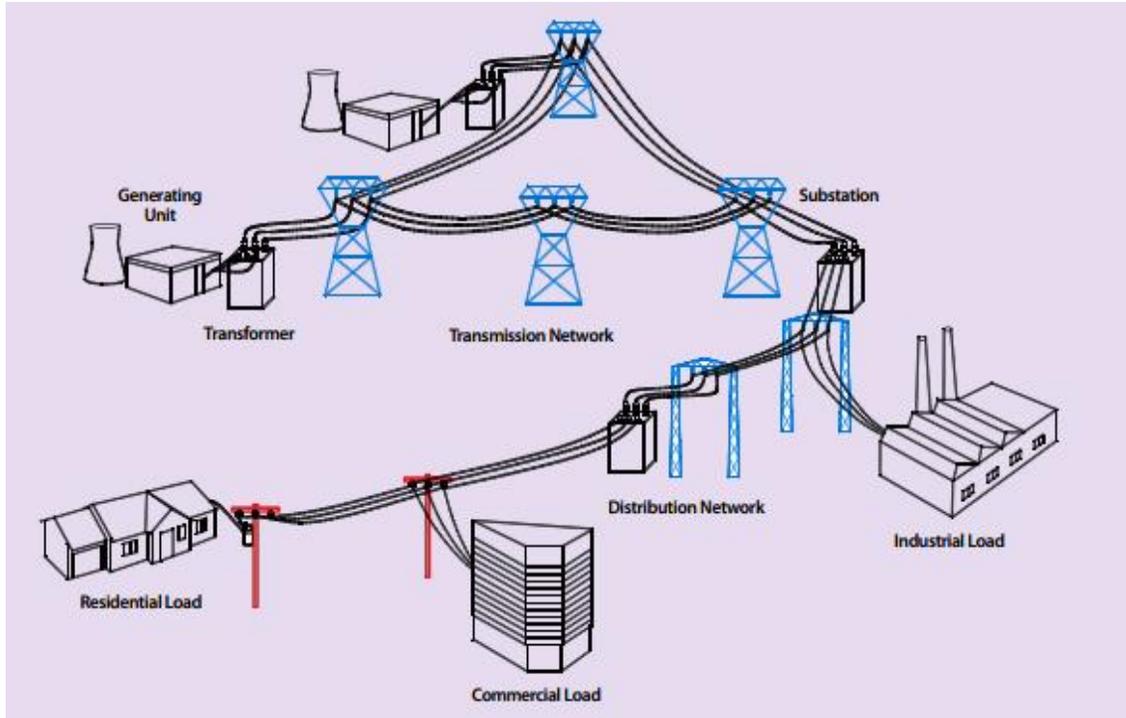


Figure No: 01

In this research work we have established a power system with a distribution network having lumped loads at three busses and all three loads are operating at full load condition. As a model in ETAP, a distribution feeder of 400V is developed to investigate the overvoltage dilemma when large solar power is added at the busses of distribution network of a power system. Three scenarios are well-thought-out which was summarized above.

### Key Features of Power System

A distribution feeder is developed within power system which is operating at full load with and without addition of solar power both at small and large scale. The key features are:

- Three lumped loads are connected which are operating at full load condition.
- Three busses are developed and each bus is connected with a lumped load.
- Bus # 01 is connected with a Generator. Its specification will be discussed below.
- At each bus solar power is added first at small scale and then at large scale.

### Components of Power System

The system under consideration is developed in ETAP according to the data obtain from real and recorded resources [7]. The ETAP Software has many features which enable us to build our own power system with desired specification. The components of the system under consideration are as follows:

- MVAR Controlled Generator
- Step down Transformer
- Busses
- Distribution network
- Lumped Loads
- Solar Panels
- Battery Banks
- Invertor and Convertor

**Parameters of Power System**

- Specification of the MVAR Controlled Generator is tabulated in the following table.

Table No: 01

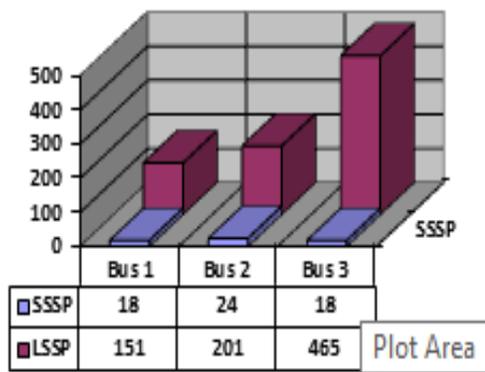
Type	Rated Power	Rated Voltage	No of Poles	RPM	Power Factor	Frequency
MVAR Controlled	20 MW	22kV	4	1500	0.99	50Hz

- Two step down transformer is used having ratings are as follows

Table No: 02

Type	Rated Voltage	Point of Installation
Step Down Transformer	22/13.8 kV	Between MVAR Generator and Bus 1
Step Down Transformer	13.8 / 0.4 kV	Between Bus 1 and Feeder 1
Step Down Transformer	13.8 / 0.4 kV	Between Bus 2 and Feeder 2
Step Down Transformer	13.8 / 0.4 kV	Between Bus 3 and Feeder 3

- Lumped loads having ratings of 0.212MVA, 0.212MVA and 0.106MVA has been taken from Bus 1, 2 and 3 respectively.
- Solar Panels ratings are as follows.
- High storage ratings of battery banks are used which are readily available in ETAP.



Graph No: 01

SCSP = Small Scale Solar Power  
LSSP = Large Scale Solar Power  
Scale on the Graph.  
One step on y-axis = 1kW  
except for LSSP at Bus three  
where one step on Y-axis =  
100kW

**III. BLOCK DIAGRAM AND REPLICATION OF THE SYSTEM UNDER CONTEMPLATION IN ETAP**

The block diagram of the system under consideration is shown in the figure below.

Simulation in ETAP is done according to the three conditions stated above which are briefly explained below:

When there is no solar power is added on Distribution Feeder. “Investigated and inspected the system stability and checked the status of protection schemes.”

When there is solar power added in small scale on Distribution Feeder. “Investigated and inspected the system stability and checked the status of protection schemes, relays and CTs functions etc.”

When there is solar power added in large scale on Distribution Feeder. “Investigated and inspected the system stability and checked the status of protection scheme, relays and CTs functions etc.”

### Block Diagram

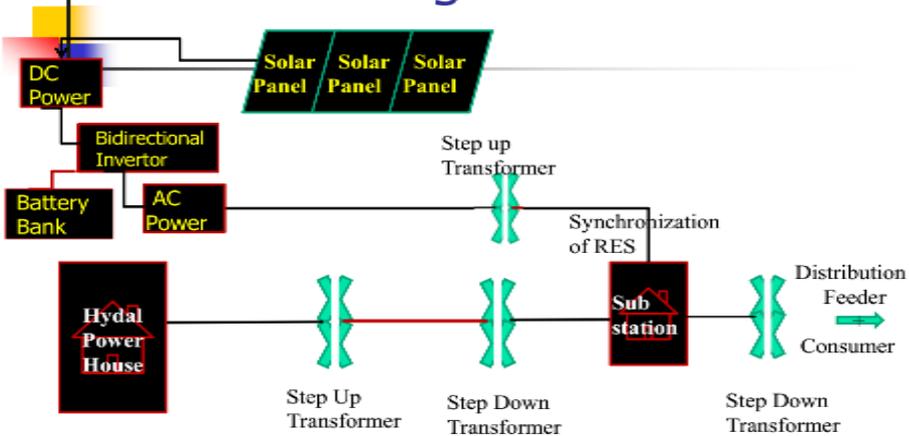


Figure No: 02

**Condition # 01:**

When there is no Solar Power is added on Distribution Feeder  
 Simulation of distribution feeder in ETAP when no solar power is added is shown in the following figure.

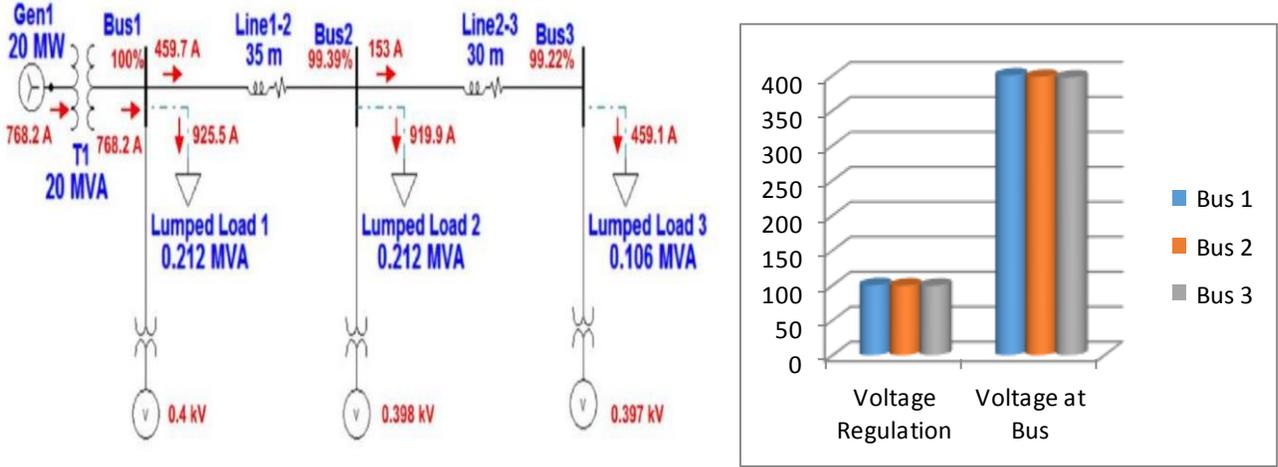


Figure 03: Simulation in ETAP without solar power.

Graph No: 02

**Condition # 01: Investigate Results**

Table No: 03

Bus Number	Voltage Regulation Before Solar Power Injection	Voltage Regulation after Solar Power Injection	Voltage at Bus before Solar Power Injection	Voltage at Bus after Solar Power Injection	Operation of Protection Schemes
Bus # 1	100 %	No Solar Added	400 V	No Solar Added	Normal
Bus # 2	99.39%	No Solar Added	398 V	No Solar Added	Normal
Bus # 3	99.22%	No Solar Added	397 V	No Solar Added	Normal

When there is no solar power added, all busses are operating at normal at voltages and the lumped loads are taking properly from the feeder. Voltage regulation is almost 100% and system is stable and functioning properly. All protection schemes, CTs and Relays are functioning properly. No issues were found. It's a stable system with all parameter at normal condition.

**Condition # 02:** When there is solar power added in small scale on Distribution feeder

Following is the figure showing the simulation of distribution feeder at 0.4kV in ETAP which is investigated under addition of small scale solar power on it.

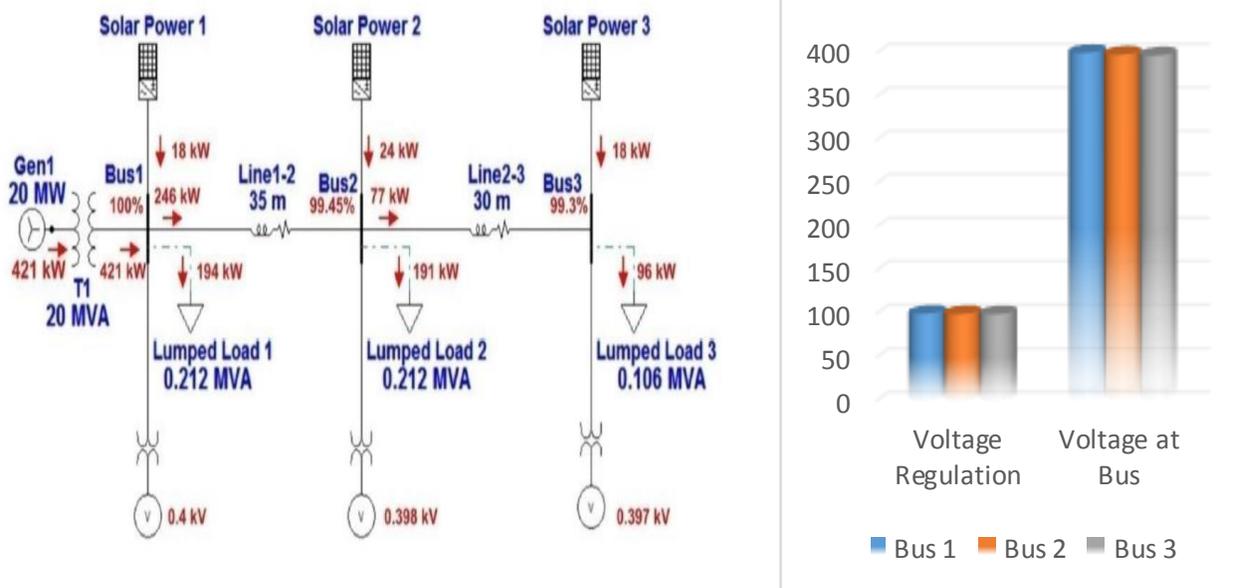


Figure No: 04 Simulation in ETAP when small scale solar power is added.

Graph No: 03

**Condition # 02: Investigate Results**

Table No: 04

Bus Number	Voltage Regulation Before Solar Power Injection	Voltage Regulation after Solar Power Injection	Voltage at Bus before Solar Power Injection	Voltage at Bus after Solar Power Injection	Operation of Protection Schemes
Bus # 1	100 %	100 %	400 V	400V	Normal
Bus # 2	99.39%	99.45 %	398 V	398 V	Normal
Bus # 3	99.22%	99.30 %	397 V	397 V	Normal

When there is small scale solar power is added, all busses are operating at normal voltages and the lumped loads are taking properly from the feeder. Voltage regulation is almost 100% and system is stable and functioning properly. Protection schemes are functioning normally. All CTs and Relays are working properly. No issues were found at small scale solar power penetration. It's a stable system with all parameter at normal condition.

**Condition # 03:** When there is solar power added in large scale on Distribution feeder

Simulation in ETAP of Distribution Feeder when large scale solar power is added in the system is shown in the following figure.

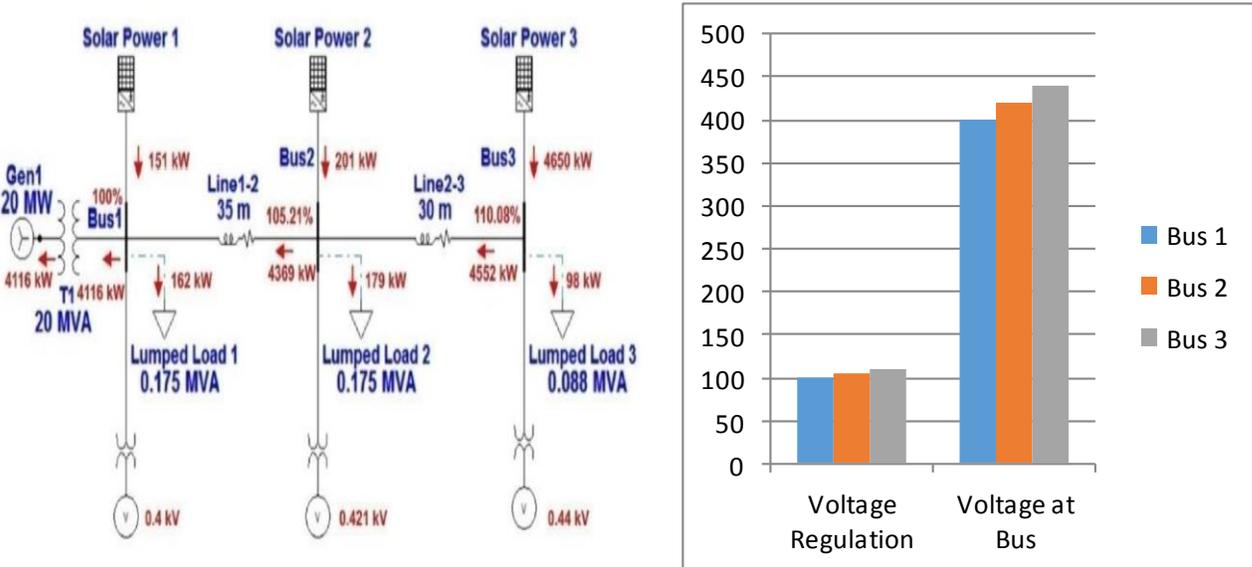


Figure 05: Simulation in ETAP when large scale solar power is added. Graph No: 04

**Condition # 03: Investigate Results**

Table No: 05

Bus Number	Voltage Regulation Before Solar Power Injection	Voltage Regulation after Solar Injection	Voltage at Bus before Solar Power Injection	Voltage at Bus after Solar Power Injection	Operation of Protection Schemes
Bus # 1	100 %	100 %	400 V	400V	Not Normal
Bus # 2	99.39%	105.21%	398 V	421 V	Not Normal
Bus # 3	99.22%	110.08 %	397 V	440 V	Not Normal

When there is large scale solar power is added, Bus2 and Bus3 isn't operating at normal voltage, they goes into "Overvoltage Condition" while Bus1 is operating at normal voltage. Voltage regulation is change and exceeds from 100% at Bus2 and Bus3. As the system goes into overvoltage condition, the protection schemes are starts malfunctioning. The CTs and Relays are not working properly. Issues of Overvoltage were found at large scale solar power penetration. It's not a stable system and all parameter are not working at normal condition.

As we have successfully examined the three conditions stated at the beginning of this paper. We have found that the system under consideration is going into "overvoltage condition" when large scale solar power is added in the system. A potential solution to this issue is successfully simulated in ETAP which specified in the following paragraphs.

**Potential Solution to Overvoltage Issues**

- These are the final solution we found during our research work to overcome the issues concerning overvoltage.
- Install battery banks with large charging capacity on the distribution feeder.
- We have found a benefit and that is improvement in voltage regulation on the busses where solar power is added in large scale which will discuss at the end of this paper.

**Charging Mode of the Power Bank:**

By installing large capacity battery banks for power storage as well as for power supply in needs, the issues of overvoltage can be eliminate from the distribution feeder.

• This is illustrated by simulation in ETAP in Figure 06 and Figure 07. Figure 04 shows the charging mode of battery banks. When overvoltage start occurring the system enable charging mode of battery banks and stop the system from going into overvoltage by storing excess power of the system into battery banks.

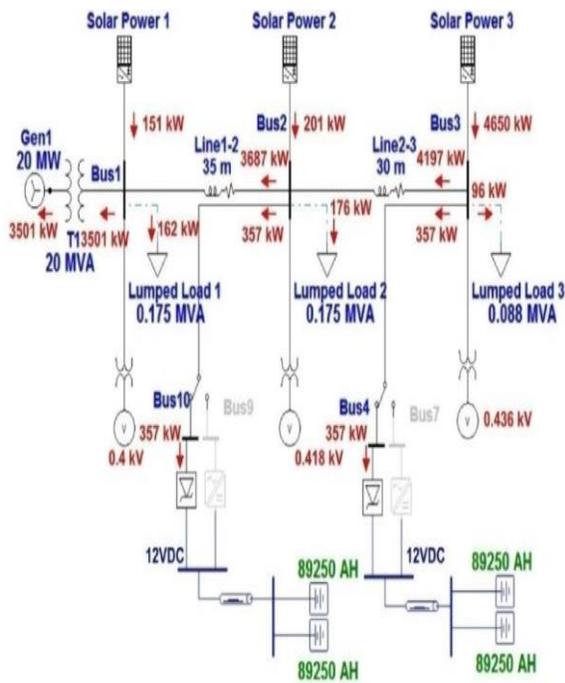
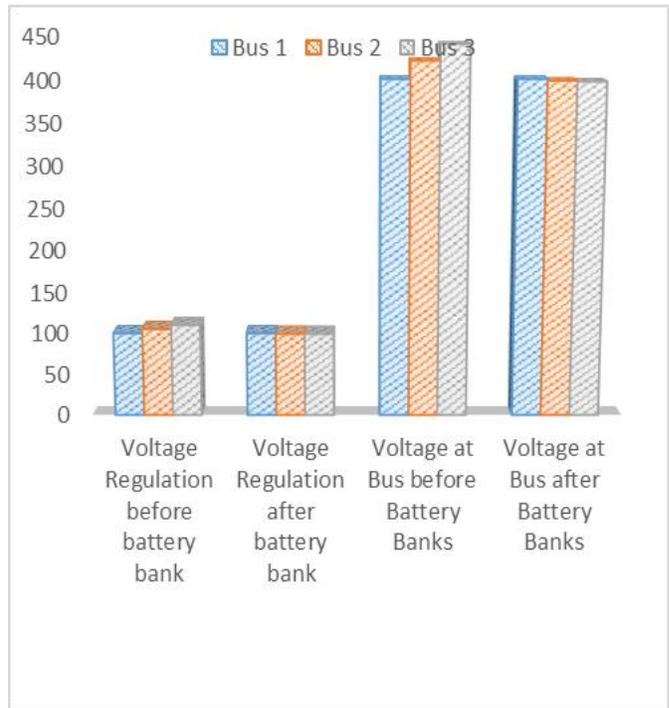


Figure 06: Charging mode of battery banks



Graph No: 05

The Simulated Results are tabulated below:

Table No: 06

Bus Number	Voltage Regulation After Large Solar Power Injection	Voltage Regulation after Battery Installation	Voltage at Bus After Solar Injection	Voltage at Bus after Installation of Battery Banks	Operation of Protection Schemes
Bus # 1	100 %	100 %	400 V	400V	Normal
Bus # 2	105.21 %	99.40 %	421 V	398 V	Normal
Bus # 3	110.08 %	99.30%	440 V	397 V	Normal

This simulation and tabulated results clearly showed that when excess amount of solar power is added in the system, the excess power at Bus 2 and Bus 3 get a new path to travel and when the power is reached at battery banks, the battery banks begin to store the excess power. As we are using high storage capacity battery banks therefore, the storage capacity of battery always has some space to store excess power even if solar panels work at full efficiency during whole day light. This tapping of the excess power from the busses prevents the system from going into “Overvoltage Condition” and made the system stable even at large addition of solar power at busses.

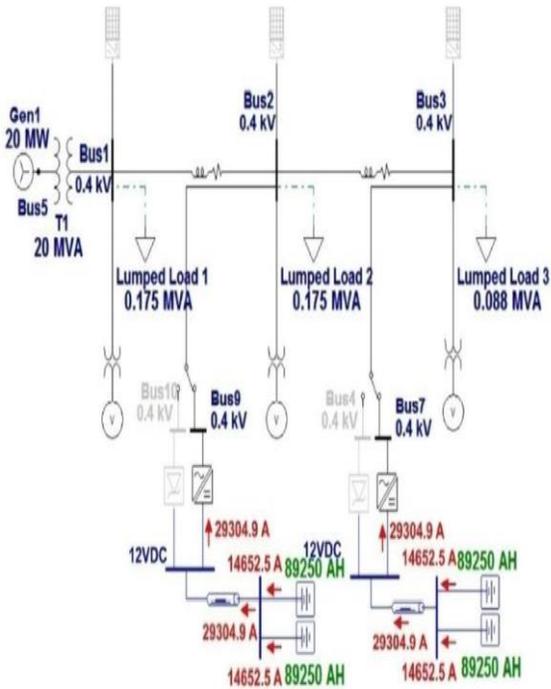
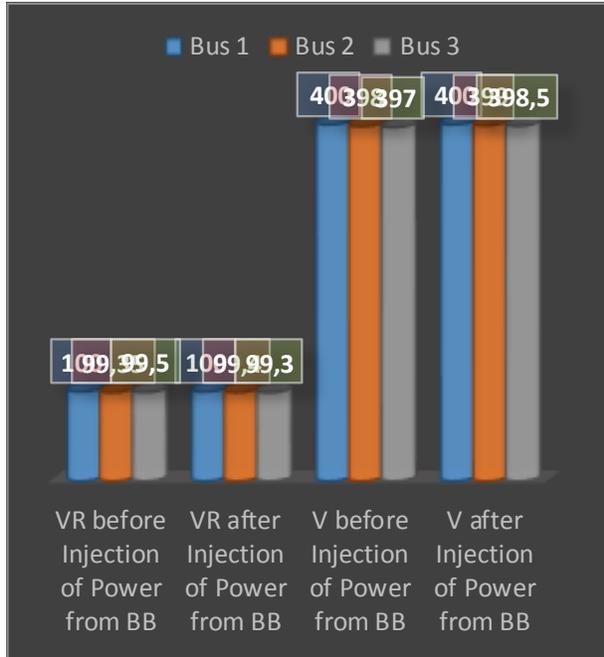


Figure No: 07



Graph No: 05

**Discharging mode of Power Bank:**

When power is in need for the system, the battery banks is supplying power into the system which is operates at normal conditions and no issues found.

The Simulated Results are tabulated below.

Table No: 07

Bus Number	Voltage Regulation After injection of Power from Battery Banks	Voltage Regulation after Battery Bank Installation Before injection of Power From Battery Banks	Voltage at Bus Large Power Injection	Voltage at After Solar	Voltage At Bus after Installation of Battery Banks	Operation of Protection Schemes
Bus # 1	100 %	100 %	400 V	400V	400V	Normal
Bus # 2	99.35 %	99.40 %	421 V	398 V	398 V	Normal
Bus # 3	99.50 %	99.30%	440 V	397 V	397 V	Normal

At the end of the day light or at evening, the power demand is increase many folds as the domestic users also uses electricity for domestic purposes with industrial loads. At such timing the power demand is reached at peak and we need extra power in the system to overcome this peak value of load. For that purpose the stored power in the battery banks are readily available in the system without any complication and we don't need to turn on peak loads generators etc.

From the simulation in ETAP, we have found that by installing the stored power from battery banks into the feeder has no negative impact on the system. It will be helpful to reduce the power demand and the loads will properly operating at the busses. Yet we have to convert the stored power at battery banks into AC before it is added into the feeder but our software done it well using convertors and the synchronization is quite successful.

From the above discussed solutions we have now successfully concluded that the overvoltage issue can be eliminated by using battery banks and it has an additional benefit which is "improvement in voltage regulation."

This benefit is tabulated below. This data is collected from Bus 2 only.

The smaller the value of voltage regulation, the closer is the buses voltage compared to the rated operating voltage of the buses. It also means lesser voltage drop across the distribution line. In addition, having operating voltage of Bus 3 to be closer to the rated voltage, it means that more loads is able to be catered by the distribution feeder while the operating voltage still remains in the range of acceptable voltage.

#### IV. Conclusion and Endorsement:

After analyzing the effect of solar power at the power system we have concluded that the integration of solar power is quite possible yet it has some negative impacts on the system but they can be eliminated. From this research work we have found that we don't need any additional generator to meet the peak load demand of power even after day light. It is quite economical for our system. Additionally, it has a very good benefit that is improvement in voltage regulation. So we don't need any additional step to improve voltage regulation at busses after installing solar panel at busses.

Table No: 08

No Solar Added	No Solar Added	Solar Added	No Solar Added	Solar Added
No Load Voltage (V)	Full Load Voltage (V)	Full Load Voltage (V)	Voltage Regulation (%)	Voltage Regulation (%)
400	398.4	398.6	0.401606426	0.351229303
400	397.8	398.9	0.55304173	0.275758335
400	397.8	399.6	0.55304173	0.1001001
400	398.0	400.0	0.502512563	0
400	398.1	399.8	0.477267018	0.050025013
400	398.1	399.2	0.477267018	0.200400802
400	397.8	397.8	0.55304173	0.55304173

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## VAGINAL BACTERIAL FLORA OF PREGNANT WOMEN COLONIZED WITH B GROUP STREPTOCOCCI.

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### ABSTRACT

Group B streptococci (GBS) are a group of bacteria which is found in 15-40% of healthy women's colon and vagina. Pregnant women with colonized vagina with GBS are prone to transmit it to their newborn. In the recent decade, Group B Streptococcus (GBS) has been one of the common causes of the early onset of sepsis among the newborns, which leads to high rate of morbidity and mortality. The incidence of early onset GBS disease is from 1.3 to 3.7 per 10000 live births. In addition, GBS is one of the main causes of infection in pregnant women with chorioamnionitis, endometritis, genitourinary tract and surgical wound infection. Genital infection is responsible for almost one-third of preterm deliveries, and GBS produce protease activity resulting to cervical ripening. Vaginal cultures were conducted in 532 women at 22 to 36 weeks of gestation, who visited TSMU The First University Clinic obstetrics and gynecology department. Among 532 women, 117 were found to be GBS positive and 415 were GBS negative.

Our results showed that the rate of vaginal colonization is 21,9% approximately the same as the other countries (15-40%). No significant difference was found in positive cultures with mother's age, educational level, and history of pregnancy.

**Keywords:** Streptococcus, pregnancy, neonate.

### აბსტრაქტი

ჯანმრთელი ქალების 15-40%-ს აღენიშნება B-ჯგუფის სტრეპტოკოკის კოლონიზაცია მსხვილ ნაწლავებში და საშოში. ორსულებში კოლონიზაცია საფრთხეს უქმნის ნაყოფს. ბოლო ათწლეულებში B-ჯგუფის სტრეპტოკოკი არის ადრეული ნეონატალური სეფსისის ყველაზე ხშირი გამომწვევი, რომლის ლეტალობა მაღალია. B ჯგუფის სტრეპტოკოკით გამოწვეული აგრეული ნეონეტალური მენინგიტების ინციდენტურობა შეადგენს 1,3-დან 3,7-ს 10000 ახალშობილზე. ამასთან იგი მშობიარეებში იწვევს ქორიამნიონიტებს, ენდომეტრიტებს, შარდსასქესო სისტემის და ჭრილობის ინფექციებს. გენიტალური ინფექციები შემთხვევათა 1/3-ში იწვევენ ადრეულ მშობიარობას, ასევე B ჯგუფის სტრეპტოკოკის პროტეოლიზური აქტივობის გამო ხდება საშვილოსნოს ყელის ნაადრევი მოშლილობა.

ჩვენ რეტროსპექტიულად შევისწავლეთ 532 ორსული B ჯგუფის სტრეპტოკოკის ვაგინალურ კოლონიზაციაზე ორსულობის 22-36 კვირაზე, რომლებმაც მიმართეს თსსუ პირველ საუნივერსიტეტო კლინიკის მეანობა-გინეკოლოგიის დეპარტამენტს .532-დან 117 შემთხვევაში იყო დადებითი კულტურა, ხოლო 415-უარყოფითი.

ჩვენი შედეგებით ვაგინალური კოლონიზაცია B ჯგუფის სტრეპტოკოკით იყო 21,9%, რაც დაახლოებით უთანაბრდება მსოფლიო ქვეყნების მონაცემებს (15-40%). არ გამოვლენილა რაიმე კავშირი კოლონიზაციასა და ორსულის ასაკს, განათლებასა და ორსულობის ისტორიას შორის.

**საკვანძო სიტყვები:** Streptococcus, ორსულობა, ახალშობილი.

### INTRODUCTION

Vaginal colonization of Group B streptococcus (GBS) has been known as an important issue in mother and newborn's health, which is getting frequent in developing countries. Group B streptococci (GBS) are a group of bacteria which is found in 15-40% of healthy women's colon and vagina. Pregnant women with colonized vagina with GBS are prone to transmit it to their newborn [1],[3]. In the recent decade, Group B Streptococcus (GBS) has been one of the common causes of the early onset of sepsis among the newborns, which leads to high rate of morbidity and mortality [1]. The incidence of early onset GBS disease is from 1.3 to 3.7 per 10000 live births [2]). In addition, GBS is one of the main causes of infection in pregnant women with chorioamnionitis, endometritis, genitourinary tract and surgical wound infection. Genital infection is responsible for almost one-third of preterm deliveries, and GBS produce protease activity resulting to cervical ripening [3].

Most women infected by GBS are asymptomatic, and the organism can be found from their throat, vagina and rectum [4]. Among infected women, 50% showed GBS colonization in their vagina, while the rest revealed infection in their rectum and throat. However, the prevalence of colonization differs based on the age, parity, race, concurrent vaginal yeast colonization, genetic-ethnic factors, socio-economical status, pork consumption and recent sexual intercourse [4,5]. GBS colonization of the maternal genital tract is related to early onset neonatal sepsis, as a result of vertical transmission before or during labor [6]. The rate of vertical transmission of GBS between mothers and their offspring is about 29-85% (mean=51%). This transmission to some extent depends on factors including the severity of maternal colonization in birth canal [4].

The rate of GBS infection in the newborn of colonized mother who has not received antibiotic during delivery is one out of 200, and in cases of receiving antibiotic, it is one out of 4000. In the presence of other predisposing factors like prematurity, maternal fever, premature rupture of membranes (PROM) more than 18 hours, low birth weight and multi parity, the infection rate increases [4]. In the USA, the two major prevention strategies for GBS disease include the screening method and the risk-based approach. Pregnant women carrying GBS are offered to take intrapartum antibiotic prophylaxis [7].

The Centers for Diseases Control (CDC) recommended GBS screening for all pregnant women between 35 and 37 weeks of pregnancy, as well as taking intrapartum antibiotic prophylaxis [8],[9]. Pregnant women with unknown GBS status should be treated with antibiotic at the time of delivery [4].

The mortality rate of early onset sepsis has estimated about 50% [9],[10]. Furthermore, early onset GBS sepsis leads to a severe neonatal condition, which may result to serious neurological damage.

Vaginal cultures were conducted in 532 women at 22 to 36 weeks of gestation, who visited TSMU The First University Clinic obstetrics and gynecology department in 2015-2016.

#### **MATERIAL AND METHODS:**

Two sterile swabs from vagina were taken by a gynecologist and were sent for smear test and culture to the bacteriology laboratory. The first swab was used for preparing direct smear and gram staining to detect bacteria, epithelial cells and the number of white blood cells (WBCs). The second swab was cultured for GBS on selective chromogenic agar (StrepBSelect Agar, BIO-Rad Laboratories). After 18-24 hour incubation at 37°C appearance of blue colonies are presumptive identification of GBS. Agglutination test of group-specific polyside antigens was used for conformation (red agglutination on a green background). Sensitivity of this method is 99,9%.

#### **RESULTS:**

Among 532 women, 117 were found to be GBS positive(21,9%) and 415 were GBS negative (78,1%).

#### **Conclusion:**

Our results showed that the rate of vaginal colonization is 21,9% approximately the same as the other countries (15-40%). However, more studies are required to determine the specific rate of vaginal colonization. No significant difference was found in positive cultures with mother's age, educational level, and history of pregnancy.

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## VENTRICULAR SEPTAL RUPTURE AND TIMING OF SURGICAL INTERVENTION

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### ABSTRACT

Ventricular septal rupture (VSR) is a rare but lethal complication of acute myocardial infarction (AMI). patients presenting with ST-elevation MI (STEMI) were evaluated for heart rupture (VSR) based on reperfusion strategy. , After undergoing a primary percutaneous coronary intervention (PCI), VSR was reported to occur in 0.23-0.71% of patients. We Reported case of 70 year old, male, caucasian who were admitted in our hospital with encephalopathy and hypotension. Ventricular septal rupture (VSR) is a rare but lethal complication of acute myocardial infarction (AMI). Mortality of patients is significantly depending on timing of surgery. Operative management of patients can be complex, and having a systematic approach is helpful. The cornerstone of medical management of VSR is afterload reduction, and may be considered routine care. According our case, surgical intervention was delayed and despite adequate treatment patient was died . There is no clear evidence to guide the surgical management of patients who are in shock, as all approaches have shown extremely high mortality.

Possible strategies include emergent surgery on individuals with marked haemodynamic instability and circulatory compromise.

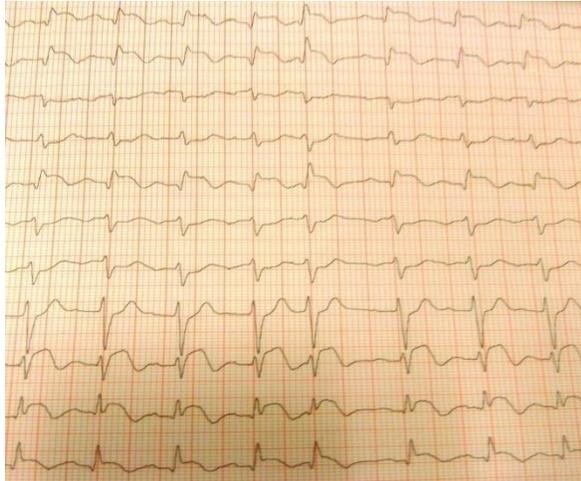
**Keywords:** Ventricular septal rupture (VSR), intra-aortic balloon counter pulsation (IABCP), Miocardial infarction, PCI (percutaneous coronary intervention)

### INTRODUCTION

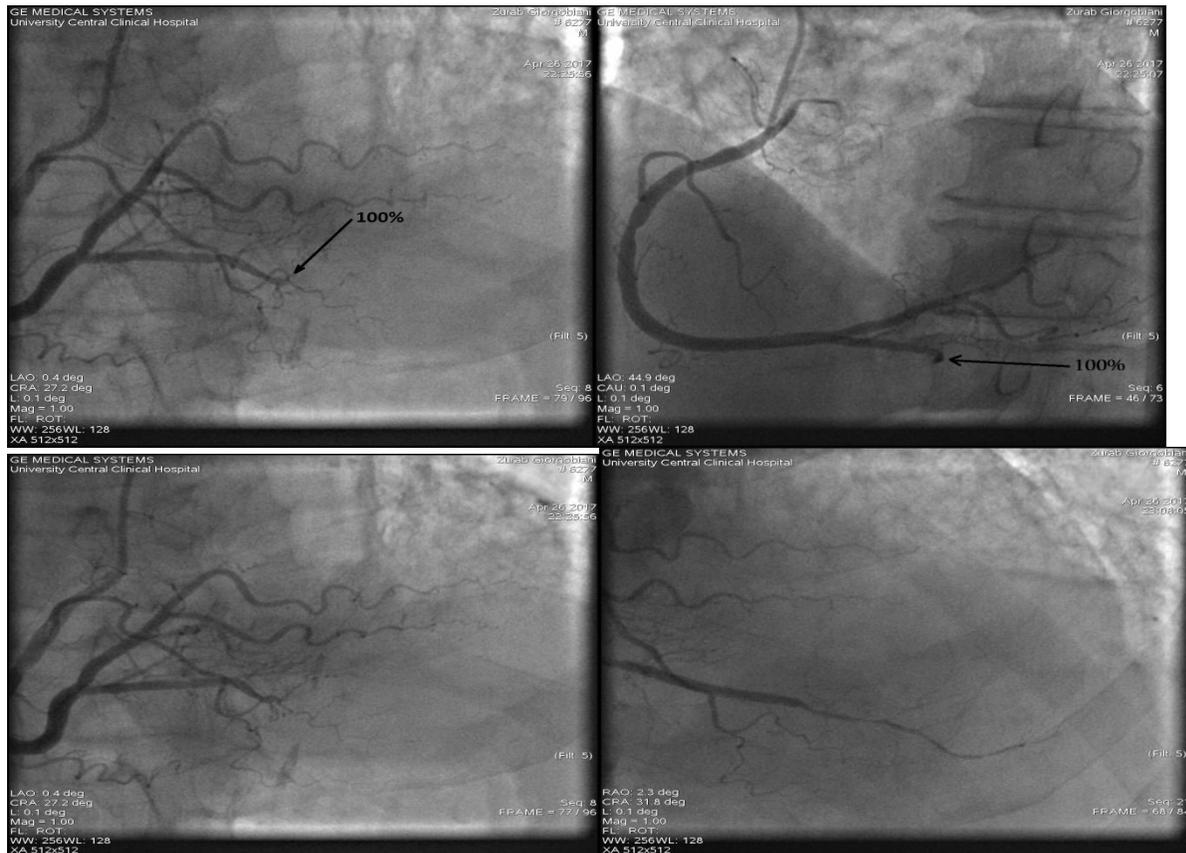
Ventricular septal rupture (VSR) is a rare but lethal complication of acute myocardial infarction (AMI). patients presenting with ST-elevation MI (STEMI) were evaluated for heart rupture (VSR) based on reperfusion strategy. , After undergoing a primary percutaneous coronary intervention (PCI), VSR was reported to occur in 0.23-0.71% of patients. Post-infarction VSR carries significant mortality (36.%) despite aggressive surgical management. Rupture develops after full-thickness (transmural) infarction of the ventricular septum and can occur at any anatomic location., Ventricular septal rupture is likely to be associated with total occlusion of the infarct-related artery. the newly formed communication results in left to right shunting of oxygenated blood from the high-pressure left ventricle to the lower-pressure right ventricle. Mortality was highest in patients who underwent operation in the first 24 h, consistent with other investigators. The case reflects the important problem after myocardial infarction, ventricular septal rupture and challenges the timing of intervention.

### CASE REPORT

Patient,70 year old, male, caucasian was admitted in our hospital with encephalopathy and ypotension. ECG revealed ST segment elevation in II,III,AVF,V<sub>4</sub>-V<sub>6</sub> lead, ST segment depression in AVL,V<sub>1</sub>-V<sub>3</sub> lead.



Koronarography detected left main artery without important stenosis, 95 % stenosis of middle segment of left anterior descending artery and 75% stenosis of distal part of left anterior descending artery. 40% stenosis of middle segment of right coronary artery, occlusion of posterior descending artery (Pict.1)



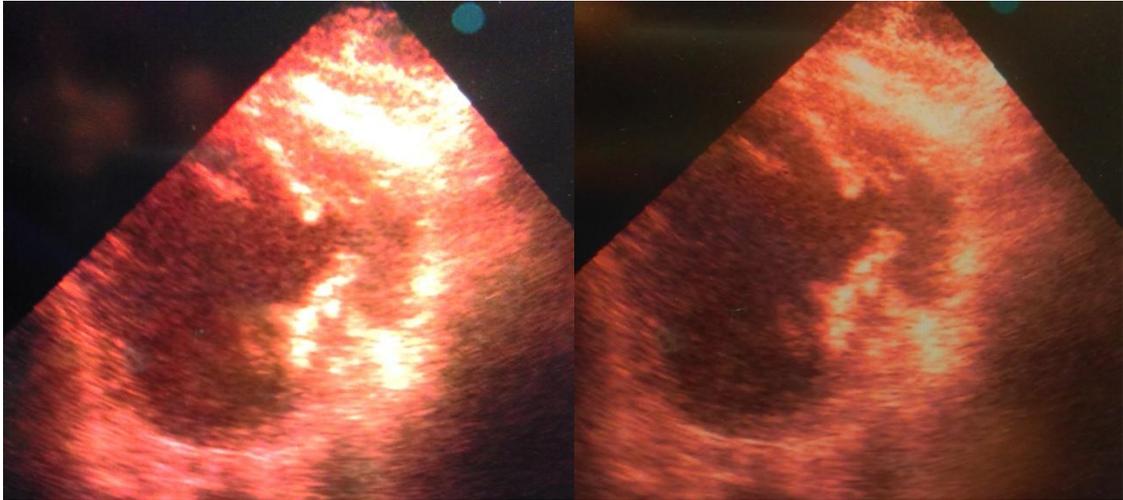
Picture 1.

The septal blood supply comes from branches of the left anterior descending coronary artery, the posterior descending branch of the right coronary artery. After recanalization and balloon predilatation of posterior descending artery, was performed drug eluted stent implantation (promus Element Plus, Everolimus DES, Boston Scientific) (Pict 2)



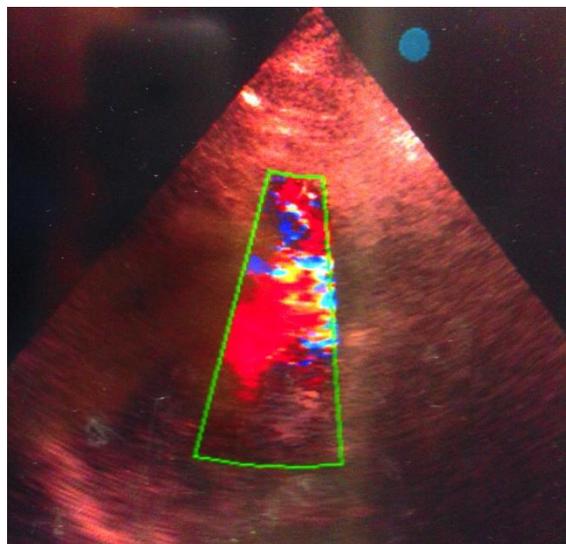
Picture 2 Stant implantation

After revascularization patient state was severe . transthoracic echocardiography (TTE) have been used to help diagnose postinfarction VSR (pict 3).



Picture 3 VSR

TTE findings have been improved with the use of color-flow Doppler methods to visualize the VSR. Usually, the diagnosis is made by a prompt transthoracic echocardiogram identifying drop-out of the ventricular septum in the 2D image and demonstration of flow across the septum using colour Doppler (pict.4)



Picture 4. Colour Doppler, flow across the septum

For hemodynamic support was used pressor infusion and intra-aortic balloon counter pulsation (IABCP). IABCP reduced left ventricular afterload, thus increasing systemic cardiac output. IABCP also facilitated diastolic augmentation with an increase in coronary blood flow, resulting in an improved oxygen supply. Surgical intervention was delayed until stabilization of patient state, but after 3 days of PCI patient was died.

#### DISCUSSION

The median time from onset of symptoms of acute myocardial infarction to rupture is generally one day in the GUSTO trial and 16 hours in emergently revascularize occluded coronaries in SHOCK trial. Management of the patient who is in acute, decompensated cardiogenic shock should be directed at reducing left-to-right shunt with afterload reducing agents and IABP placement. IABCP reduces left ventricular afterload, thus increasing systemic cardiac output and decreasing the Qp-to-Qs ratio. IABCP also facilitates diastolic augmentation with an increase in coronary blood flow, resulting in an improved oxygen supply. Current guidelines of the American College of Cardiology–American Heart Association for the treatment of patients with acute myocardial infarction recommend immediate operative intervention in patients with septal rupture, regardless of their clinical status. In the STSA-CSD study, early repair occurring less than 7 days post-MI had much greater mortality than delayed repair occurring more than 7 days post-MI. The overall operative mortality from other study was 60% which is much greater than the STS-ACSD study which was 42.9% and had the greatest mortality in patients who underwent emergent surgical repair after VSR (less than 24 hours). A waiting period before surgery allows infarcted muscle to develop a firm scar to facilitate the surgical repair, however many patients died while awaiting surgery or underwent emergency surgery after sudden decompensation. According our case, surgical intervention was delayed and despite adequate treatment and Intra-aortic balloon counter pulsation (Use of circulatory support devices such as IABP may provide a survival benefit and stabilizes patients until surgery can be performed), after 3 days from revascularization patient was died.

#### CONCLUSION

Ventricular septal rupture (VSR) is a rare but lethal complication of acute myocardial infarction (AMI). Mortality of patients is significantly depending on timing of surgery. Operative management of patients can be complex, and having a systematic approach is helpful. The cornerstone of medical management of VSR is afterload reduction, and may be considered routine care. According our case, surgical intervention was delayed and despite adequate treatment patient was died. There is no clear evidence to guide the surgical management of patients who are in shock, as all approaches have shown extremely high mortality. Possible strategies include emergent surgery on individuals with marked haemodynamic instability and circulatory compromise.

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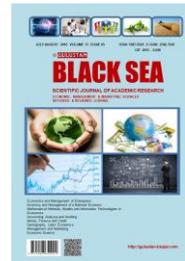
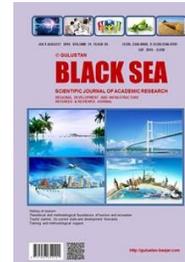
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