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Section 1. Accounting

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DIRECTIONS FOR IMPROVING THE EFFICIENCY OF AUDIT IN THE CORPORATE GOVERNANCE SYSTEM

Abstract. This article describes the corporate governance operations, including the definition, functions and importance of audit, internal audit, external audit, audit committees. In particular, the agency's problem arises from the urgency of the issue, the goals and objectives of external audit in solving it, its relationship with corporate governance and its effectiveness, as well as the audit committee, its new requirements and tasks, its organization. The new definition of internal audit, which is the main taste of corporate governance, its main principles and the new tasks that it implements today are presented.

Keywords: Corporate governance, external audit function, external audit efficiency, internal audit, external audit, audit committee, supervisory board, financial reporting, audit opinion, agency theory, transparency, organization of audit committee.

Introduction

It is clear from foreign experience that a number of financial failures and crises have attracted world attention in the last two decades. Examples include Enron, Worldcom, Tyco, Parmalat, and many other major crises [3]. Many projects worth billions have been canceled due to lack of management skills, prevention and control measures. As a result of these financial failures and crises, investor confidence in financial statements and management reporting has declined significantly.

The key role of corporate governance is to restore market confidence. Restoring investor confidence in financial markets is not easy. To do this, it is important to create clear criteria that meet the requirements of effective management and management of enterprises

that act in the interests of shareholders, and corporate governance to achieve results. This is because the theory of agency in today's economy is that management (agents) do not always act in the interests of property owners who are not involved in property management, and shareholders demand protection of their property [4]. In order to solve this problem, the supervisory board should monitor the executive body and directors and perform an oversight function, including an internal control system over financial reporting [5]. In this regard, audit services play an important role in reducing the information asymmetry ("information asymmetry" – the principal and the agent have different types and amounts of information about the company's activities), as well as easing agency problems between managers and shareholders [3]. Thus, it is clear

that the role and function of effective audit, especially external and internal audit, as well as the audit committee in the control function of corporate governance are the most basic factors in the modern economy.

The globalization of the world economy and the phenomenal emergence of corporate governance are contributing to the further development of its efficiency and the emergence of modern concepts. Today, Corporate Governance has become an important link in ensuring the efficiency of companies.

Literature review

The term “corporate governance” first appeared in the United States in the 1970s. Later, the term became widespread in European countries, where it was continued in research in the field of corporate governance, corporate law and the creation of corporate structures (organizations) [6]. The word “corporate governance” was first used by Richard Eells to mean “the structure and operation of the corporate system”. Corporate relations were first studied in 1932 by the American jurists A. Berle and G. Means in the classics as a process of corporate and private property management [8]. Although the term “corporate governance” is not mentioned in their work, they have studied the classic agency problem: how can corporate managers, as agents of shareholders, be directed to the management of corporate assets and the protection of shareholders’ interests? They linked corporate governance to the division of property and management, expressed in agency relations between property owners (external persons, investors) and their agents (insiders, managers).

From the examples given in the introductory part of the research, the weaknesses of audit committees and internal control systems in large companies such as Enron have led to corporate failure because they provide central monitoring of corporate governance mechanisms.

This means that in corporate governance, reliable and accurate accounting information that has been audited is necessary to reduce the agency’s problems.

Over the last thirty years, as a result of the development of corporate accounting, the audit function has changed radically. In particular, there is a need to implement an effective and comprehensive “audit trinity”, including internal and external auditors, the audit committee [10]. In 1999, the Blue Ribbon Committee introduced an audit committee, an internal audit, and an external audit that enhanced the reliability of financial statements as a “three-pronged tool” of corporate governance. Internal audit is perceived as a corporate governance mechanism [11]. The main function of internal audit in the corporate governance system is performed by the audit committee. As part of the corporate governance mechanism, the audit committee, together with the management of the organization, internal and external auditors, monitors the promotion and protection of shareholders’ capital and interests [12]. The Audit Committee has the right to act on behalf of the Board of Directors in order to protect investors and ensure corporate accountability, while assuming an important oversight role in corporate governance [13]. The Audit Committee receives reports from the management, internal and external auditors on the effectiveness and efficiency of internal management [14].

To alleviate the agency’s problems, the basics of corporate governance have been developed to control management behavior and encourage it to be carried out in the interests of shareholders. This can be achieved by preparing high-quality financial statements and reducing revenue manipulation. **External audit** is one of the monitoring tools used by the supervisory board to encourage managers to take into account the interests of property owners. Therefore, based on the agency theory, an effective board of directors (supervisory board) and audit committee play a key role in monitoring and controlling the actions of agents and, as a result, reduce the agency’s costs, taking into account the interests of key agents [4].

External audit is an integral part of corporate governance in the company’s internal control system,

which helps to monitor the company's management and thus increase transparency.

In order to meet its obligations to shareholders, the Supervisory Board must be provided with accurate and reliable information. The auditor assists the board in achieving this goal. There should be an open and frank meeting between the auditors and the board.

Auditors' (external) communication with the supervisory board and the audit committee should be open.

Today, stock market regulators and foreign investors are concerned about revenue management, especially in the last two decades.

One of the most important systems of monitoring is corporate governance. Its main goal is not to improve corporate performance, but to solve the agency's problems by aligning management interests with the interests of shareholders [16]. Gul and Tsui advocated the effectiveness of corporate governance as a monitoring system [17].

External audit is perceived as another important monitoring system that helps to reconcile the interests of managers and shareholders and to reduce the capacity of managers' actions. Cohen and others point out that even if the role of the audit committee is perfect, the external auditor is responsible for the financial statements when the symbolic actions of the audit committee can lead to effective management questions [18].

None of the studies on corporate governance and audit conducted in Uzbekistan has focused on the relationship between external audit and corporate governance. Therefore, this study examines the impact of external audits on corporate governance in joint stock companies, including listing companies.

Problem statement

The impact of external audit on corporate governance, in particular, can be fully understood only if the function of external audit is properly understood as a profession. The basic rights and obligations of the external audit activity, responsibilities should

be defined in the regulations on external audit in accordance with the code of ethics and standards of external audit.

The effectiveness of corporate governance cannot be without the effectiveness of external audit. For this, the factors that directly affect the effectiveness of the external audit are the culture and support of the supervisory board. In addition, many studies have examined the impact of audit opinion and audit quality on audit effectiveness for U.S. companies [Shropshire (2010, Johnson, Schnatterly, et al. 2013)].

The purpose of the study was to determine the relationship between external auditors and corporate governance in joint stock companies. The problem is that the corporate governance system does not have enough up-to-date and reliable information on external audits. For this reason, a study was conducted to study the impact of external audit in the corporate governance of joint-stock companies.

Research methodology

The overall goal of the study is to increase the effectiveness of auditing in Uzbekistan by examining the relationship between external audit and corporate governance.

The specific purpose of the study:

This study examines the changes in corporate governance that affect the effectiveness of external audit. These variables include the type of audit report and the timing of its submission, the type of audit organization (large quartet or local), the existence of an audit committee and internal audit service in the supervisory board, and the total assets of the joint stock company. such factors were analyzed. A related variable here is the **external audit effectiveness (EAE)** in the corporate governance system of Uzbek joint stock companies.

External Audit Effectiveness (EAE)

The effectiveness of an external audit is considered in the work of the audit organization and the auditors as a set of indicators such as powers, practices, quality control and assurance. The audit organization and the attitudes of auditors are formed on the basis

of technical standards of audit, legal and regulatory requirements governing auditing.

In particular, the impact on the effectiveness of audit organizations is the distribution of annual income of audit organizations by type of audit opinion, the degree of application of international auditing standards, participation in international networks (membership in the auditor, membership in the auditor, etc.) CIPA, ACCA, CPA) are calculated in points, a total of 100 points.

Independent variables.

Audit report

Previous research by the Securities and Exchange Commission (SEC) has shown that high-quality audits improve the quality of financial statements and reduce the risk of financial errors in an audit report [20]. This is due to the fact that in many studies the hypotheses have been taken into account in the unqualified opinion, but the explanatory (conditional) conclusions have not been taken into account.

Type of audit organization

The volume of the audit organization is highly dependent on the disclosure of the data. One of the most important powers of an audit firm is to encourage clients to disclose more information in their annual reports [21]. The merger of four world-renowned audit firms, currently known as Big-4, consisting of PricewaterhouseCoopers (PwC), Deloitte Touche Tohmatsu (DTT), Ernst & Young (EY) and KPMG, will have a significant impact on small-scale audit firms where mergers are a mechanism to prevent corporate governance [22]. However, research by Kim, Simunic, and others has found that audit firms of all sizes do not significantly affect the quality of an audit [23].

Audit report lag (ARL)

It is important information for users of financial statements, including investors and potential investors, when making business decisions. For this reason, timely presentation is one of the most important features of financial reporting [24] and can be used to reduce data asymmetry [24]. Unfortunately, some empirical and hypothetical evidence suggests

that some companies are delaying the publication of their financial statements due to delays in auditing. It is known from some studies that the delay in the audit opinion indicates a low efficiency of the audit organization, ie inversely related to the ARL [24].

Audit Committee

Cadbury's report recommended that all companies set up audit committees. Smith's report emphasizes that the audit committee plays an important role in ensuring the independence and impartiality of the external auditor, as well as in overseeing the company's management.

Most importantly, Smith's report emphasizes the need for the audit committee to be more proactive in raising concerns about directors than putting them under the guitar. In addition, Smith's report emphasizes that all members of the audit committee should be independent and non-executive directors. The annual reports of companies should provide detailed information on the tasks and responsibilities of the audit committee and the actions taken by the audit committee to fulfill these obligations [24].

Internal audit

Corporate governance is not an end in itself, but a means to an end. Different factors affect the achievement of the goal. One of these factors is the effective Internal Audit Function (IAF). The concept of internal audit has played a key role in the debate on corporate governance and financial reporting, and its activities play an important role in the system of effective management and risk management. An internal audit is an independent evaluation function created by management to review these transactions. It impartially reviews, evaluates and reports on the adequacy of internal control as a contribution to the proper use of resources. The guidelines for effective corporate governance include internal control and audit recommendations as an important part of the corporate structure.

The provisions of the Cadbury Code, published in 1992, are designed to improve internal mechanisms based on the assumption of the relationship

between the quality of corporate governance, internal control, audit and financial reporting.

The goal of internal audit is to achieve effective corporate governance through the implementation of the above new and important principles and tasks, and to create additional factors and mechanisms to attract foreign investment into the economy of our country.

Control variables

In addition to the hypothetical variables, we added three control variables. First, a measure of the size of the total assets of a joint venture for a joint stock company. On the one hand, international experience shows that large companies spend more time and money on external auditing than small and medium-sized companies. In fact, large companies need more monitoring. In other small and medium-sized companies, external audit sampling is not economically feasible. Secondly, it has been established that joint stock companies have a listing or zeroing on the Republican Stock Exchange "Tashkent", which confirms the reliability of the enterprises in determining the reliability of the indicators of the international index. Third, the benefits of joint-stock companies' economic efficiency indicators have been studied to influence the effectiveness of the external audit.

Data collection method

According to the information given in the first chapter of the case, there are 587 joint-stock companies operating in the country. Of these, 520 joint-stock companies, 30 commercial banks and 37 insurance companies operate. As of February 28, 2020, 99 out of 587 joint stock companies are listed companies (Source: According to the data of the Republican Stock Exchange "Tashkent" https://uzse.uz/isu_infos?page=2 as of February 28, 2020).

In order to further enhance the importance of this study, 37 companies were selected to prepare their financial statements on the basis of IFRS and compared with listed companies, based on the requirements of the above decision, and their annual report data were used.

Listing companies registered with the Tashkent Republican Stock Exchange (UZSE) are also included in the analysis in order to further improve and increase the favorable investment climate in the country and provide investors with transparent information about the capital market. As of December 31, 2018, there were 107 listing companies in UZSE, of which 41 companies were selected for this study

Model view.

This study is the first study in Uzbekistan of changes in corporate governance that affect the effectiveness of audit (EAE). Correlation and regression analysis were used, and the effect of descriptive variables on this EAE model is expressed. As in previous studies, corporate governance as well as control factors have been studied for independent variables.

In the regression model, the EAE used a correlation between the dependent variable and the independent variable.

$$EAE = \beta_0 + \beta_1(AUDOPIN) + \beta_2(AUDTYPE) + \beta_3(ARL) + \beta_4(ACEXIST) + \beta_5(IAEXIST) + \beta_6(LISTING) + \beta_7(SIZE) + \beta_8(PROFITABLE) + \varepsilon$$

Hypothesis (H) about the effectiveness of the external audit and the relationship between independent variables are interpreted as follows:

H1: There is a "positive" correlation between the EAE and the audit report;

H2: There is a "positive" correlation between of EAE and the types audit organization;

H3: There is an "negative" correlation between the EAE and the submission of the audit opinion at a later date;

H4: There is a "positive" statistically significant correlation between the EAE and the existence of the audit committee;

H5: There is a "positive" statistically significant correlation between the existence of the EAE and the internal audit service;

H6: There is a "positive" correlation between EAE and the listed joint stock company;

H7: There is a “positive” statistically significant correlation between the EAE and volume of assets of the joint-stock company;

H8: There is a “positive” statistically significant correlation between the EAE and the return on assets of a joint stock company.

Analysis and results

In analyzing the impact of external audit on the corporate governance system of joint-stock companies in Uzbekistan, this study provides a basis for further supplementation of primary data. Was also used to measure the degree of correlation between the variables under consideration.

Table 1. – Classification analysis of selected joint-stock companies in Uzbekistan in 2018

Variables	Nº	Minimum	Maximum	Mean	Standard deviation
<i>Dependent variable</i>					
EAE	78	13	74	46.53	13.98
<i>Independent variables</i>					
AUDOPIN	78	0	1	0.91	0.29
AUDTYPE	78	0	1	0.04	0.19
ARL (day)	78	50	331	136.51	41.12
ACEXIST	78	0	1	0.47	0.50
IAEXIST	78	0	1	0.74	0.44
LISTING	78	0	1	0.47	0.50
SIZE (UZS) '000	78	560027	32200661047	1590522268	5352812982
PROFITLOSS (UZS) '000	78	(3020089954)	1140412680	12301455	393590995
PROFIT IBLE	78	(0.30)	0.67	0.09	0.15

Formed by the author by entering primary data in the SPSS program

In this study, the effectiveness of audit firms (EAEs) providing audit services to joint stock companies with a selected corporate governance system was assessed at 100 points, with a minimum of 13 points, a maximum of 74 points, and an average score of 47 points. The system of corporate governance also takes into account the descriptive analysis of changes that affect the effectiveness of external audit.

One of the important analyzes of this scientific work is the regression analysis of these variables. The regression analysis of the report model is significant ($p < 0.01$). $R^2 = 0.19$ and the corrected $R^2 = 11$ percent and $F = 2.315$. This means that 19% of the variables related to the effectiveness of the external audit are these 8 independent variables. The remaining 81% are explained by factors other than these 8 variables. This is explained by the fact that 100% of the selection was not covered, 78 (13%) out of 587 joint stock companies were selected.

The value of p , which differs from zero, yielded 0.035. The value of p is 0.035, and the established distributed significance level is 0.01 (1%) higher than the officially distributed data. Normally, the value of p should be 1%, 5% and 10%, and in the social sphere it should be 5%. In this study, the variability related to the effectiveness of external audit in $p < 5\%$ and in general is statistically significant to independent variables. However, this requires additional study of other variables in addition to the variables we have selected.

The H1 hypothesis did not confirm a “positive” correlation between the effectiveness of the external audit (EAE) and the types of audit opinion (AUDOPIN). This means that the “unqualified” audit opinion issued to joint-stock companies does not mean that their external audit is effective.

The hypothesis of H2 a “positive” correlation between the EAE and the AUDTYPE has been con-

firmed, and there is a correlation between them. In other words, the audit of joint-stock companies by a single “big four” audit organization increases the efficiency of external audit by 24.6%.

The hypothesis of a “negative” correlation between the H3 EAE and the audit report submission deadlines (LgARL) indicates a “positive” statistically significant correlation. In other words, the long-term submission of audit opinions in selected joint-stock companies has a significant impact on the efficiency of audit organizations. This is due to the size of the joint-stock companies we have chosen and the long-term preparation of financial statements prepared by them.

While the hypothesis of a “positive” correlation between the H4 EAE and the existence of the audit committee was confirmed, the SPSS program is tabulated separately in this analysis because it generates the same vector as the listing companies.

There is a “positive” correlation between the H5 EAE and the existence of the Internal Audit Service (IAEXIST). The presence of an internal audit service in each joint-stock company increases the efficiency of external audit by 12.4%.

The H6 hypothesis confirms a “positive” correlation between the EAE and the Listing Joint Stock Company (LISTING). The inclusion of these joint-stock companies in the list leads to a higher efficiency of external audit.

There is a “positive” statistically significant correlation between the H7 EAE and the SIZE. This indicates that the effectiveness of external audit is higher in large joint-stock companies than in small ones. Such results can be attributed to the fact that large enterprises are associated with multidisciplinary corporations and use modern technology and present their accounts in a timely and quality manner.

Another explanation is that large companies have strong internal control systems and effective audit committees, and as a result, auditors spend less time conducting compliance and independent testing.

The hypothesis of a “positive” correlation between the H8 EAE and the return on assets of the

joint-stock company (PROFITABLE) has been confirmed. It influences the effectiveness of external audit in enterprises with high return on assets.

The results of this study will be useful for stakeholders (especially investors and regulators).

In the system of corporate governance, external and internal audit, as well as the analysis and interpretation of the effectiveness of the audit committee through the above econometric model, the realization of the social sphere, the knowledge and understanding of the real situation. Based on studies and analysis, the following can be cited as elements of audit effectiveness in the corporate governance system.

Conclusions and suggestions

In this article, we have looked at the importance of changes in the corporate governance system that affect the effectiveness of the audit. We discussed the role of the audit function in corporate governance and the ways in which these important functions can help solve agency problems. Corporate errors such as Maxwell, Barings, and Enron have necessitated the need to increase the effectiveness of these functions. The study of the current state of audit in the system of corporate governance in our country has allowed us to draw the following conclusions on the second chapter of our research:

1. From the point of view of agency theory, the audit function is an important corporate governance mechanism for shareholders that helps them to monitor and control the management of the company.

The term “true” (as opposed to “accurate”) is used by auditors when an audit firm considers the authenticity of its financial statements in accordance with its professional standards. Examples of such assessments include provisions for doubtful debts, collateral costs, debt relief reserves and contingent liabilities.

2. Financial statements audited by an external auditor are those that help reduce the information asymmetry and protect the interests of the various parties by ensuring that the financial statements of management are not subject to material misstatement.

3. This study examines the changes in the corporate governance system that affect the effectiveness of external audit. These variables include the type of audit report and the timing of its submission, the type of audit organization (large quartet or local), the existence of an audit committee and internal audit service in the supervisory board, and the total assets of the joint stock company such factors were analyzed. A related variable here is the external audit effectiveness (EAE) in the corporate governance system of Uzbekistan joint stock companies.

4. A theoretical model of changes in the system of corporate governance that affect the effectiveness of external audit has been developed.

5. The audit committee was examined as an independent variable and the internal audit service as a corporate governing body. An internal audit is an independent evaluation function created by management to review these transactions.

6. In the modern system of corporate governance, the basis for the establishment of the audit committee and its functions were studied in depth, its modern and new functions were proposed.

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Section 2. Accounting

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IS SOCIAL MEDIA MARKETING EFFECTIVE IN CHINA?

Abstract. Social media has developed very fast globally, with Facebook, Twitter and Instagram in the western countries and WeChat and QQ in China. It naturally became a marketing channel among other digital marketing methods. Given the short experience of Chinese to the internet and social media, is social media an effective marketing method? Upon surveying over 700 consumers, this study finds the answer to be NO, or at least Not Yet. Finding better ways to use this rich marketing platform other than high frequency advertising is essential to the future of social media marketing in China.

Keywords: Social media marketing, WeChat marketing, Social Media Marketing in China, Consumer Acceptance.

I. Introduction

Social media has a significant influence on our lives. According to a recent report on the global state of digital, there are 3.484 billion active social media users around the world as of January 2019, achieving a 45 percentage penetration (Hootsuite, [6]). The worldwide accessibility to internet enables more people to communicate through various online platforms. Based on the global active social usage penetration rate as of February 2019, 64% of the internet users accessed Facebook, 45% accessed Whatsapp, 32% accessed Instagram and 21% accessed Twitter (Clement [3]). While many popular social networks are available in multiple languages and have a wide range of users across countries, there are also social platforms designed for a specific community and provide local content to their users. In China, there are three major social media platforms: WeChat, QQ and Weibo. By January 2019, the total number of active social media users in China reached 1.007

billion, which is equivalent to 71% of total population (Hootsuite [6]).

The popularity of social media naturally sparked the industry of social media marketing or advertising. Social media advertising is the second largest segment of digital advertising market with a market volume of \$89,905 million in 2019, following Search Advertising with \$127,862 million spending (Statista [12]). In China, the ad spending in social media advertising amounts to \$14,526 million, ranking the second in the global revenue ranking in 2019 (Statista [12]). As revenue from social media advertising increases, the awareness of the potential of social media are recognized by social marketing companies, who start to help business advertise to reach their customers. 88% of social marketers have acknowledged the importance for their brands to provide customer service through social media, and 80% of them said that their key marketing strategy is to increase engagement across social channels (Sprout Social, 2018). Additionally, 90% of

brands use social media to increase brand awareness and 77% of brands expect their use of social media to increase (Hootsuite [6]).

Despite the potential of social media marketing, 58% of brands find it difficult to measure the effectiveness of social media advertising (Hootsuite [6]), and only 3% of Internet-using adults say they trust the information they get from social media (Pew Research Center, 2018). Therefore, it is important to understand the consumers' acceptance of such pervasive marketing tool in order to define success.

II. Literature Review

Marketing has changed rapidly over the decades and it continues to change in this century. In comparison to other business area, marketing is a relatively young concept emerged in the early 1900s. This introduction will examine the marketing tools before and after the technological leap when computers, phones and other creations were developed. The introduction will trace the history of marketing until recent years and serve to provide a general understanding of the technological marketing methods we have today, specifically social media marketing.

History & Types of Digital Marketing

As the advancement of technology, the term "digital marketing" first emerged in the 1990s. The common forms of online advertising include search engine marketing, social media marketing, content marketing, influencer marketing, affiliate marketing, email marketing, viral marketing and so on (Benson [2]). Archie, the first search engine, was created in 1990. Following that in 1993, Wandex became the first ever search engine that was accessible for the World Wide Web. In October 1994, AT&T launched the first banner ad on Wired's Website. Fast forward to 1999, a search engine company GoTo.com introduced the first pay-for-placement search advertising keyword service (Cook [4]). At the same time, banner ads continued to gain popularity as companies started to focus on their desired demographics and led to the beginning of target ad placement. The creation of pop-up, pop-under and

display ads in 1997 eventually led to standardized pop-up blocking features for most web browsers by the early 2000s. After 2010, the value of online ads are discovered by most marketers. Today, online ads are so commonly used for advertising purposes that 91% respondents of a recent research thought that ads today are more intrusive and compared to two or three years ago (Hub Spot, 2018). As customers' dissatisfaction of intrusive ads increases, marketers are focusing on developing more targeted and exclusive advertising experience that offers relevant content for future consumers.

Social Media Marketing is relatively newer than the other online channels. However, marketing in the form of social media has become the second largest in the digital marketing. Advancing by an incredible rate, social media advertising is a market that did not exist a decade ago, but is projected to generate \$11 billion in revenue by 2017 (Karr [8]). The history of it traces back to the 2000s. The prevailing social networking sites such as LinkedIn, Facebook, and Twitter were first introduced to the world in between 2002 to 2006. Today, more than 90% of the marketing executives utilize social media, 76% of businesses use social networking to achieve their marketing objectives, and 77% of brands expect their use of social media to increase (Newberry [6]). Due to censorship on western social media, China developed its own social networking platforms. Local social networking sites such as Wechat, Weibo and QQ are attracting millions of users; therefore, despite being unable to access the global market, China is still a major social media market. As one the most popular social media platforms, Wechat is a messaging app developed by Tencent, one of China's top technology companies. Wechat is primarily used as a social networking app, but it also contains many other recreational features. Because of its inclusiveness, it gained millions of users shortly after it is launched in 2011. Wechat Moment is one of the many functions of Wechat. It provides a platform for users to share their updates either with texts or pictures.

Key Factors of Consumers' Acceptance of Social Media Marketing

The concern over privacy is one of the top factors influencing a consumer's acceptance of social media marketing and its impact was found to be negative, since consumers felt that the information provided to the third-party e-retailers may not be private and could be used for purposes they do not wish for (Nadeem [11]). Despite its popularity, social media still remains as a rather untrustworthy media, because of its interactive and utilitarian features. Building trust or credibility is essential then. Credibility is the beliefs or trusts of consumers toward specific products/services (Xu [13]). In general, products and services generally foster connection between consumers and an organization to build credibility. Even though online transactions are increasing, people remain skeptical about online transactions. For marketers, trust building has to be the utmost consideration in communications with consumers (Mishra & Tyagi [10]).

Consumers' brand preference is another factor affecting their acceptance of the method of marketing, in turn affecting their purchasing decision. The self-image congruity reflects a consumer's brand preferences and satisfaction. Consumers with stronger self-image congruity are more inclined to the brand and become more satisfied with the brand as compared to those with lower self-image congruity (Jamal & Goode [7]). An individual's emotional attachment to a brand will predict his commitment to the relationship with the brand (Mishra & Tyagi [10]). Similarly, in the context of WeChat retailers, self-congruity will predict a strong attitude toward a frequently purchased and reliable retailer.

III. Methodology

In this study, a target consumer was defined as someone who had purchased products under the influence of WeChat marketing, since WeChat is the biggest social media in China. In order to gain better insights, a survey was used to collect data measuring the effectiveness of social media marketing. The

survey was created through Wen Juan Xin, an online survey website, and was shared through URL links, QR codes, and social media Sharing.

The questionnaire consisted of 10 multiple-choice questions for all respondents and 3 selective questions that were only asked if respondents indicate that they had experience as a WeChat retailer. The only demographic information collected was on the respondent's age group. For WeChat retailers, information was collected on their frequency of advertising via social media, while for all respondents, there were questions inquiring about their opinions on and experience of the social media marketing activities they encountered.

Initially, the survey was distributed online, however, which resulted in respondents clustering in two age groups: one in 10–20 years old (primarily from my circle of friends and their friends of similar ages) and one in 40 and above (primarily from my parents' social circles). Realizing this potential drawback, a series of actions took place in order to correct this problem. In the second round of distribution, the survey was sent specifically to people in the 20–30 and 30–40 year old range. Furthermore, I also did a live distribution by going to different shopping malls to interview respondents in the desired age groups. As a result, a total of 731 responses were collected and the study achieved a more balanced distribution of ages groups.

IV. Results

The 731 respondents participants had a fairly even distribution across age groups, by the three rounds of effort to distribute the survey strategically. As shown in Figure 1, the percent of respondents from different age groups is fairly evenly distributed, with 10–20 years old making up 35.6%, 28% above 40 years old, 17.6% from 30–40 years old, while 17.5% from 20–30 years old.

Social Media Has Become the Most Popular Method of Online Marketing

Another important finding from the survey is shown in the bar chart as in Figure 2 below, showing

the prevalence of social media marketing to people in China. Respondents reported that social media marketing is the most commonly seen method of mar-

keting out of all the other ways of marketing, and the result shows that 677 out of 731 respondents have encountered social media marketing.

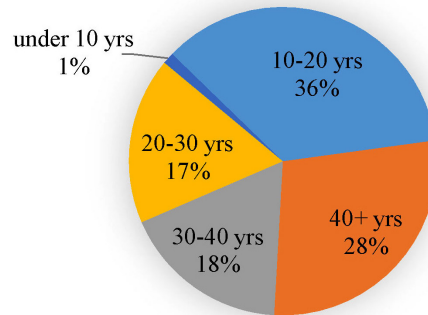


Figure 1. Age Distribution of Respondents. Percent of respondents by age group

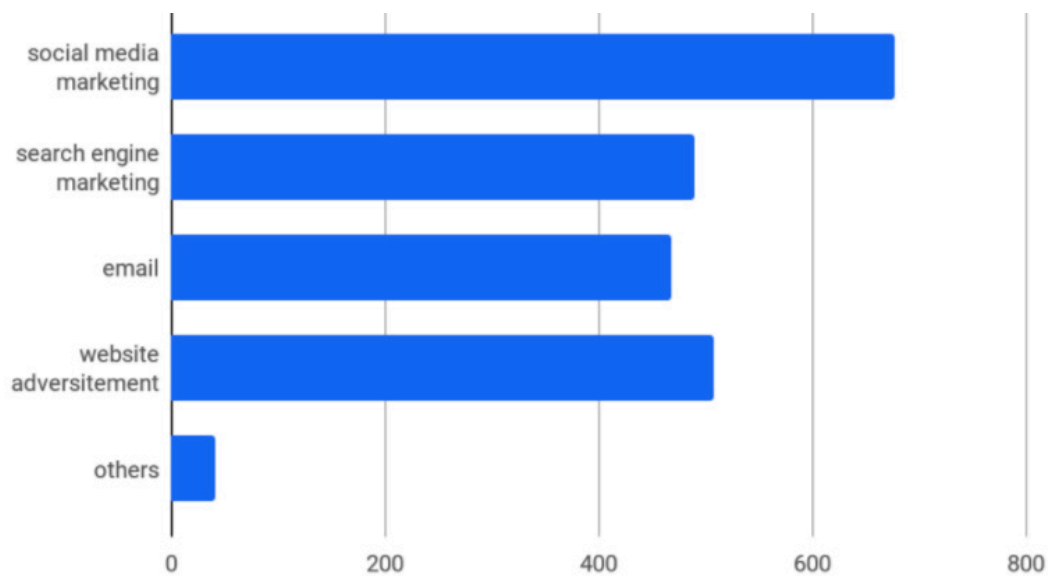


Figure 2. Types of Online Marketing Respondents Experienced

High Frequency Social Media Ads Could Hurt

However, the effectiveness of such marketing technique is questionable. Most retailers or web store owners post moments at a frequency as high

as everyday with several posts, but most of the respondents (68%) would choose to block the posts from retailers' or web store owners' Wechat accounts.

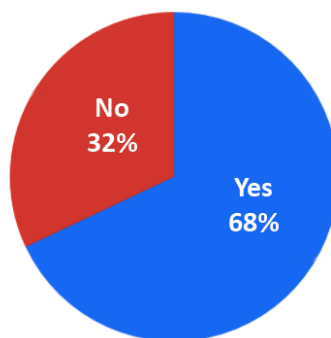


Figure 3. Percent of Respondents Willing to Block Advertising Moment Posts

Social Media Had Little Impact on Purchasing Decisions

The survey results suggested that Chinese consumers are not influenced much by social media when it comes to purchasing decisions. When asked whether advertisement would ultimately motivate

consumers to purchase different products, 80% of the respondents purchased products based on their personal preferences, 74% would examine the utility of the product before purchasing, while only 42% respondents would consider friends' recommendations.

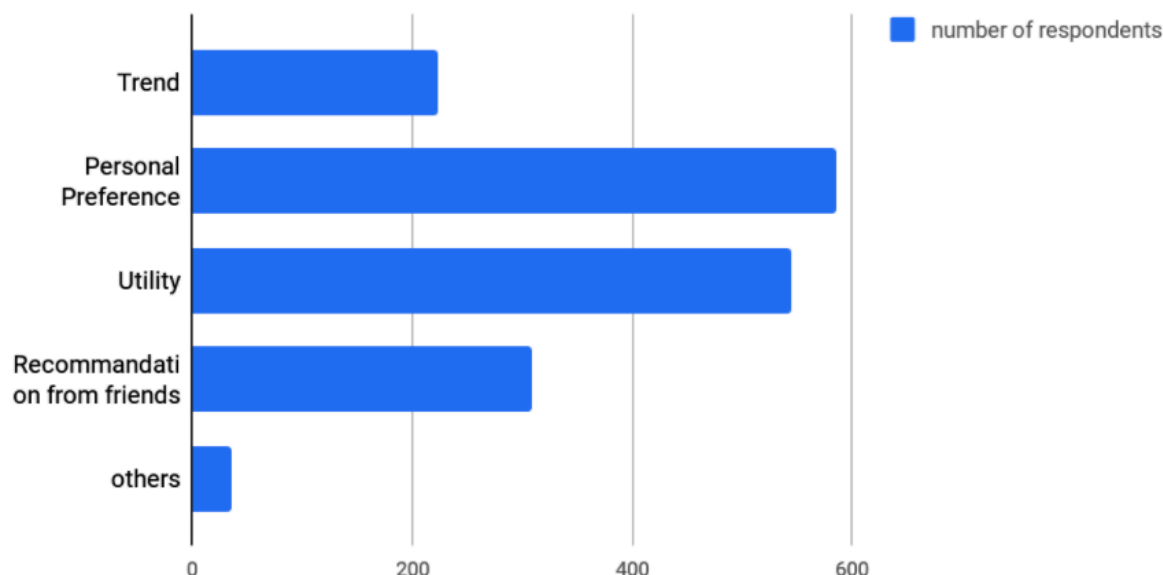


Figure 4. Factors Influencing Consumers' Purchasing Decisions

When asked to rank their willingness to purchase after viewing Wechat ads, only 12% selected 8 and above on a scale of 1–10, with 1 being not likely and 10 being very likely. The majority of the respondents remain 'cool' or indifferent.

Table 1. – Willingness to purchase after Viewing WeChat Ads

	Willingness to Purchase
1–4	33.60%
5–7	54.40%
8–10	12.00%

Conclusion

The response of the Chinese consumers showed that social media marketing has become commonly seen. As the currently most used social media app in China, Wechat not only dominates people's social lives, but also has become an advertising channel for retailers trying to affect people's purchasing decision. However, the consumers aren't buying the efforts as seen in the survey that consumers' willingness to purchase products remained low. Thus, besides the popularity of social media marketing, its effectiveness is still very low.

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CONSUMER BEHAVIOUR IN THE ALCOHOLIC BEVERAGES MARKET OF RUSSIA

Abstract. This paper is devoted to the analysis of consumption behavior in the alcohol market. Alcohol misuse is considered an important problem for Russia and the world overall.

Knowing the factors affecting the alcoholic beverages consumption, the frequency and volume of alcohol consumption contributes to effective communication with consumers of alcoholic beverages, which should lead to a decrease in the level of consumption. It is necessary to identify which factors have the greatest impact on decision making when purchasing and consuming alcoholic beverages. In this regard, the analysis of consumer behavior in the alcohol market is necessary for the creation of marketing campaigns in the development of anti-alcohol policy.

Keywords: consumer behavior, market of alcoholic drinks, beer, wine, spirits, motives of consumption, alcohol consumption, drinking habits.

Introduction

Alcohol has accompanied humanity throughout its history, being an integral part of the way of life and culture of the population in many countries of the world. Today, alcohol is perceived as a socially acceptable phenomenon, accompanying cultural or family events, holidays and meetings in everyday life. Besides, alcohol consumption is a means of satisfying certain human needs. For instance, it performs certain psychological tasks, helping to increase positive feelings or reduce negative ones. Alcohol helps other people to remove barriers, such as, disquiet, conflict, future-phobia, frustration, escaping from reality, etc. Motivation plays an important role in the alcohol consumption, for example, following a role model (alcoholism is not a disease programmed by genetics), availability, and advertizing. Most of people drink alcohol seldom, because they like the taste of alcoholic beverage, and drinking such beverage is related to the gastronomic impressions and facilitates the social communications and sociability, and also it is used for commemorating the important events and achievements.

However, excessive alcohol consumption is also one of the most serious problems around the world, causing addiction and being one of the greatest risks to the quality of life of the population. The severity of this issue is one of the main causes of poor health and premature death among people. Health is perceived by society as an integral part of the quality of life, plays an important role especially in the economic development of the state, ensuring the reproduction and quality of human resources, and creates the basis for socio-economic growth.

In recent years a positive trend of a gradual reduction in alcohol consumption has been observed in Russia, accompanied by changes in consumption patterns and the establishment of new relationships between market participants. This also means that simultaneously changing behavior and reducing the consumption of alcoholic beverages is preceded by a change in lifestyle and living conditions. Various measures are being taken to limit the consumption of alcoholic beverages in order to reduce the negative effects of alcohol abuse. To implement effective

measures reducing consumption, it is necessary to determine the factors affecting the decision-making process when purchasing alcoholic beverages.

Methods

The aim of this study is to identify factors that influence consumer decision-making leading to the purchase in the Russian alcoholic beverages market. The main source of primary data were the results of a questionnaire survey obtained using an online survey. The questionnaire was created using Google Forms and 2,200 respondents participated in it. The questionnaire survey included questions about consumption of alcoholic beverages, type of alcoholic beverages, places and frequency of consumption, motives of consumption and factors influencing consumer buying behavior.

The subject of the survey was the identification of consumer behavior in the alcoholic beverages market in Russia. During the survey, respondents were divided into two groups using a filter question. One of the groups was represented by respondents who do not drink alcohol. Descriptive statistics methods were used for processing primary data.

The data was processed using MS Excel and SPSS Statistics software.

The structure of the respondents

The survey involved 2,200 respondents, of whom 80% said they were consumers of alcoholic beverages. Of the total number of respondents, 52% were women and 48% were men. Almost half of the respondents (45%) are people in the age category from 25 to 39 years. Next are consumers (26%) aged 18–24 years, 12% of respondents – the age category from 40 to 54 years, 11% – young people under 18 years, 6% – 55 years and older.

As for employment, the majority of respondents (55%) are employed, 24% are students, 6% are businessmen, and 5% are retired, unemployed, and the same number (5%) of respondents are in the household or on maternity leave.

The majority of consumers were people with higher education, the proportion of which is 56%. A significant proportion (20%) were respondents with incomplete secondary education. This may be related to the fact that almost a third of all respondents are in the under-24 age group, many of whom are students.

Table 1. – The Structure of the Respondents

The identity of the respondents	Absolute frequency	Relative frequency (%)
1	2	3
Sex		
Men	1156	53%
Women	1044	47%
Age		
Under 18 years	232	11%
18–24 years old	576	26%
25–39 years old	988	45%
40–54 years old	267	12%
55 years old and over	137	6%
Education		
Incomplete secondary	108	5%
General secondary	431	20%
Primary professional	153	7%
Secondary specialized	273	12%
Higher	1235	56%
Current economic activity		
Student	522	24%

<i>1</i>	<i>2</i>	<i>3</i>
Employed	1204	55%
Businessman	134	6%
Household, maternity leave	108	5%
Retired	109	5%
Unemployed	123	5%

In accordance with the purpose of the work, first of all, the respondents' behavior in relation to the preference of certain types of alcoholic beverages was considered. The following graph shows the percentage of respondents by type of alcoholic beverages, as well as those who do not drink alcohol at all.

According to the results of the study, beer (30%) and wine (30%) are the most preferable alcoholic beverages, while spirits are the least (19%), 21% of respondents do not drink alcoholic beverages.

Among beer consumers, most of the respondents noted that they have incomplete secondary, secondary and secondary specialized education. For people with higher education, beer is also a popular drink, but the second most popular compared to wine (22% and 24%, respectively). Respondents with a higher level of education are less likely to consume strong alcohol, with only 13% indicating spirits as

their preferred beverage. Thus, the relationship was determined and a positive influence of high education level on the type of preferred drink was found.

Results

Patterns of consumption of various alcoholic beverages (beer, wine, spirits) differ significantly from each other, so it would be wrong to consider the factors of alcohol consumption in general. For this reason, the consumption of certain types of alcoholic beverages is influenced by the factors below.

As part of the study, to identify the factors, respondents were offered twelve answers. Such factors as price, favorable offer, taste characteristics, quality, manufacturer, brand, label, volume of products, recommendations of friends, advertising, availability of alcohol were considered.

The following figure shows the results of respondents' responses when purchasing beer.

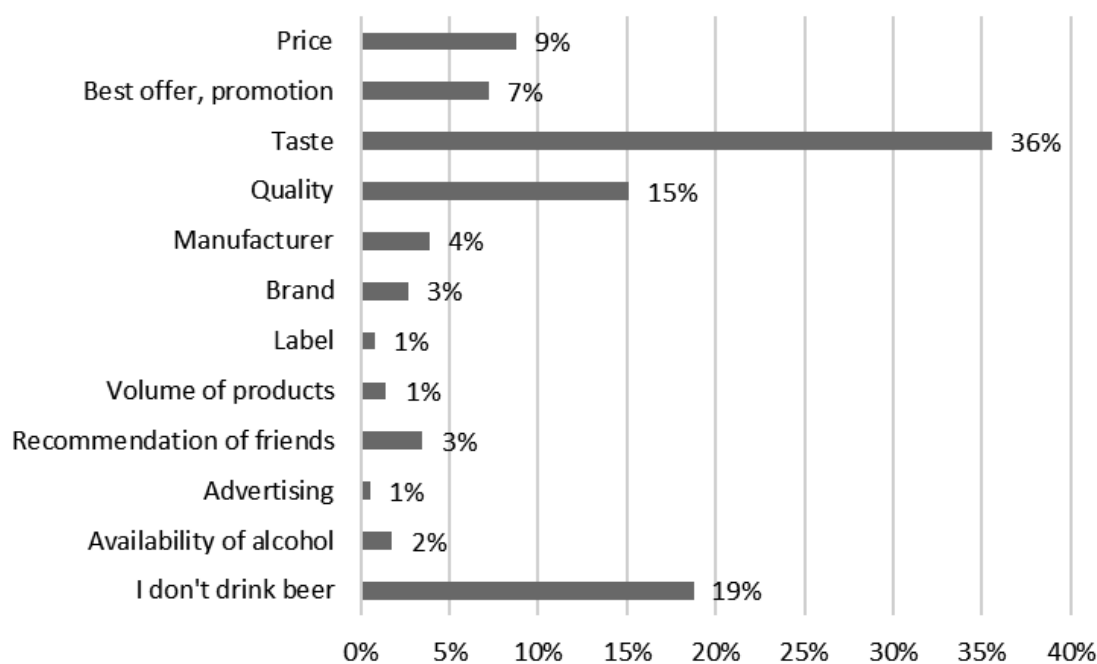


Figure 1. Factors when choosing beer

Taste characteristics have the greatest influence on the decision to buy beer (35%). This may be due to the fact that consumers who prefer beer primarily want to enjoy the drink. The next significant factor when buying beer is the quality, which was noted by 15% of Russian respondents. Also 9% marked the price. The favorable offer was rated as a less significant factor (7%).

Consumers are least affected by availability, advertising, product volume, and label. Only 1–2% of respondents mentioned these factors. According to the responses, 19% of respondents mentioned that they do not drink beer.

The following diagram shows in detail the responses of respondents when choosing wine.

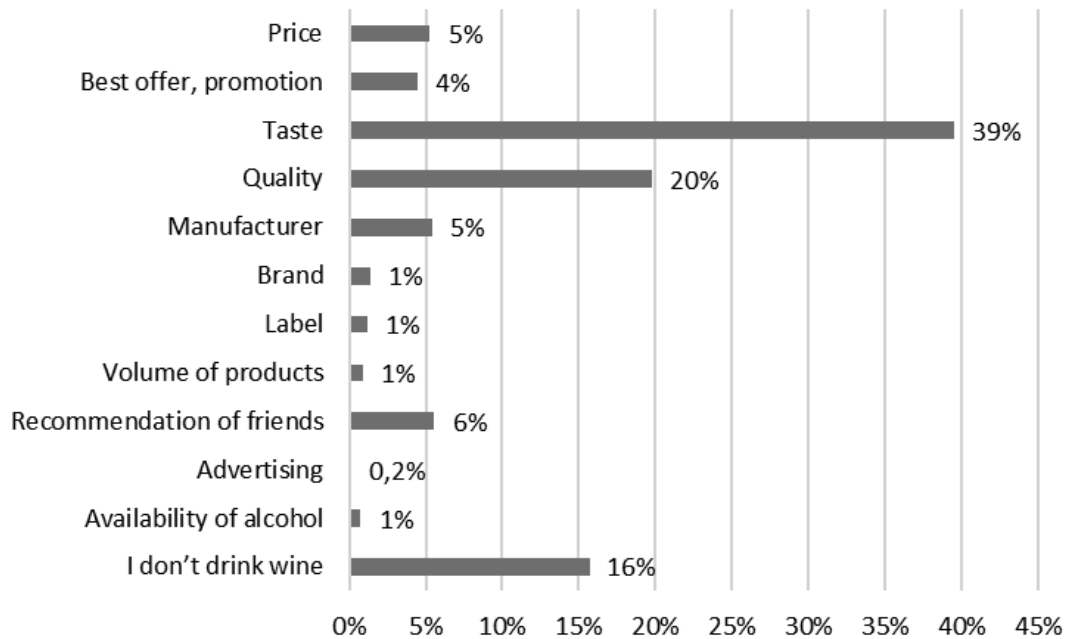


Figure 2. Factors when choosing wine

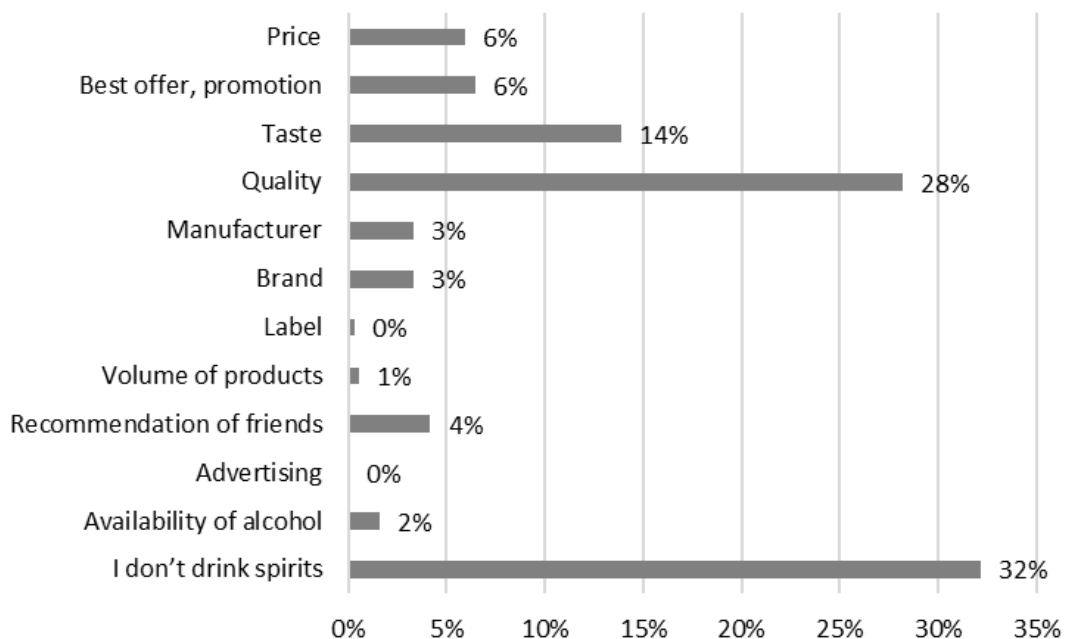


Figure 3. Factors when choosing spirits

As in the case of buying beer, wine consumers are most influenced by the taste and quality of the drink. 40% of them are most affected by taste characteristics, 20% of respondents noted the quality factor.

Also 6% noted the recommendation of friends. This factor was significant for the respondents when purchasing wine, compared to the selection of other beverages. Perhaps, when buying wine, due to low awareness regarding this drink, consumers rely not only on their experience.

Less important factors were price, manufacturer and favorable offer, which was 5% for each factor. Consumers are least affected by availability (1%), label (1%), product volume (1%), and brand (1%). According to the study, consumers are not affected by advertising at all. The percentage of respondents who said they did not drink wine was 16%.

The following figure shows the responses of respondents regarding spirits.

The main factor when choosing spirits is the quality. In comparison with low-alcohol beverages, just when buying strong alcoholic beverages quality is most important. The second factor is the taste of strong alcohol. Although for consumers of spirits this factor is much less important than for consumers of beer and wine. We obtained only 14% (spirits) of responses compared to 35% (beer) and 40% (wine).

Fewer quantity of responses is related to the price (6%) and the best offer (6%). Consumers are completely unaffected by advertising (0%) and labels (0%). A third of respondents (32%) marked that they do not drink spirits.

Conclusion

The study found that the factors that influence consumer choice differ depending on the category

of a drink. In case of choosing low-alcohol beverages, such as beer and wine, the vast majority of respondents indicated taste. Thus, the taste properties are crucial when choosing low-alcohol beverages. Compared to beer and wine, the taste of the drink when choosing spirits is not as important. When choosing spirits, respondents pay more attention to the quality of the drink and this factor is the most significant. Although it is important to mention that consumers more often make decisions based on their perception, rather than on the basis of an objective situation. In case of choosing spirits, the quality of the alcoholic beverage is perceived differently by each respondent. Respondents might have formed their ideas about quality based on various facts: their own feelings, income level, knowledge or recommendations from outside. The perception of quality is subjective and its level may change depending on a number of reasons that cannot be predicted.

A preference for low-alcohol beverages is typical for people with the highest level of education. They are adherents of low-alcohol beverages and most of them prefer wine to other alcoholic beverages. It is worth mentioning that the interrelation between lower education and greater alcoholism indicates that increasing the level of education should be one of the goals of programs for the prevention of alcoholism. This factor can serve as an important recommendation for the development of preventive measures to reduce alcohol consumption.

Based on this research, recommendations for reducing alcohol consumption can be prepared in the future.

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Section 3. Economics, organization and management of enterprises, branches, complexes

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ENERGY EFFICIENCY STRATEGY IN RUSSIA: LOW CARBON CHALLENGES AND CORPORATE RESPONSES

Abstract. In this article the main directions of the Russian government policy to improve the energy efficiency of the economy are discussed. Key trends of the energy efficiency policy in Russia and the energy saving activities of the leading Russian iron & steel companies are addressed. Two case studies of the energy saving and energy efficiency policies of the largest metallurgical companies in Russia (Magnitogorsk Iron & Steel Works, MMK, and Novo-Lipetsk Iron & Steel Works, NLMK) are considered. These Russian companies successfully use the whole range of internationally approved energy saving instruments tailored to the domestic context, drastically upgraded the energy efficiency of operations and their experiences worth disseminating across the iron and steel industry.

Keywords: Energy efficiency, energy saving, energy efficiency management, energy service contract, low carbon development, corporate response, institutional drivers, Russia.

Introduction

Russia as a part of the Paris Agreement sets ambitious goals in greenhouse gas (GHG) abatement, resulting in absolute GHG emission cap, bringing

the national emissions by 2030 to 70–75% compared to the 1990 level.

Roadmaps for the future low carbon development in Russia are tailored to the national peculiarities of economic structure, that is fully in

line with the principles of the Paris Agreement. Russian industry is heavily dominated by energy-intensive export –oriented sectors, including mining, metallurgy, chemical industry, etc. Large volumes of this primary processing products, being exported to the EU countries, are transformed there into high-tech products, thus making Russian and EU economies interdependent and operating as one vertically integrated system, where the difference in energy efficiency between the parts is determined by the technological nature of the respective processing stages. Based on the figures of energy intensity that are much higher in Russian than in the G 7 countries, the Russian national and corporate strategists

consider the energy efficiency as a key factor in the respective national and corporate GHG abatement policies and measures. The goal of this research is to assess the key trends in the energy efficiency policy in Russia, and notably – the corporate activities in this field, using the experience of the leading Russian iron & steel companies.

Methodology

The problems of energy efficiency in general and in the iron & steel in particular are widely studied in Russia in the works of Shevelev L. [17, 59–67], Brodov A. [2], Porfiriev B. [15, 963–971], Makarov A. [8] and other researchers. The algorithm of the research is shown in (Figure 1).

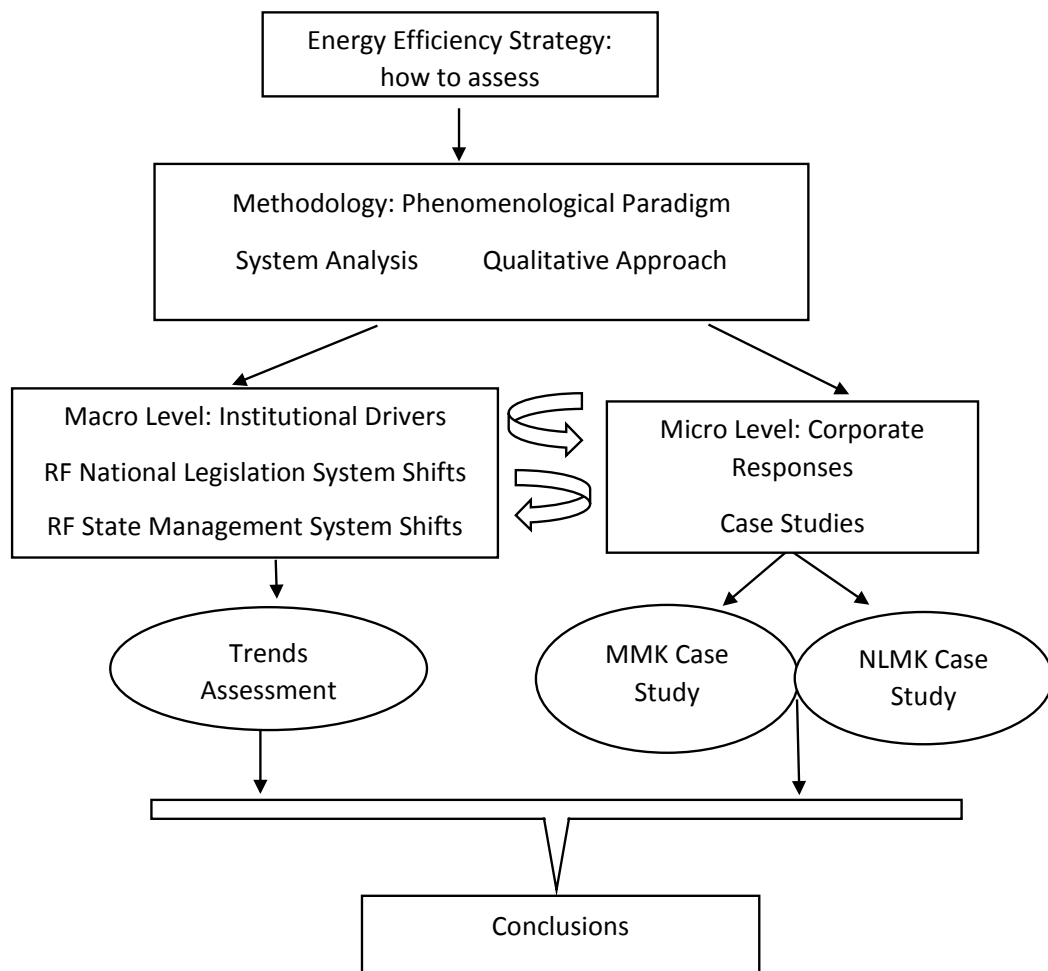


Figure 1. Research Mind MapSource: developed and compiled by the authors

Methodology of the research is based on systems analysis, treating a research object (iron & steel companies) as a system, reacting to the external impacts (challenges, requirements, etc.) and interacting with its environment (legal, institutional, others). Components of each of the systems are analyzed, with overall goal of producing comparative phenomenological study, tracing similarities and differences between them and fixing the actual trends of their development.

Results

Institutional Drivers: State Energy Efficiency Policy and State Management in Russia.

In 2010–2017, marked by proactive energy efficiency policy, the Russian Federation increased significantly its RISE (World Bank Regulatory Indicators for Sustainable Energy) energy efficiency rating, moving from the of low energy efficiency country group to the group of countries with average results (46th position among 133 countries). National energy intensity measured as MJ/GDP USD PPP 2011 during the period of 1990–2015 dropped down from 10 to 8.6 [19].

The key priorities in the energy efficiency policy of the Russian Government were defined by the Decree of the President of the RF of June 4, 2008 No. 889 and subsequent documents of the RF, including the Federal Law No. 261-FZ of November 23, 2009 “On Energy Saving and Improving Energy Efficiency”, and the State program “Energy Efficiency and Energy Development”, approved on April 15, 2014. These documents define strategic national goal – reduction of energy intensity of GDP by at least 40% from the 2007 level by 2020. Targets were set for several industry indicators, such as oil processing depth, losses of electric energy in electric grids, other specific indicators of fuel and energy consumption.

Energy intensity of Russia’s GDP during the period of 2012–2017 has decreased by about 5%. Further strategies were defined in 2018 by the Ministry of Economic Development of Russia within the Comprehensive Plan to Improve the Energy Efficiency of the Economy in the RF, focused on increase the energy efficiency of the economy by using the best existing

world practices. The key elements of the national energy efficiency government policy currently include:

- management system, based on several energy efficiency indicators, used by the government programs, to provide respective feedback to the respective federal executive bodies;
- legal regulation in the production, transfer and consumption of energy resources (energy audits, energy service contracts, etc.);
- technical regulation and standardization, incentivizing modernization of the key industries;
- financial mechanisms (subsidies for energy efficiency related activities; special financing mechanisms supporting energy saving projects);
- support mechanisms (energy saving promotion, training of population and the workforce).

Ministry of Economic Development of the RF is monitoring the situation in the energy-intensive sectors of the Russian economy, including all relevant sectors in 89 regions of the RF. The scope of this monitoring is wide: the energy efficiency of oil and gas extraction, processing, transportation, electric and thermal energy generation, power transmission, coal mining in the oil and gas sector. The Ministry established and monitors control system; technical regulation, standardization, and methodological support; financial arrangements; supporting mechanisms. The following indicators in energy saving and energy efficiency are traced: depth of oil refining, energy losses in electric networks, consumption of equivalent fuel for the supply of electric and thermal energy, energy saving in oil transportation, total fuel consumption of energy resources per ton of coal production. Targets for each indicator improvement are set for each year within the program [5].

One of the promising ways to improve energy efficiency is the use of best available technologies (BAT) – a practice widely used by the international leaders. This practice is actively used in Russia within the Federal

Law on BAT No. 219, adopted on July 21, 2014. The information on existing BATs is accumulated by the National Bureau of BAT, the Bureau composed the sectoral lists of BATs and guides the respective work on BATs introduction on the corporate level.

The ratification of the Paris Climate Agreement by the RF in 2019 initiated a series of discussions on additional policies directly targeting the GHG emissions

and other energy saving and energy efficiency issues. One currently discussed issue deals with the Carbon Tax, proposed by some corporate stakeholders. Others consider this measure premature and argue that this tax may result in additional financial burden for the enterprises. The levels of financial burden due to this measure for the key metallurgical corporations of Russia are shown in the (Table 1) below.

Table 1. – Potential financial losses of the leading Russian metallurgical corporations at different carbon tax rates

Corporation	Financial losses at the rate of \$15 per 1 t. of CO ₂	Financial losses at the rate of \$35 per 1 t. of CO ₂
Magnitogorsk Iron & Steel Works	\$330 million p/a	\$770 million p/a
Cherepovets Iron & Steel Works	\$285 million p/a	\$665 million p/a
Novolipetsk Iron & Steel Works	\$283 million p/a	\$662 million p/a
West Siberian Iron & Steel Works	\$195 million p/a	\$455 million p/a
Chelyabinsk Iron & Steel Works	\$135 million p/a	\$315 million p/a

Source: [17, 59–67]

One can conclude that the state energy efficiency policy in Russia is comprehensive and detailed, it is developing fast and is open for new initiatives. In many aspects it reflects the best international practices, described in the World Bank document “Policy matters. Regulatory indicators for sustainable energy” [18]. The key issue is how these policies and measures are supported on the corporate level? Let us analyze the corporate policies and practices of key metallurgical corporations of Russia, notably the Magnitogorsk Iron & Steel Works (MMK) and Novolipetsk Iron & Steel Works (NLMK).

Efficiency Energy Instruments and Corporate Response: two case studies.

PJSC Magnitogorsk Iron & Steel Works (MMK) and Novolipetsk Iron & Steel Works (NLMK) are among the world’s largest steel producers and occupy leading positions among Russian iron and steel enterprises. Both MMK and NLMK are vertically integrated companies with full production cycle from iron-ore processing to downstream production of rolled steel and other high value added (HVA) prod-

ucts. Production in 2018, for MMK and NLMK have reached 12.7 and 18.2 million tons of steel, respectively, added by sizeable amounts of rolled steel and other HVA products.

These activities, seriously affecting the environment, require adequate response, therefore, the respective environmental policies and measures are undertaken. Both MMK and NLMK apply best practices of environmental safety. In 2000–2018, MMK allocated over 58 billion rubles for environmental activities, which finally led to a decrease of gross emissions into the atmosphere by 1.6 times and gross emissions of pollutants into water basins – by 2.4 times over the period [1, 96–99]. Both companies employ state-of-the-art closed loop supply systems for their process water. Today, 100% of industrial wastewater from MMK facilities and 95% from NLMK facilities are used in the recycled water supply. Figure 2 depicts the general approach to energy saving used by both companies.

As for MMK air pollution policies, they aim to drastically reduce emissions. According to this

policy, by 2025 low levels of air pollution in city of Magnitogorsk should be achieved. Similarly, NLMK corporate Environmental Program presumes dropping emissions of harmful substances by 5% from 19,8 kg per ton of steel produced in 2019 to 18,8 kg by 2023. NLMK Group funding of environmental goals is also impressive: the company plans to spend

24 billion rubles on environmental projects within coming 4 years. As for the Energy Saving and Energy Efficiency, both MMK and NLMK share the vision of necessity of the best international practices, including: ISO 50001 energy management system; personnel environmental management; motivation and engagement (rationalization proposals) [13].

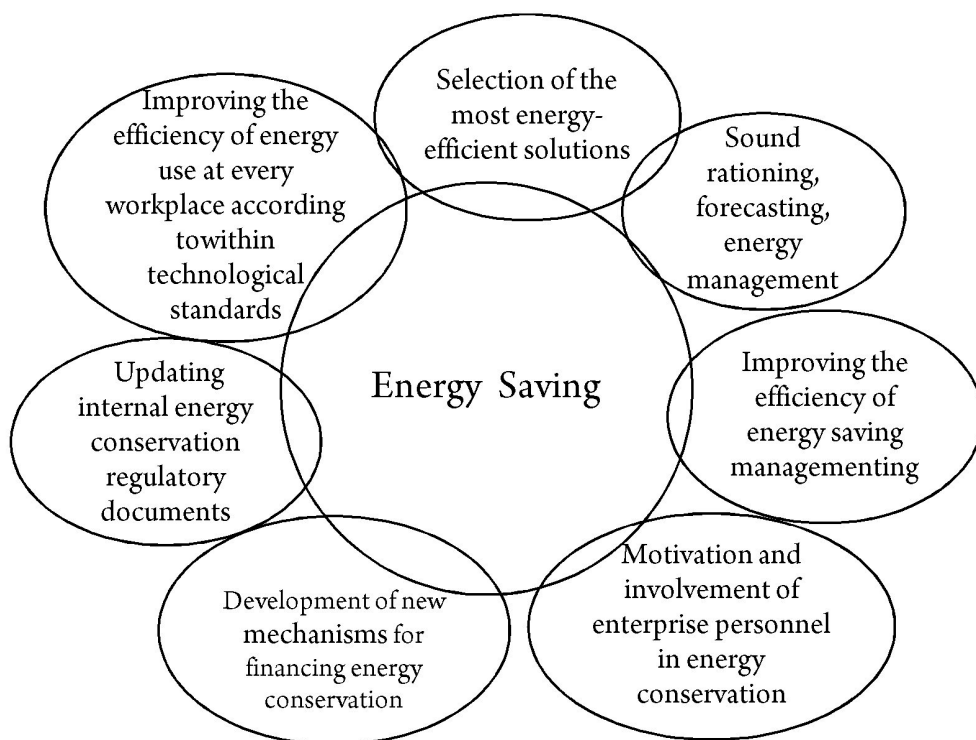


Figure 2. Components of the general approach to energy saving strategy
Source: developed and compiled by the authors

ISO 50001 energy management system was introduced at the MMK in 2016 when the Group was certified for compliance with the requirements of the international standard ISO 50001. The standard procedures helped streamlining the management of the energy saving activities, allowing the company to save annually significant amount of energy and effectively reduce GHG emissions. In 2017 and 2018, the total economic effect from the implementation of energy efficiency projects at MMK amounted to around 1 billion rubles and 0.5 billion rubles respectively. Specific benefits of ISO 50001 energy management standard have resulted by 2018 in 8.1% rise of energy performance improvement over three years;

\$38,596,000 of the total energy cost savings over three years; 698,186 metric tons of the total CO₂-eq. emissions reductions; total pure water savings – 7.9% [10; 11].

As for NLMK it has introduced the ISO 50001 energy management standard even earlier – in 2012, being the first large Russian iron & steel company to be certified in accordance with this standard. Within 2014–2015 all the production facilities of NLMK have undergone the ISO 50001 energy management standard certification procedure, with impressive energy saving results achieved since then.

Both companies have followed the leading trend of personnel involvement in the corporate environ-

mental and energy saving activities, introducing various incentives to fortify results achieved and activities performed. To improve the effectiveness of personnel management MMK has created at the Energy Management Platform (EMP) in 2016 a divi-

sion named Ideas Management Block. This allowed to successfully work with energy efficiency proposals and design ideas, reduce the time for approving proposals and increase the number of implemented ideas (Table 2).

Table 2. – Energy Management Platform activity

Year	Rationalization proposals submitted, number	Implemented projects, number	Economic effect, mln rubles
2016	390	138	68
2018	680	139	73.25

Source: [12; 13]

For the same purpose NLMK has created the corporate Internal Environmental Improvement System, that focuses attention on prevention of environmental hazards as well as proposes and implements respective measures. Proposals and other activities of the personnel are rewarded – number of rewarded persons has reached 200 in 2019.

Environmental and energy saving practices of MMK and NLMK have some differences reflecting the internal priorities of the companies concerned: MMK activities are more focused on energy service contracts [4, 6]. The respective work started in 2014 and included a series of energy service contracts: modernization of the lighting system in rolling shops, installation of frequency regulation on smoke exhausters of converters, modernization of the automated power supply system, etc. This type of contract proved to be an effective means of cost sharing for the energy efficiency projects, using external financial sources. NLMK has focused on environmental audit of the supply chain. A system of environmental indicators was established for all suppliers of the Group and every supplier underwent a thorough environmental auditing in line with these criteria. All new suppliers of the Group underwent this procedure in 2018–2019.

Conclusions

Analysis of the energy saving policies and practices of the MMK and NLMK, the key Russian iron & steel corporations, thwarts some popular visions depicting Russian companies as lagging behind the key global trends. On the contrary, one can easily trace similarities between the policies of two companies and their counterparts in the West and East. The energy & environment policies and strategies of the companies concerned can be assessed as responsible and aggressive. They are supported by a high level of involvement of senior management and ordinary staff and are organized using modern management systems. As a result, the indicators of the energy efficiency and carbon footprint of the Russian iron & steel companies are getting quite close to those of the EU companies. The difference between them in 2016 was around 12%. The companies are facing tough international challenges and serious government pressure that in some cases may seem counterproductive, exposing the companies to excessive regulatory and financial risks. Still, the corporate efforts described are in line with the global changes, and the policies concerned deserve serious attention as examples of adequate policies in the field of energy saving and energy efficiency.

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IMPROVING THE OPERATIONAL EFFICIENCY OF THE ELDERLY KITCHEN IN HANGZHOU

Abstract. As the aging population in china grows, many elderly people live in their homes after they retired since there are not enough senior homes. Compared with those living in senior homes, they don't have enough support of home care and may not be able to cook every day. The Elderly Kitchen Program in Hangzhou City is one such program subsidized by the government to help the elderly with their nutrition needs. The program is very welcomed by the elderly, but its current operation models have a lot of room to improve. The most felt pain point by the specific customers is the price setting, which if lowered, will attract more elderly people to participate in the program. There are many ways to reduce the meal cost, such as encouraging participating customers to help with some low capacity work, engaging the senior homes to use part of their cafeteria for the program, and encouraging the participates to help each other with meal pick-up. The success of the Elderly Kitchen Program will have very positive influence in the communities.

Keywords: welfare, Elderly Kitchen Program, government subsidy, meal plans

I. Introduction

The aging population is growing fast in China, especially in Zhejiang Province. According to the Hangzhou government's census, by the end of 2016, there were 1 591 300 people aged 60 or above in Hangzhou, but by the end of 2017, there are 1 671 824 people aged 60 or above, accounting for 22.16% of its total population. The increase of the number of the elderly people brought a big need for home-based care, including medical care and meal support. As the old Chinese saying goes: food is the first necessity of men. How to solve the problem of diet for the elderly, especially for those who live alone, is becoming a more and more prominent issue. The government of Hangzhou City experimented on Elderly Kitchen, which was a program initiated and sponsored by the city government to provide subsidized food support for the elderly. In this program, the elderly pay for the prepared food at a price that is lower than its regular cost, and the government subsidize the gap between the price and cost.

It is important to control its cost so that the program can last longer within budget and provide for more elderly who need the support. However, so far the Elderly kitchen is not very cost effective in the early experimental communities. Most of the elderly in these communities have low income and their acceptance of the program is not very high, even at the subsidized price. By August 2018, the basic pension for urban corporate retirees was about ¥2773 (Chinese Yuan) per month in China ("Notice on further solving the living difficulties of former industrial and commercial enterprises" (ministry of Labour and social welfare [2002] no. 9), but the elderly in the experimental communities are lower than this average. Taking the Shuangling community as an example, 90% of the elderly have income lower than the average. Their need for an affordable meal program is very high.

One solution is to improve the operational efficiency of the Elderly Kitchen to lower the program's cost to make it more affordable. This study aims to

analyze the pain-points in the current operating models of the program and explore possible improvements.

II. Data and analysis methods

This study used data from government and community reports and also surveyed 30 elderly on their opinions and experience of the Elderly Kitchen. The experimental site of Jianggan District was selected as the sample for this study due to restricted access to other program data.

For the survey, I interviewed 30 elderly citizens in the community and all are 55 years or older. Twenty of them live alone while 9 live with their spouse, and none of them live with their children. Due to their low income, 60% of surveyed indicated an acceptable price of ¥5–10 per boxed meal, while the others indicated ¥5–10 per meal.

III. The current business model of elderly kitchen

The Jianggan district set up 102 program touch-points for the Elderly Kitchen running in three types of models. The first type includes 28 cafeterias where the elderly can dine in, the second type includes 71 pick-up sites with boxed meals where the elderly need to pick up by themselves to take home, and the third type covers 3 lines of delivery sites with food carts. Besides these 102 locations, there are also a new method where a designated small area is reserved in some cafeterias for the Elderly Kitchen, where the elderly can enjoy food with their friends and dine in a better environment. Since this is a brand-new method, there is not much data on it.

In model type one, The 28 cafeterias use a form of collaboration between the Elderly Kitchen Program and small businesses. The community office provides the space for these cafeterias and some third party small businesses run the day to day operation. Besides the elderly, they can also serve other customers at the market price, while customers of the Elderly Kitchen Program pay at a 70% discounted price. The gap of the 30% is where the government subsidy goes. At the end of the year, these

cafeterias will submit their financial statements and a report on how many elderly consumers they have served in the year. Then the government can decide how much to subsidize and reimburse the third party small businesses. These cafeterias are like the partner with government. They are small but very flexible to locate in dispersed locations, so that the Elderly Kitchen Program can reach more elderly with quality hot food. There is an ideal atmosphere when the elderly can sit down in these cafeterias to enjoy their hot meals. On the other hand, they still can make some profit from the other customers they serve at the regular price.

In model type two, the 71 pick-up sites are supported by a small number of relatively bigger commercial cafeterias, who make boxed meals for the Elderly Kitchen Program. If old people are disabled, they can order in Eleme and waiting for courier. Since these commercial cafeterias are relatively large, they can buy a large amount of raw materials at wholesale price and the cooks are better trained, able to cook many dishes at the same time. There is an economy of scale in these cafeterias so the cost is lower than those of model type one. While being able to lower the cost of the box meals, they have a really limited menu offering just a few dishes. Since they provide the boxed meals at a price set by the Elderly Kitchen Program, they can make some profit as well.

The third model is 3 delivering lines with food carts. This model has some similarities with model two, but instead of boxed meals, they provide different dishes in a food cart format where the elderly can pick the items they like. Three big commercial cafeterias make the food and use cars to deliver the food salvers to communities. The community office provides the place for them to sell the food. The elderly enjoy a more flexible menu in this model and can choose what they want instead of the identical kinds boxed meal in model 2.

IV. Pain point of the current business models

Pain points are the critical aspects of the business model where inefficiency exists. By comparing the

current operating models and gathering consumer perceptions, three main pain points were found.

The biggest pain point is how to set the price to attract more elderly people to participate in the program. The subsidized price needs to go even lower since most of the elderly expect so from the Elderly Kitchen Program. Currently, the program cannot be considered as a total public welfare since the elderly customers still pay a portion out of pocket. When there is no such program, the elderly are very interested in these boxed meals; however, when the program runs, many do not actually go because of the price. Some of the elderly like to compare the price of the boxed meals with the cost of cooking themselves, concluding that the price is too high. On the other side, if the price is lowered to the point of comparable to their home cooking cost, the profit margin for the providers would be rather small to sustain their daily operation.

The second pain point lies in the cost of these cafeterias. The costs of employing the cooks, maintaining the equipment, daily cleaning, gas, water, the cost of hiring cooks, maintaining equipment, cleaning and electricity expenses all have relatively high fixed prices. In the current operation model, it's hard to lower these cost items. The elderly canteens generally make low profit, or even suffer a long-term loss. This situation is not conducive to a healthy and stable development of the Elderly Kitchen Program. Many kitchens have failed because of the low profit.

The third pain point is how to deliver food to the disabled old people or the old people who are sick. It is not convenient for these old people to walk to the program touch-points. Also, when it is very hot in summer or very cold in winter, the weak elderly cannot go out of their rooms. Helping them to reach the program will on one hand increase the customer base, and on the other hand push the program to reach the needy deeply. The delivery lines can be a solution, but currently they have a limited routing and the elderly may have safety concerns opening their doors to the stranger couriers.

V. Proposed solution

Addressing these pain points will naturally yield a better model. For pain point one and two, which is around price and cost of the Elderly Kitchen meals, we need to think of the demand and the supply. On the demand side, if the program can attract more elderly by lowering the price, the cafeterias may still be able to get a better profit due to the economy of scale. On the supply side, when it comes to lowering the price, a good solution is to learn from those kitchens that are more successful, which usually have big sizes, and they can enjoy wholesale prices for the raw materials. When the number of customers per cafeteria increases due to the lowered price, these program cafeterias can benefit from a similar economy of scale. Even though they may face prices higher than wholesale, but would be better than the smaller orders before.

Prepay, Reservation and Elderly Volunteers

Using a pre-pay and reservation system, and encouraging the elderly to help out in the cafeterias can help to ease pain-point one on lowering price and reducing cost. The pre-pay mechanism is that the elderly pay for a certain number of meals up front and get a meal cards so that they could come to eat more often. From my survey, most respondents (85% of total) are willing to pre-pay and like the idea of reservations. In this way, the kitchens can better plan their purchase orders to meet the demand without too much excessive waste. This improvement in operation efficiency can help to lower the cost of the meals. Yet another suggestion is that some of the elderly people can work for the Elderly Kitchen Program by helping with the food cooking, water refilling, or cleaning. They may feel more fulfilled when helping out, and at the same time, the kitchens can save on some cost.

Collaborate with Senior Homes and Elderly Help Elderly

For the pain point three on reaching less capable elderly people, my suggestions are 1) utilize the existing senior homes in the communities to serve as

a Elderly Kitchen cafeteria, and 2) to encourage the elderly to help each other with picking up the meals. Just in Jianggan district, there are eleven senior homes dispersed throughout the district. If they can allow part of their cafeterias to support the Elderly Kitchen Program, it will be very convenient to reach the elderly people who do not live in the senior homes, but live relatively close. All of the respondents to my survey agreed that this would be a good model.

Furthermore, a rewarding system can be used to encourage the elderly to help each with the meals. Sometimes it is not convenient for some elderly live far away to dine in or pick up from the Elderly Kitchen touchpoints. The relatively younger elderly people aged 55–70 who are able to walk and willing to help others can bring food back for the others living in their neighborhood. Each time they help others, they can gain some points and these points can be redeemed toward some free goods later. This model is similar to the policy for garbage classification in Europe, where people who sorted garbage correctly get points, and they can use the points to get free goods. The government or organizations usually pay for these goods. The advantage of this model is that it is efficient. Even though not much in value, the free goods are seen as a sign of self-worth and the ability to help others. It can be very fulfilling to the elderly and promote their willingness to help others. On the other hand, the less capably seniors also benefit from this model because they do not need to spend money on meal delivery.

Potluck Beyond the Elderly Kitchen Program

Besides the Elderly Kitchen Program, I also see the opportunity to encourage a pot-luck fashion without the need for operating an elderly kitchen. In this model, the elderly can cook their own dishes but eat together in one person's home and all enjoy

the pot-luck dishes. The sharing with each other will reduce wasted food and people can enjoy each other's accompany at the same time. It can be good for the elderly people's health and it is convenient for those who live in nearby neighborhood. Of course, this model only fits when several conditions are satisfied. First, the participating elderly need to be capable enough to cook. Secondly, they need to live close enough to feel comfortable to gather like a party. Thirdly, they need to be friendly enough towards each other. There are many details to be concerned about in order to make this model a feasible one. Nonetheless, it is worthwhile exploring.

VI. Conclusion

The Elderly Kitchen Program in Hangzhou has been a very popular experiment so far and there is a bright future for it. The price and cost of its meals need to be improved and there are rooms for improvement from both the program and the elderly customers. By addressing these issues, the program would be able to reach more elderly customers in the long run. The key lies in increasing its economy of scale, cooperating with existing senior homes, and encouraging the customers to help out in the kitchens and among themselves. Potluck fashion meals are another possible solution for the elderly people.

There are some potential issues of my proposed solutions as well. For example, if more and more elderly people earned enough points for the free goods, can the government afford to fulfill their award? Also, we should worry that whether the elderly volunteers are healthy enough to avoid potential disease spreading. What's more, because volunteers provide door-to-door service, the safety issue arises as many old people live alone at home and are vulnerable. All these can be good research topics for later researchers.

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SME FINANCING PROBLEMS AND FUTURE TRENDS

Abstract. The main focus of this paper is to analyze bank lending that is a primary source of SME financing. The problems and risks in bank lending are determined and methods of governance of credit risks are listed. The alternative ways of SME lending are analyzed. It is necessary for SMEs to be reliable partner, improve the quality of business plans and investment projects.

Keywords: small and medium enterprises (SMEs), bank lending, working capital, trend analysis.

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ПРОБЛЕМЫ ФИНАНСИРОВАНИЯ МСП И БУДУЩИЕ ТЕНДЕНЦИИ

Анотации. Основное внимание в этой статье уделяется анализу банковского кредитования, являющегося основным источником финансирования МСП. Определены проблемы и риски в банковском кредитовании и перечислены методы управления кредитными рисками. Анализируются альтернативные способы кредитования МСП. МСП необходимо быть надежным партнером, улучшать качество бизнес-планов и инвестиционных проектов.

Ключевые слова: малые и средние предприятия (МСП), банковское кредитование, оборотный капитал, анализ тенденций.

Современные малые и средние предприятия (МСП) представляют значительную часть мировой экономики, на которую приходится почти 90% всех современных предприятий.

Они вносят большой вклад в создание рабочих мест и экономический рост, особенно в развивающихся странах. Хотя они стали жизненно важной частью финансовой экосистемы, эти предприятия сталкиваются с чрезвычайными трудностями в доступе к финансам. МСП часто связаны с более высокими рисками, значительными транзакционными издержками и отсутствием залогового обеспечения – около 50% кредитов для малого бизнеса отклоняются.

Проблема глобальная: предприятия из стран Восточной Азии и Тихоокеанского региона представляют наибольшую долю (46%) от общего числа МСП с недостаточным объемом банковского обслуживания в мире, за ними следуют Латинская Америка и Карибский бассейн (23%), а также Европа и Центральная Азия (15%). По данным Финансового форума МСП, в 2018 году финансовый разрыв между потребностями МСП в мире и доступными средствами достиг 5,2 триллиона долларов [1].

Банковское кредитование является наиболее распространенным источником внешнего финансирования для многих МСП и предпринимателей,

которые часто в значительной степени зависят от традиционного долга для удовлетворения своих начальных, денежных потоков и инвестиционных потребностей. «Разрыв в финансировании», который затрагивает эти предприятия, часто является «разрывом в росте капитала». Могут потребоваться значительные суммы средств для финансирования проектов с высокими перспективами роста, в то время как соответствующие структуры прибыли зачастую трудно прогнозировать. Финансовые ограничения могут быть особенно серьезными в случае стартапов или малых предприятий, которые полагаются на нематериальные активы в своей бизнес-модели, поскольку они очень специфичны для конкретной фирмы и их трудно использовать в качестве обеспечения в традиционных долговых отношениях [2]. После глобального финансового кризиса 2008–2009 годов банковские кредитные ограничения, с которыми сталкиваются МСП во многих странах, еще больше подчеркнули уязвимость сектора МСП в отношении изменения условий банковского кредитования. Во время финансового кризиса фирмы зоны евро, и особенно МСП, сообщали об острых проблемах доступа к внешнему финансированию. Приблизительно 70% МСП не имеют доступа к официальному кредиту, что создает дефицит кредита в размере почти \$2,6 трлн. у МСП вместе взятые [3].

Артола и Хенре (Artola and Genre) (2011) подтверждают эти утверждения, анализируя ответы на уровне фирм на опрос МСП ЕЦБ и ЕС о доступе к финансам между 2009 и 2010 годами. Они используют два индикатора финансовых ограничений, основанных на восприятии с одной стороны и на опытных финансовых ограничениях с другой, и используют модели пробитовой и полиномиальной регрессии, чтобы определить, какие характеристики фирм, секторов или стран определяли восприятие и опыт финансовых ограничений во время финансовых потрясений изучены. Они считают, что восприятие финансового кризиса в целом основывалось на фирмах, но те фирмы,

которые действительно переживали кредитный кризис, как правило, были маленькими и молодыми, подтверждая тот факт, что МСП, как правило, больше страдают, когда ужесточаются стандарты кредитования [4]. Аналогичным образом Чавы и Пурнанандам (Chava и Purnanandam) (2011) считают, что фирмы, которые могут получить доступ к капиталу только через банки – как это обычно бывает с более мелкими фирмами, – наиболее уязвимы для банковских кризисов по сравнению с фирмами с альтернативными источниками капитала [5]. МСП, как правило, более уязвимы и подвержены влиянию, чем более крупные корпорации. Давняя необходимость укрепления структур капитала и уменьшения зависимости от заимствований теперь стала более насущной, поскольку многие фирмы были вынуждены увеличить левередж, чтобы пережить кризис, и в то же время банки во многих странах ОЭСР были сокращать свои балансы, чтобы соответствовать более строгим пруденциальным правилам. Поскольку банки продолжают процесс сокращения доли заемных средств, существует риск того, что масштабное сокращение банковских активов может привести к кредитному кризису [7; 8]. Существует широкая обеспокоенность тем, что кредитные ограничения просто станут «новым нормальным» для МСП и предпринимателей и что они могут быть непропорционально затронуты продолжающимися финансовыми реформами, и особенно быстрыми темпами их реализации, поскольку они в большей степени зависят от банковского финансирования, чем крупные фирмы, и в меньшей степени способны адаптироваться [6].

Конкретные проблемы ограничивают традиционное банковское кредитование МСП. Во многом это связано с большими трудностями, с которыми сталкиваются кредиторы при оценке и мониторинге МСП по сравнению с крупными фирмами [9]. Во-первых, асимметричная информация является более серьезной проблемой для МСП, чем для крупных фирм. МСП часто не предоставляют про-

веренные финансовые отчеты, которые дают достоверную финансовую информацию, хотя обычно они обязаны предоставлять их и предоставлять их соответствующим органам по запросу.

Во-вторых, проблема принципала/агента, которая присуща всем операциям финансирования, и особенно остра в случае МСП. После получения финансирования предприниматель может использовать средства не теми способами, для которых он предназначен. Предприниматель может предпринимать чрезмерно рискованные проекты, поскольку весь «верх» проекта принадлежит предпринимателю, в то время как банкир предпочел бы менее рискованную операцию, даже если прибыльность меньше, чем при более рискованной альтернативе. Есть и другие причины, которые привели к проблемам получения МСП финансирования, некоторые из них: МСП по своей природе неформальные и молодые, у них меньше доверия на рынке, они работают в незнакомых секторах, часто недостаточно активов для обеспечения и др.

Финансовые учреждения разработали несколько методов, чтобы смягчить частоту возникновения таких проблем при кредитовании МСП. Основная цель состоит в том, чтобы изменить механизм распределения рисков, чтобы согласовать стимулы между кредитором и заемщиком.

Обычно используемые методы управления кредитным риском для МСП включают

- 1) Запросы на крупные взносы от потенциальных заемщиков;
 - 2) Требования к обеспечению. то есть актив заемщика, право собственности на которое предоставляется кредитору в случае неисполнения обязательств;
 - 3) Кредитные гарантии, при которых в случае дефолта заемщика гарант компенсирует заранее определенную долю непогашенного кредита [9].
- Кредитные соглашения, то есть условие, налагаемое кредитором, которому заемщик должен соблюдать, чтобы соблюдать условия кредитного

соглашения. Общие кредитные соглашения включают в себя:

- 1) Страхование рисков / страхование контента, при котором заемщик обязан сохранять страховое покрытие на заводе / оборудовании или инвентаре в целях защиты от катастрофической потери залога;
- 2) Страхование жизни ключевого человека, которое страхует жизнь незаменимого владельца или менеджера, без которого компания не могла бы продолжаться. Кредитор обычно получает назначение политики;
- 3) Требования к уплате налогов лицензий, при которых заемщик соглашается поддерживать эти расходы в актуальном состоянии. Фактически, неуплата приведет к тому, что активы компании будут обременены залогом от правительства, которое будет иметь приоритет перед активом банка;
- 4) предоставление финансовой информации о заемщике и поручителе, посредством чего заемщик соглашается представить финансовую отчетность для дальнейшей оценки банком;
- 5) Заемщик не может предпринимать конкретные действия без предварительного разрешения, такие как: смена руководства или слияние, требование дополнительных займов или распределение дивидендов.

Поэтому необходимо расширить спектр инструментов финансирования, доступных для МСП и предпринимателей, с тем чтобы они могли продолжать играть свою роль в росте, инновациях и занятости. Финансовая стабильность, финансовая доступность и финансовое углубление должны рассматриваться как взаимодополняющие цели в стремлении к устойчивому восстановлению и долгосрочному росту. Хотя банковское финансирование будет по-прежнему иметь решающее значение для сектора МСП, более диверсифицированные варианты финансирования МСП могут поддержать долгосрочные инвестиции и снизить уязвимость сектора к изменениям на кредитном рынке. Действительно, проблема чрезмерного

привлечения МСП, возможно, усугубилась реакцией политики на финансовый кризис, поскольку программы стабилизации в чрезвычайных ситуациях, как правило, фокусировались на механизмах, которые позволили фирмам увеличить свой долг, так как финансирование из других источников стало более скудным [6; 8].

Эффективная финансовая система – это система, которая может предоставлять финансовые ресурсы широкому кругу компаний в различных обстоятельствах и направлять финансовое богатство из разных источников в бизнес-инвестиции. Поскольку банковский сектор остается слабым, а банки приспосабливаются к новой нормативной среде, институциональные инвесторы и другие небанковские игроки, включая состоятельных частных инвесторов, могут сыграть потенциальную роль в заполнении финансового пробела, который может увеличиться в посткризисной среде [9]. Именно в этот момент на рынок вышли альтернативные решения по кредитованию МСП и создали новую надежду для МСП. Альтернативные кредитные учреждения смогли решить все те проблемы, которые стали препятствием для роста МСП в сфере кредитования и финансирования. Благодаря быстрому процессу выдачи кредитов, односточным панелям мониторинга, обеспечивающим максимальную прозрачность между кредитором и заемщиком, а также простым выплатам и вариантам погашения, кредитное финансирование стало намного проще для МСП. Альтернативные кредитные учреждения обнаружили проблемы в традиционном банковском деле, который выступал в качестве барьера для МСП при обращении за кредитами. Пионеры

индустрии альтернативного кредитования исследовали и выяснили различные виды потребностей в финансировании у типичного МСП, и создали индивидуальные решения по кредитованию, соответствующие их потребностям.

Согласно Moody's Analytics взгляд на будущее состояние кредитования фокусируется на следующих элементах:

- 1) Инструменты для автоматизации сбора и структурирования данных малого бизнеса из финансовой отчетности, налоговых деклараций и других документов;
- 2) Разработка кредитных моделей с использованием факторов, выходящих за рамки финансовой информации, и широкое использование данных для оптимизации принятия решений;
- 3) Инструменты на основе правил для автоматизации процессов и решений, а также функциональность рабочих процессов для отслеживания задач и требований;
- 4) Расширенные возможности мониторинга портфеля и бизнес-аналитики [10].

Для решения задач быстро меняющегося рынка банкам необходимо будет использовать инструменты и технологии для расширенного сбора данных, автоматизации процессов, автоматического подсчета и принятия решений на основе правил. Преобразование процесса кредитования малого бизнеса также потребует от банков и их партнеров использования новых решений в области кредитной информации и переосмысления способов сбора и использования данных о клиентах и потенциальных клиентах для создания надежных, количественных и наглядно подтвержденных рамок принятия решений по кредитам.

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FEATURES OF INFORMATION SUPPORT OF ENTERPRISE ECONOMIC SUSTAINABILITY MANAGEMENT

Abstract. The main essential characteristics of information support of enterprise economic stability management are considered and analyzed in the article. The features, which should be taken into account when developing the integral theoretical concept of information management on enterprise economic stability, are determined. The list of requirements to information support, which are conditioned by its main purpose.

Keywords: information, sustainability, information support, management, enterprise, sustainability management

Formulation of the problem. Ensuring the economic stability of the enterprise in modern conditions requires an increase in the level of information support, which implies the informatization of management activities and assistance in the formation and development of information systems to organize information resources. The criterion for effective management of modern enterprises is the maximum satisfaction of information needs of all participants in production and economic activities. Information support for managing the economic stability of the enterprise assumes the organization of targeted arrays of information and information flows, which includes the collection, storage, processing and transfer of information to analyze the results for the preparation, justification and management decisions.

Analysis of recent research and publications. To research of questions of information maintenance of economic stability of the enterprise are devoted

works of domestic and foreign scientists-economists: Alacheva T. I., Balabanova L. V., Godina V. V., Zadorozhnyi S. V., Korneev I. K., Livoshko T. V., Mishina Y. A., Pushkar M. S., Sopka V. V., Tkachenko A. N., Cherep A. V., Chumachenko N. G., Shlyaga A. V. At the same time the problem of formation of complex information system of management of economic stability of enterprises has not received the exhaustive decision that causes an urgency of the chosen direction of research.

Presentation of the main research material. The enterprise is a dynamic structure whose state is determined by both external interaction with the environment and internal interaction between its elements. Therefore, in the course of its activities an integral part is the functioning of information flows and their use. Management of all types of information resources used in the activity of the organization requires management of information processing, movement and use.

In general terms, information support is a system of indicators and means of their description (classifiers and codes, economic documentation and the information base is organized accordingly) [1, P. 57].

From the point of view of the system approach information support is a dynamic system of data and ways of their processing, which allow to study the real state of the controlled object, to allocate the factors, determining it, and also to reveal possibilities of realization of necessary administrative actions.

Considering the specified features, it is necessary to define and characterize the factors which influence the level of information support, namely external (circle of external users, the level of information disclosure to meet the information needs of external users) and internal (the size of the enterprise and the scale of its activity; the structure of the administrative apparatus; information needs of users; the qualification level of employees of accounting and analytical departments, the level of detail and generalization of information; the period of time for the development of the information system; the level of information disclosure.)

Summarizing and critically assessing scientific works, it is possible to formulate the essential characteristics of information support of enterprise economic sustainability management:

1) is a functional complex ensuring organic interaction of technical means, methods and technologies of working with information;

2) is a set of information resources, means, methods and technologies, which contributes to the effective implementation of the management process;

3) is a tool that generates information, which consists of important data and does not allow managers to be distracted by unnecessary and cumbersome information;

4) it is a continuous process of continuous ensuring the possibility of collecting, searching, grouping, analyzing, storing and disseminating information among the interested managers of enterprises and organizations;

5) it is a tool that provides information about the status and functioning parameters of certain management objects at certain intervals or in accordance with its requests, and focuses on the previously defined key performance indicators of the subject;

6) it is a management technology, as it reflects information on the condition of the managed object and is the basis for making management decisions;

7) it is a tool that supports the functioning of the management system, because it provides timely, reliable and complete information about business processes and business objects for effective management of certain aspects of activity to senior management and managers at all levels;

8) is a specific type of professional activity because it takes into account the information needs of different subjects, in particular, the subjects of management;

9) is an integral part of the management system and process, expressing relations on organization and implementation of entrepreneurship, the purpose of which is to provide complete and reliable information for effective implementation of business activities.

Information support, as well as any other economic phenomena, has certain features, which should be taken into account when developing a holistic theoretical concept of information support of enterprise economic stability management. The main of them are:

1) a large number of information data from external and internal environment, which have a significant impact on the results of enterprises' activity in comparison with the subjects of other spheres of national economy;

2) When creating information support for enterprise economic sustainability management, attention should be concentrated on taking into account all main factors of internal and external environment;

3) The system of information support should take into account management support while ensuring their self-sustainability, flexibility and certain level of independence;

4) Special attention should be paid to automation of logistics process management [4, P. 68].

The main purpose of information support of enterprise economic stability management is to create such a mechanism of information presentation, which would meet any requirements of users, as well as the conditions of automated technologies [3, P. 24].

The purpose of information support of enterprise economic sustainability management also determines the requirements to it:

1) provision of complete, reliable, unambiguous, relevant and timely information for carrying out calculations and implementation of managerial decision-making processes in functional subsystems with minimum expenses for its collection, storage, search, processing and transfer;

2) the information should be generated with a specified level of accuracy reflect the parameters of functioning of a certain object;

3) the information support should provide the information sufficient for effective realization of all functions of the object;

4) Coding of the information and creation of reliable means of its transfer and storage for maintenance of its protection against unauthorized use and for simplification of work with information streams in a control system of the enterprises is necessary;

5) To maintain an appropriate level of promptness of provision of necessary information, compatibility with information systems that interact with the object's information support system should be ensured;

6) The information system shall provide means to control the input and output information, to register data in information files and to control the integrity of the information base;

7) the forms of documents should not only meet the requirements of corporate standards of the enterprise, but also promptly transform into a form acceptable to other users;

8) the information should enter the enterprise management system not only at a given frequency, but also at the request of users, because the parameters of the functioning of certain objects of management change over time;

9) The use of certain information by managers of enterprises and organizations should contribute to the improvement of the efficiency of their activities.

Conclusions. Information support of enterprise economic stability management can be considered from the economic, organizational, technological and technical point of view, as well as a system of resource support, as a specific type of professional activity, as a component of the management system and process.

Information support of enterprise economic sustainability management, based on a wide application of new information technologies, computer and communication equipment, allows to increase the efficiency of enterprises and organizations in several times, to optimize by given criteria of resource use, to reduce document circulation with the transition to electronic management technologies.

Thus, it is possible to offer the following definition of features of information support of management of the enterprises and the organizations: it is a functional complex providing organic interaction of technical means, methods and technologies of work with the information, possibility of purposeful continuous gathering, search, grouping, the analysis, storage and distribution of the information among interested managers of the enterprises and the organizations, and also receipt of timely, reliable and full information on a condition and parameters of functions.

As the analysis has shown, information support of management of economic stability of the enterprise plays an important role in maintenance of effective activity of the enterprise by information-analytical, methodological and instrumental support of management, and consequently, takes one of the first places in management.

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Section 4. Environmental economics

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EFFECTS OF DROUGHT ON TOTAL FACTOR PRODUCTIVITY FOR MOST STRATEGIC CROPS AND REGIONS IN TUNISIA: AN APPLICATION OF THE MALMQUIST INDEX

Abstract. This paper compares Total Factor Productivity (TFP) growth of major four agricultural sub-sectors (cereals, fruit trees, vegetables, and livestock) among the five different regions in Tunisia under changing climatic conditions. The study uses panel data set of these regions over the time period of 2000–2016 and Malmquist index approach for the empirical analysis. It includes one output (production value) and three inputs (land, labor and capital). The results show that TFP varies between sub-sectors and regions and decreases during drought years. ANOVA results reveal that fruit trees and cereals in South and fruit trees in North West are more affected by drought. This suggests that more adoption of drought tolerant crops varieties, best agricultural practices promotion and appropriated extension services programs targeted production system in each region are recommended to increase total factor productivity growth.

Keywords: Total factor productivity, Malmquist index, Commodities, Drought, Regions in Tunisia.

1. Introduction

Agricultural sector plays an important role in economic development in Tunisia. It contributes with 10% to the GDP, 11% to the total national exports and employs 17% of the active population (Dhehibi et al. [11]). However, agriculture in Tunisia is

facing drought problems and production is highly dependent to the climate variability. The country is characterized by low rainfall, limited renewable water resources and droughts are expected to be more frequent in the near future (World BankWorld Bank, [19]). Drought is one of the risks that threaten

agricultural sector and potentially connected to large economic losses (Bryan et al. [2]).

Tunisian's agricultural sector is highly dependent on water resources since it consumes more than 85% of total water use in the country (ITES, 2014). Given the climate constraints and the limited resources, agricultural development has been traditionally stimulated by the development of the irrigated sector. In fact, irrigation has been a major component of the agricultural policy pursued by Tunisian government that developed a water saving program to which significant financial incentives have been offered to promote efficient irrigation equipment. The objective of this program was also to prevent drought risks and improve land productivity. In Tunisia, irrigated area has increased from 250,000 ha in 1990 to 450,470 ha in 2015 (MA, 2016). However, the increase of irrigated area has clear consequences on the country's water resources. Despite huge investments made and the expansion of the irrigated area, several studies showed that there are some issues related to this sector in terms of water productivity, losses during transfer, distribution and uses (Dhehibi et al. [11]; ITES, 2014; Frija et al., 2015.; Chebil et al., 2019) which do not help to reduce the effect of drought on productivity in a significant way. In this context, the main objectives of this paper are to estimate the total factor productivity (TFP) levels for most strategic crops and regions in Tunisia and explore the effects of droughts on TFP growth. In Tunisia, several studies have been conducted on agricultural TFP at national level (Lachaal et al. [16], Dhehibi and Lachaal [10], Belloumi and Mattoussi [1], Frija et al. [14], Chebil et al. [4]). However, to the best of our knowledge, no studies analyzed TFP of most crops at the regional level. Therefore, comparing drought impact on TFP across regions and crops is crucial to set adaptation strategies.

The rest of the paper is organized as follows. The second section discusses data and analytical method. The estimated results are presented and discussed in section 3. Conclusions and implications are drawn in the final section.

2. Methodology

Growth in TFP is defined as a growth in outputs which is not explained by the growth in the use of inputs in production. Generally, there are two approaches (parametric and non-parametric approaches) that are extensively applied in recent literature to measure the TFP growth. In the present study, we apply a non-parametric approach using the Malmquist TFP index presented in Caves et al. [3] and Färe et al. [13]. The Malmquist index is based on distance functions that allow productivity growth to be decomposed into efficiency change (getting closer to the frontier) and technical change (shifts in the production frontier technology). This index is easy to compute and does not require information about input or output prices, and behavioural objective such as cost minimization or profit maximization (Fulginiti and Perrin, [15]; Coelli et al. [8]; Coelli et al. [9]). This is especially attractive in the context of agriculture, where input market prices are either nonexistent or insufficiently reported to provide any meaningful information for land and labor.

2.1. Malmquist TFP Index

The Malmquist TFP index was first introduced by Caves, Christensen and Diewert [3]. It measures the TFP change between two data points (e.g. those of a particular region in two adjacent periods) by calculating the ration of the distances of each data point relative to a common technology. Following Färe et al. (2004), the period t Malmquist (output oriented) productivity index is given by

$$M^t = \frac{D_o^t(x^{t+1}, y^{t+1})}{D_o^t(x^t, y^t)} \quad (1)$$

i.e., they define their productivity index as the ratio of two output distance functions taking technology at time t as the reference technology. Instead of using period t 's technology as the reference technology it is possible to construct output distance functions based on period $(t+1)$'s technology and thus another Malmquist productivity index can be laid down as:

$$M^{t+1} = \frac{D_o^{t+1}(x^{t+1}, y^{t+1})}{D_o^{t+1}(x^t, y^t)} \quad (2)$$

Färe et al (1994) attempt to remove the arbitrariness in the choice of benchmark technology by specifying their Malmquist productivity change index as the geometric mean of the two-period indices, that is,

$$M_o(x^{t+1}, y^{t+1}, x^t, y^t) = \left[\left(\frac{D_o^t(x^{t+1}, y^{t+1})}{D_o^t(x^t, y^t)} \right) \left(\frac{D_o^{t+1}(x^t, y^t)}{D_o^{t+1}(x^{t+1}, y^{t+1})} \right) \right]^{\frac{1}{2}} \quad (3)$$

The above Mamquist TFP index can be decomposed in a way that highlights what sources are attributed to the TFP growth. An equivalent way of writing

this productivity index (equation 3) is the product of two distinct components- technical change and efficiency change (Färe et al [13]).

$$M_o(x^{t+1}, y^{t+1}, x^t, y^t) = \frac{D_o^{t+1}(x^{t+1}, y^{t+1})}{D_o^t(x^t, y^t)} \left[\left(\frac{D_o^t(x^{t+1}, y^{t+1})}{D_o^{t+1}(x^{t+1}, y^{t+1})} \right) \left(\frac{D_o^t(x^t, y^t)}{D_o^{t+1}(x^t, y^t)} \right) \right]^{\frac{1}{2}} \quad (4)$$

$$\text{where Efficiency change} = \frac{D_o^{t+1}(x^{t+1}, y^{t+1})}{D_o^t(x^t, y^t)}$$

$$\text{Technical change} = \left[\left(\frac{D_o^t(x^{t+1}, y^{t+1})}{D_o^{t+1}(x^{t+1}, y^{t+1})} \right) \left(\frac{D_o^t(x^t, y^t)}{D_o^{t+1}(x^t, y^t)} \right) \right]^{\frac{1}{2}}$$

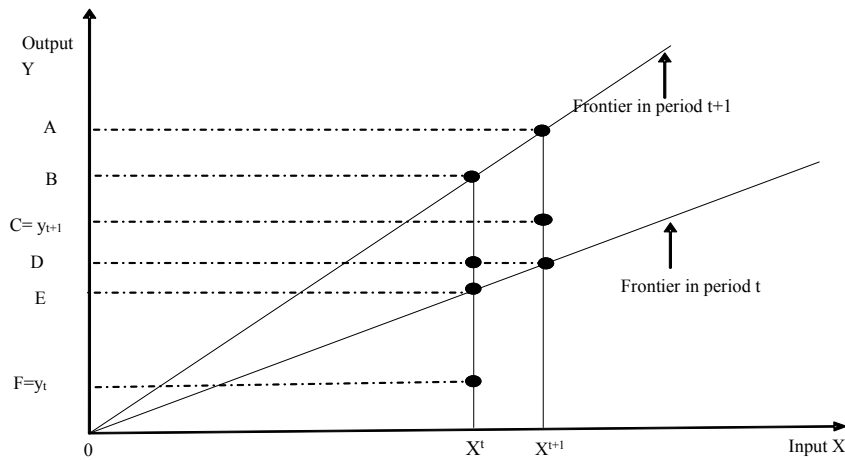


Figure 1. The Malmquist productivity index

Figure 1 explains the Mamquist index decomposition. Hence, in terms of the distance along the y axis, the index (6) becomes

$$M_o(x^{t+1}, y^{t+1}, x^t, y^t) = \frac{OC/OA}{OF/OE} \left[\left(\frac{OC/OD}{OC/OA} \right) \left(\frac{OF/OE}{OF/OB} \right) \right]^{\frac{1}{2}} \quad (5)$$

The ratios inside and outside the square bracket measure the technical change and efficiency change, respectively. Malmquist indexes greater than one indicate growth in productivity. Malmquist indexes less than one indicate decline in productivity.

2.2. Sources of data and variables specification

Malmquist TFP index has been used for the empirical analysis of disaggregated data by crops (commodities) and regions over the time period of 1994–2015. We used one output and three inputs

variables to construct indexes of TFP. The output is the value of agricultural production measured in Tunisian National Dinars (TND1TND≈0.49 USD (2015)) (constant 2005 prices). Livestock includes only sheep, cattle and goats due to data limitations for the other livestock. Land area, labor and capital stock are used as inputs. Capital stock (K) is measured in terms of accumulated capital according to the following equation (6):

$$K_t = (1 - \delta)K_{t-1} + I_t \quad (6)$$

where K_t – is the value of capital stock at t period, I_t – is real gross capital formation (investment) at t , δ – is the depreciation rate (set to 10%).

Labor (L) is measured in terms of total employment (in thousand days).

The data used in this study was collected from different sources of information which included the

National statistics agencies (INS) Ministry of Agriculture (MA), National Institute of Statistics (INS) Food and Agriculture Organization (FAO), and published papers.

Table 1. – Descriptive statistics of input and output variables (constant 2005 prices)

Commodities			Output (Million TD)	Land* (1000 ha)	Labor (1000 days)	Capital (Million TD)
Cereals	North East	Mean	109.3	199.8	1943.9	251.3
		S.D.	20.1	9.8	395.6	52.5
	North West	Mean	279.4	673.8	4736.6	682.4
		S.D.	103.0	22.7	701.0	45.8
	Center East	Mean	16.7	94.1	296.5	61.3
		S.D.	16.5	37.1	230.2	28.4
	Centre West	Mean	67.6	309.2	1201.8	224.4
		S.D.	48.4	72.4	674.2	54.3
	South	Mean	6.4	93.2	102.1	48.3
		S.D.	6.4	70.6	65.3	32.2
Livestock	North East	Mean	257.9	362.8	7.6	550.4
		S.D.	64.2	26.7	0.5	112.2
	North West	Mean	372.4	752.5	17.1	927.9
		S.D.	30.4	35.6	1.5	57.0
	Center East	Mean	164.5	283.1	10.2	380.6
		S.D.	31.6	15.3	0.7	50.0
	Centre West	Mean	195.5	515.0	11.8	552.7
		S.D.	84.5	29.3	1.1	100.7
	South	Mean	160.1	405.4	13.7	439.7
		S.D.	93.6	53.6	0.9	82.7
Fruit trees	North East	Mean	101.4	127.3	3.4	275.8
		S.D.	19.5	0.8	0.7	11.9
	North West	Mean	179.1	228.3	3.8	490.7
		S.D.	49.7	18.1	0.9	29.0
	Center East	Mean	573.7	789.1	10.7	1656.5
		S.D.	149.5	7.2	2.0	65.4
	Centre West	Mean	459.7	632.6	9.1	1321.0
		S.D.	130.5	26.9	1.9	6.1
	South	Mean	336.5	452.1	10.7	955.7
		S.D.	93.5	26.6	2.2	15.7
Vegetables	North East	Mean	148.558.5	62.3	9.1	241.2
		S.D.	45.870.7	60.7	1.3	77.6
	North West	Mean	72.844.0	25.8	3.1	116.2
		S.D.	20.791.0	2.2	0.6	19.2
	Center East	Mean	70.6	24.0	3.9	110.3
		S.D.	26.712.8	3.9	0.4	25.6
	Centre West	Mean	105.666.9	40.1	5.4	175.9
		S.D.	25.694.8	4.9	0.6	35.2
	South	Mean	53.023.4	17.7	2.6	82.0
		S.D.	16.794.2	2.1	0.3	14.2

*1000 livestock unit (LSU) for livestock (1 Cattle =1LSU, 5 Sheep = 1 LSU and 6 Goats =1 LSU)

Source: Own elaboration based on different sources

The analysis includes 4 of the most strategic crops of the country. it is built based on regional disaggregated data, including 24 governorates of Tunisia. These governorates have been aggregated into five regions (North West, North East, Center West, Center East, and South) based on bioclimatic homogeneity. Table 1 summarizes the data used in measuring TFP.

3. Empirical results

3.1. Total factor productivity change by commodities and regions

The Malmquist indices of productivity change are generated by the software package DEAP version 2.1 (Coelli [7]). The results of TFP, efficiency and technical change by regions and commodities are summarized in the table below. As can be seen in Table

2, technical efficiency is quite stable for all regions and commodities. TFP growth of all observed commodities have experienced varying degrees of decline, with the exception of cereal in the South, livestock and fruit trees in North East. This is primarily attributable to technological regress. Comparison of TFP growth for cereal among all regions show that South has the highest TFP growth (1.29) followed by Center East (1.00). The highest TFP index for livestock is registered in North East (1.019). Regarding fruit trees, North east has the highest level of TFP (1.03) and the remaining remaining regions have level lower than one. The (table 2) is showing that TFP indexes for vegetables in all regions are lower than one which means a negative TFP growth during the study period.

Table 2.– Summary of Malmquist productivity index decomposition (Mean 2000–2016)

Commodities		Technical change	Efficiency change	TFP change
Cereals	North East	0.861	0.999	0.860
	North West	0.848	1.000	0.848
	Center East	1.174	0.853	1.001
	Center West	0.848	1,021	0.866
	South	1.516	0.857	1.299
Livestock	North East	0.961	1.060	1.019
	North West	0.849	1.000	0.849
	Center East	0.984	0.999	0.983
	Center West	0.915	0.985	0.901
	South	0.922	1.000	0.922
Fruit Trees	North East	1.014	1.017	1.031
	North West	1.002	0.989	0.991
	Center East	0.861	1.000	0.861
	Center West	0.878	1.015	0.891
	South	0.948	1.000	0.948
Vegetables	North East	0.848	1.037	0.879
	North West	0.879	1.000	0.879
	Center East	0.878	1.015	0.891
	Center West	0.861	1.015	0.874
	South	0.968	1.012	0.980

Source: Elaboration by authors

3.2. TFP comparisons by drought conditions

Standardized Precipitation Index (SPI) developed by Mc Kee et al. [17]) was used for determi-

nation of drought years (drought years $SPI < -0.99$ and no drought years $SPI > -0.99$), respectively. The results of TFP growth by drought conditions are

presented in (table 3). It shows clear differences of TFP values among two drought conditions. Particularly, TFP for cereals in the South under drought

condition is much lower compared to the TFP level under no drought situation.

Table 3. – Summary of Malmquist indexes by drought conditions (mean 2000–2016)

Commodities	Region	No drought years	Drought years
Cereals	North East	0.895	0.855
	North West	0.852	0.838
	Center East	1.031	0.970
	Center West	0.882	0.846
	South	1.743	0.729
Livestock	North East	1.023	0.987
	North West	0.854	0.836
	Center East	0.992	0.973
	Center West	0.926	0.868
	South	0.933	0.908
Fruit Trees	North East	1.049	0.901
	North West	1.047	0.826
	Center East	0.904	0.819
	Center West	0.913	0.863
	South	1.018	0.858
Vegetables	North East	0.884	0.843
	North West	0.892	0.838
	Center East	0.938	0.843
	Center West	0.891	0.852
	South	1.021	0.928

Source: Elaboration by authors

3.3. Results of Analysis of variances

Analysis of variances (ANOVA) was performed with three factors (region, drought and interaction) to test significance for difference in TFP growth. Results of ANOVA of the different cases are presented in table

4. As shown in the table, interaction factors were not statistically significant at 5% level for all cases. Drought effects are statistically significant at 5% for fruit trees and vegetables. However, region effects are statistically significant only at 10% for vegetables and livestock.

Table 4. – Analysis of variances for TFP

Branch	Source	Sum of squares	df	Mean of square	F	P-value
1	2	3	4	5	6	7
Cereals	Model	6.430	9	0.714	1.65	0.117
	Region	1.547	4	0.386	0.890	0.479
	Drought	0.559	1	0.559	1.29	0.259
	Region*drought	3.178	4	0.794	1.84	0.131
	Error	30.266	70	0.432		
	Toal	36.697	79	0.464		

1	2	3	4	5	6	7
Lives- tock	Model	0.308	9	0.034	1.700	0.105
	Region	0.187	4	0.469	2.33	0.064*
	Drought	0.014	1	0.014	0.73	0.394
	Region*drought	0.004	4	0.001	0.050	0.995
	Error	1.410	70	0.020		
	Toal	1.718	79	0.021		
Fruit Trees	Model	0.635	9	0.070	5.57	0.00**
	Region	0.09	4	0.023	1.89	0.122
	Drought	0.265	1	0.265	20.93	0.000**
	Region*drought	0.062	4	0.015	1.23	0.306
	Error	0.088	70	0.012		
	Toal	1.522	79	0.019		
Vege- tables	Model	0.217	9	0.024	1.86	0.072*
	Region	0.125	4	0.031	2.41	0.057*
	Drought	0.062	1	0.062	4.78	0.032**
	Region*drought	0.010	4	0.002	0.200	0.937
	Error	0.909	70	0.129		
	Toal	1.126	79	0.014		

* *Difference significant at 5% *Difference significant at 10%

Source: Elaboration by authors

Table 5.– Results of Least Squares Means tests ($Pr > |t|$)

Com- modities	Regions	Regional factor				Drought factor
		North West	Center East	Center West	South	Drought/No drought
1	2	3	4	5	6	7
Cereals	North East				0.231	0.936
	North West			0.970	0.124	0.970
	Center East	0.922	0.674	0.938	0.316	0.852
	Center West		0.536	0.560	0.116	0.912
	South					0.003**
Livestock	North East				0.195	0.732
	North West			0.098*	0.1684	0.827
	Center East	0.020**	0.732	0.3421	0.2213	0.788
	Center West		0.0132 **	0.0929*	0.6414	0.418
	South					0.730
Fruit Tree	North East			0.092*	0.472	0.084*
	North West	0.469	0.029**	0.266	0.963	0.001**
	Center East		0.086*	0.5123	0.059*	0.138

1	2	3	4	5	6	7
Fruit Trees	Center West-South				0.213	0.381 0.006**
Vegetables	North East	0.973	0.601 0.563	0.877 0.887 0.638	0.035** 0.015** 0.041** 0.013**	0.636
	North West					0.414
	Center East					0.099*
	Center West					0.497
	South					0.113

* **Difference significant at 5% *Difference significant at 10%

To further explore the distinguished factors with different results in terms of TFP, we conducted the Least Squared Means (LSM) tests for comparisons between pairs of means among more than two categories, which will provide information on which specific factor category is significantly different from others. LSM test is recommended where there are not equal observations for each combination of treatments.

This test shows that the differences of TFP mean values between regions for cereals are not statistically different at 5% level (Table 3). However, it shows a statistical difference at 5% for livestock between North West and North East and between North West and Center East. Among the regions, the maximum TFP was obtained in North East. The LSM test also shows that TFP of North East was significantly different from Center East for fruit trees. Results of this later test show a statistical difference at 5% between South and other regions for vegetables. Regarding to the pairwise comparisons between TFP under drought and no drought conditions for different regions and crops, results are showing that fruit trees and cereals in South and fruit trees in North West are more affected by drought. Hence, the LSM tests for comparison of the means show a statistical difference at 5% between TFP for cereals and fruit trees in the South (table 5). Results also show a difference at 5% between TFP for fruit trees in Center West. As can be seen in table 5, the test is showing a significant

difference at only 10% of this indicator for fruit trees in North East and vegetables in Center East.

4. Conclusion and policy implications

In this paper, the Malmquist productivity index was used to calculate the total factor productivity growth across regions for most commodities during the 2000–2016 period under drought conditions. Empirical results show that TFP varies between sub-sectors and regions and decreases during drought years. Globally, it was found that total factor productivity has experienced a negative evolution in study regions for these commodities. The results also indicate a negative impact of drought on total factor productivity. Fruit trees and cereals in South and fruit trees in North West are more affected by drought.

The results show ANOVA results reveal that fruit trees and cereals in South and fruit trees in North West are more affected by drought

The results of this study can be used by policymakers and water resources managers who are looking for ways to address drought problems in productivity growth of Tunisian's agricultural sector. Identifying those regions and commodities most at risk facilitates appropriate formulation of new drought policy. This suggests that more adoption of drought tolerant crops varieties, best agricultural practices promotion and appropriated extension services programs targeted production system in each region are recommended to increase total factor productivity growth.

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Section 5. Population economics

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HOW TO ECONOMICALLY STIMULATE PEOPLE TO DO EXERCISE

Abstract. China has 300 million people with chronic diseases and an important strategy is to encourage such patients to exercise for better health. However, the fact is that not many people with chronic disease have the habit of doing exercise. This paper reviews the reports of Chinese public's chronic diseases and exercises situation and tries to figure out the solution to this problem by encouraging people to do exercise. The survey explores the exercise situation and chronic disease situation, and tries to make suggestions to stimulate people to do exercise. I concluded that we could solve the problem in three ways: build a gym near office and business buildings, encourage the construction of rewards and punishment systems for oneself, and implement team discounts for fitness centers.

Keywords: Economics, chronic disease, strategy, physical exercise, health, fitness center.

I. Introduction

In the 19th meeting of the Chinese Communist Party, one of the topics was *To Prevent Diseases before they Occur*. Why would the government be so concerned about the problem of chronic diseases? The answer has to do with the national cost of treating chronic diseases and quality of life for all the people. Chinese people spend 30 billion yuan per year on treating cardiovascular and cerebrovascular diseases, the direct economic loss of hepatitis is up to 36 billion yuan, and the indirect economic loss was estimated to be about 55 billion (National Life Index Report [5]) try to avoid semi-colons. Chronic disease has become a major cause of death for Chinese citizens, with mortality rate of 85.3% in urban areas and 79.5% in rural areas. The implicit cost includes the reduction of operational capability, the loss of working hours, and the time cost of friends and family caring for the patients. On the other hand, the

explicit cost includes the expense of providing medical service including medicine treatment, hospitalization expenses, and prevention of funds, and the expense from receiving medical service including the travel expense for patients and chaperone personnel, board wages, nutritional food charges (Chronic Diseases in China Report [2]).

Take obesity as an example, increasing BMI could affect the function of the digestive system and the function of the endocrine system, and increase the risk of getting cancer and cardiovascular disease. Not only can obesity causes physical damage, it can also bring psychological harms.

Preventing chronic diseases is necessary, and one well-known approach is to do physical exercise. On the one hand, exercising can help people keep fit, reduce their weight, retain good cardiovascular health, reduce the risk of getting Alzheimers, and strengthen one's immune system (The Health Benefits of Exercise [7]).

Doing exercise can also improve one's mental health. Because sports are often done in social environments with groups of people, they are also opportunities to stay connected and to improve social relationships. Furthermore, exercises can also help to release stress. Biologically, when people are doing sports, the body will produce a hormone called endorphin, which is linked to the feeling of delight. At last, exercising can enhance one's self-confidence. When people successfully finished the process of working out, self-efficacy is increased. People will start to have confidence in themselves that they can work out difficulties (Exercise for Mental Health [4]).

However, in reality, people do not do exercise often, especially those who need exercise the most, whom are not so healthy overall. Why is it so, when they know exercising would benefit them, and even could cure their disease? This study aimed to understand key factors keeping people from exercising. Hopefully, these findings can help to find ways to promote beneficial exercises.

II. Literature Review

According to *National Health Insights Report 2019*, 96% of the surveyed indicated some health problems (in China? be specific as to population), which was alarmingly high. The report also showed that while people recognized the importance of exercise to health (the importance score was 9.2 out of 10), the actual rate of people doing sports was low.

In 2005, *Bulletin of Sport Science & Technology* proposed research on this topic. *Analysis on the Present Situation of Physical Exercise in China* [1] showed that the participation rate of doing exercises/sports for more than 1 time per week for all ages was 34.1%~55% for males and 28.3%~52.6% for females. The attendance of physical exercise is more for males than females, and more for youths and elders than middle-aged people. Most people would prefer ball games and walking as the main way of exercise, while young females focus more on body-building (meaning strength training? this is a surprising finding). Young females attend more diverse sports events,

but as the age increased, the events were gradually concentrated on running and bodybuilding exercise.

The Analysis also found that for male under 60, "too busy with work" and "no interest in doing exercise" were the top reasons for not working out, and "heavy housework" and "no interest on doing exercise" were the top two reasons for females to not workout. In the people above the age of 60, "with no interest in doing exercise" was the number one reason for males not to work out, while "heavy housework" and "not interested" were for females. Clearly, the lack of interest is a pivotal issue that we should tackle.

III. Methodology

A survey was used to collect data for this study. It contained 15 questions in 5 sections. The first part asked about gender and age of the respondent, and the second part asked whether they liked to exercise with a group or alone. The third section was about whether the respondents have chronic diseases, and if yes, what kind of diseases. This was important to know, because some patients may be physically limited to certain exercises.

The fourth part had 6 questions, asking whether they persisted in exercises. If yes, they were asked to provide information on the frequency and duration of their exercise each time, and the type of sport. Otherwise, they were asked about the reasons why they don't do exercise and what they thought were the main issues prohibiting more frequent exercise.

The last part is to get information on what the respondents consider to be able to promote people to do exercises. The four questions asked about what helps to keep doing exercises, whether having a nearby gym helps, whether getting a monetary reward would help, and how much would be the appropriate reward.

IV. Results

1. The Demographic Distribution of the Respondents

A total of 536 respondents answered the survey, and the gender distribution is 44.4% male (238) and 55.6% female (298). This suggests that the respondents were well balanced.

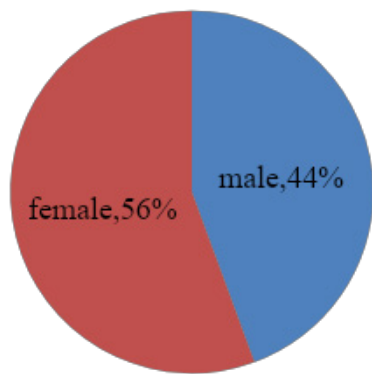


Figure 1. Survey Respondents by Gender

Most respondents are of ages 13–22 and 30–65 (Table 1). Two of the most popular social media applications in China were used to reach the potential respondents: wechat and QQ. Youths are more likely to use QQ, while adults are more likely to use wechat. I have posted the survey on the QQ and Wechat so the respondents were evenly distributed in different ages due to the different use habits between the adult contactors on wechat and youth contactors on

QQ. The respondents who are aged from 30~65 have the similar portion with the respondents aged from 13~22, each about 46%~47%.

Table 1. – Age Distribution of the Survey Respondents

Age	Distribution
0~12	0.19%
13~18	20.34%
19~22	24.07%
23~30	7.46%
30~65	46.27%
Above 65	1.68%

2. Persistence of Working Out is a Habit – You Have it, or You Don't.

From the survey results as shown in (Figure 2), we can see that the top reasons for people from all ages who have chronic disease and do not take part in sports are 1) no persistence, 2) exhausted from work and school, that even if they have time they still do not want to exercise, and 3) no time.

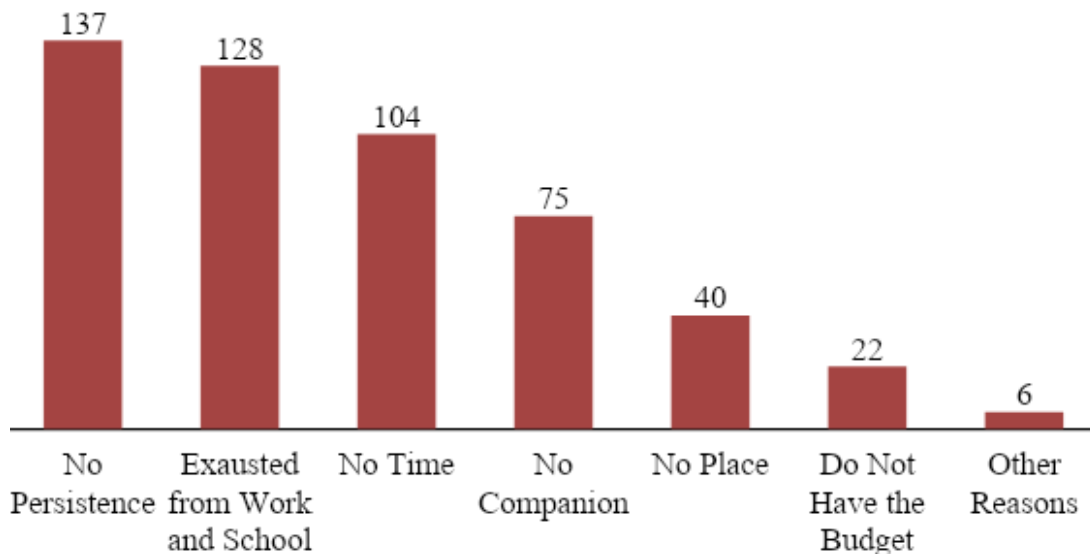


Figure 2. Reasons for Not Working Out

For people answering “no persistence” as the reason for not working out, a deeper analysis was done to see if there is any way to solve this issue. Almost all the people from all aged with chronic diseases chose “do not have self-discipline” and “did have this habit” for these two options, as shown in (Figure 3) below.

Persistence was considered to be a self-discipline issue and a habit that they didn't have. From the prevalence of these two reasons of lack of persistence, and the fact that the prevalence was similar from all age groups, it indicates that persistence may be a character very hard to develop as a habit.

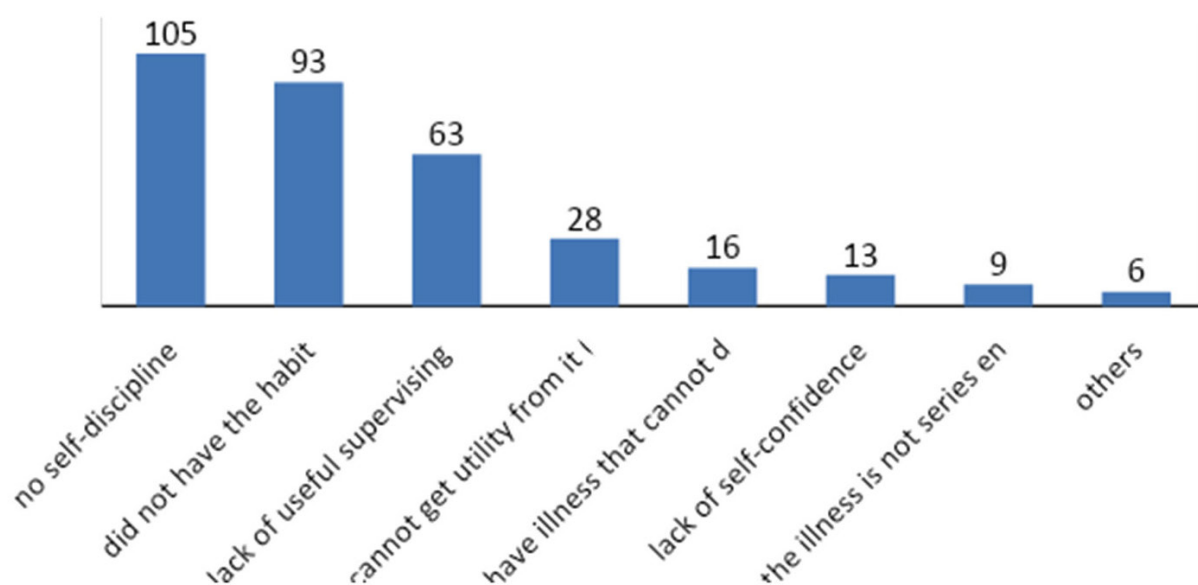


Figure 3. Reasons for Why No Persistence

3. Exhausted People Are Hard to Move

The second reason “exhausted from work and school, even if have time, still do not want to exercise” is especially high from the age 13~22 (due to the limited population, most of my respondents from age 19~22 are university or college students). This group is especially hard to motivate. When

they were asked “Will you exercise if there’s a new gym built near the school/workplace?”, a great proportion of students answered no. Even when asked whether they would work out if they would get some money reward, the majority answer was just “possible” (The answer is separated into 3 categories: not possible, possible, and very possible).

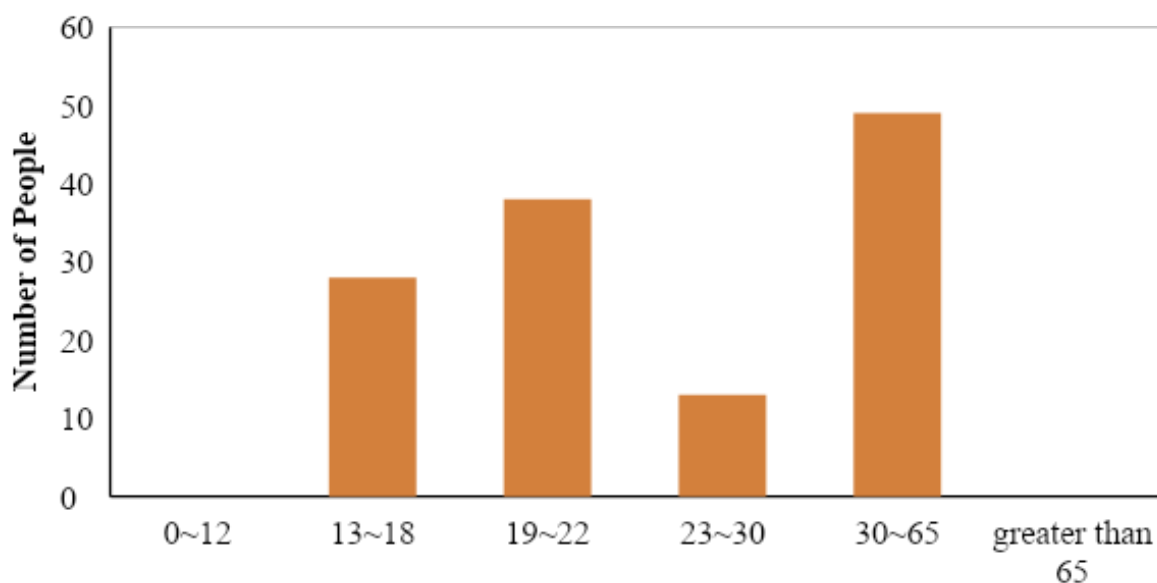


Figure 4. Age Distribution of Not Working Out due to Being Exhausted

4. Time is a Constraint for Everyone

The third reason is no time. This reason spreads widely across all age distributions. Com-

pare the people who choose this answer and the two options before, the “with companion” strategy, which will be mentioned in the afterward

part of this essay, doesn't have so much influence anymore. This may indicate that the reason of "no

time" is a strong and hard reason to change for everyone objectively.

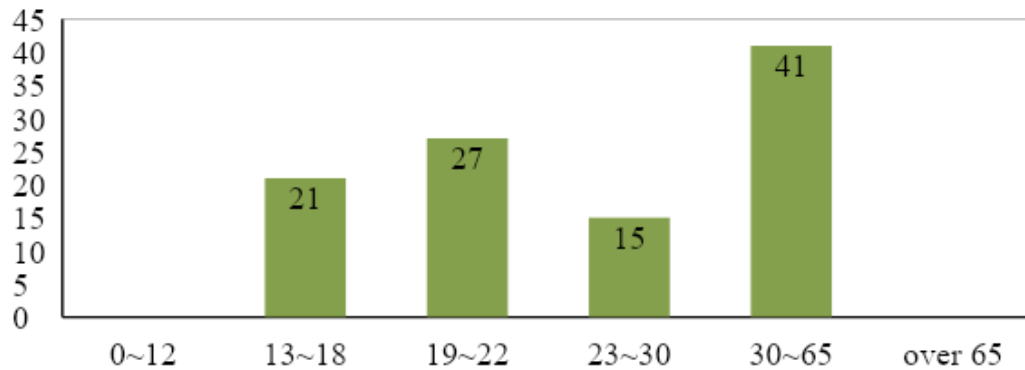


Figure 5. Age Distribution of People with No Time to Work Out

5. Partnering With A Companion is the Most Effective Strategy

Possible strategies to promote exercise were compared for respondents with the top 3 reasons for not working out. Popular strategies included having a coach, following a leader, or having a companion. Clearly, as shown in Figure 6, having a partner or companion in exercising appears to be most effective. Also, by comparing the respondents with dif-

ferent reasons for not working out, these strategies generally work the best to counter 'no persistence', while the least in moving people with "No Time" to work out.

For the question asking their personalities (like to work alone or with groups), I found out whether people like to work alone or with groups, the possible way they choose in the question "How to increase your enthusiasm in exercising?" is "with companies".

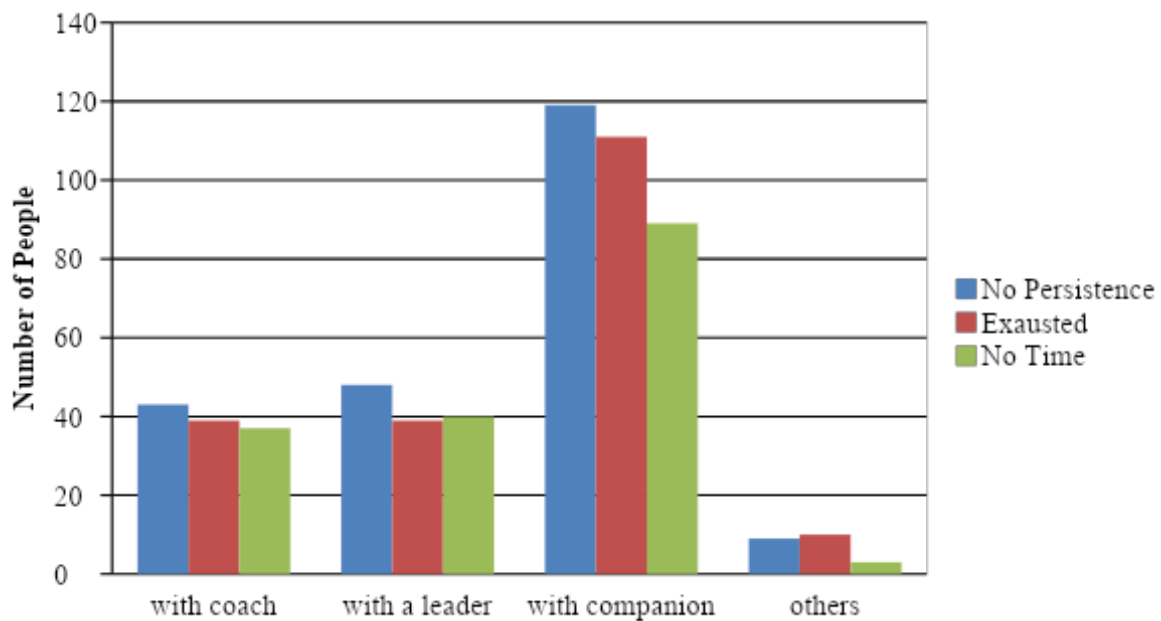


Figure 6. Strategies to Motivate People to Exercise

6. Monetary Incentives

Although respondents aged from 23 to 30 have many similar answers to those aged 13~22, there are

two questions they answered very differently from 13~22 and 30~65: "If you can get a monetary reward for doing exercise, would you exercise more?"

(answer “yes”), and “How much money would you like to get for doing sports?” (answer “50~100 yuan”). Considering the people who are aged in this range usually are new university graduates and trying to find a job and succeed in economic independence from parents, the answers for this question make sense.

To my surprise, the people over the age of 30 with chronic diseases have the highest rate of answering “attending sports activities” for almost every day, and would like to go to do sports when they are asked ““Will you exercise if there’s a new gym built near the school/workplace?” Older people tend to value more on their health.

V. Proposed solutions

If the government wants to build new public gyms to increase the exercising rate, I would suggest that they build them near those office and business buildings, because people who work in those buildings are more likely to use the gym. Middle-aged people place more value on their health, and they don’t have as much pressure to earn money as the fresh graduates of the university do, so when they have the chance and an incentive (a new gym built nearby), the possibility for them to go exercise is much more than other people. Also, doing sports

together may help to build good relationships with workmates, the condition of “with companion” is more possible to realize.

To solve the problem of “do not have self-discipline” and “did have this habit”, we may build some rewards and punishment system. This may work for those aged 23~30, because the money they get from exercising can tempt them to do sports.

For those who answered “with companions”, operators of those gyms and fitness centers could start some “team plan”, so that when people go with groups they could have discount or VIP cards which can only be applied to groups. Also those places could provide some team coupons for those 23~30 aged people, because these people are more likely to be attracted by monetary discounts.

VI. Conclusion

It is common sense that doing sports and exercises would be beneficial to people’s health, and from the result, we can confirm this statement again. And from the answers to my survey, we can see the causes of the low exercising rate: time, persistence and vigor would be the most important reasons. However, due to the social nature of humans, companions from other people would be the most efficient way to increase people’s desire for doing exercise.

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Section 6. Economics of recreation and tourism

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DEVELOPMENT OF TOURISM AND ITS BRIEF ANALYSIS IN KASHKADARYA REGION, UZBEKISTAN

Abstract. The article provides information on tourism development in Kashkadarya region, current status analysis, factors influencing the development of the sector and ways to solve them. In the article, it is described the importance of tourism and this work briefly focuses more on figures in local tourism and their impact on the region's economy, as well as culture.

Keywords: Art monuments, heritage sites, infrastructure, investment, ecotourism, guides, recreational tourism, rural tourism, ethno tourism, gastronomic tourism, sports tourism.

There are a bunch of fields including sport, tourism, art and music, intelligence that have an impact on development of any other countries. And the tourism is considered the most influential one among those sectors. For that reason, necessary measures are being taken in Uzbekistan to accelerate the economic, organizational and legal development of the tourism industry, to more effectively use the tourism potential of the regions, and to radically improve the management of the tourism industry. The land of Kashkadarya plays a crucial role in the development of the industry due to its rich history, ancient heritage, monuments of past and unique nature.

In this regard, it is worth mentioning the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On Effective Use of the Tourism Potential of the Kashkadarya Region" (Nation-

al Database of Laws, 09/19/198/2728 dated 08.03.2019) [3].

Further development of tourism potential of Kashkadarya region, creation of favorable conditions for wide acquaintance of tourists with unique historical and cultural and architectural heritage, development of tourism infrastructure for providing targeted tourism services, increase of tourist flow to the region by turning the region into a center of cultural and entertainment activities and increasing the length of tourists' stay in the area, as well as increasing the number of local people engaged in entrepreneurial activities are carried out on the basis of the priority directions specified by the Cabinet of Ministers of the Republic of Uzbekistan [3].

In Kashkadarya region, 1,311 objects of cultural heritage are registered, of which 1,041 are archeol-

ogy, 200 are architecture, 43 are sculptures and 27 are tourist destinations.

While preserving these cultural heritage sites, it is important that they should be reconstructed and renovated. Especially in Kitab, Shakhrisabz, Yakka-bog, Guzar and Karshi districts, there are many examples of such national heritage. The dedication of about a dozen points of “Actions strategy” will further enhance our responsibility as stated in a video conference held by President Shavkat Mirziyoev on July 12, 2019 with members of the Parliament, the political parties and the Ecological Movement of Uzbekistan. For example, the development of a new terminal of an international airport, the protection of life and health of tourists and guides while organizing of visits to tourism destinations and the development of eco-tourism can be implemented in many projects [4; 5].

In addition, there are 50 accommodation facilities in the region (2,682 seats), more than 100 national and European cuisine restaurants and national teahouses serving visitors to the area [1].

According to statistics, in the past year more than 1 million 450 thousand tourists have visited to the region, including 72,100 foreign tourists. The work on development of tourism infrastructure of the region in 2018 amounted to 90 billion soums and 49 projects were implemented. It is no exaggeration to say that the scope of such projects in 2019 has expanded. In particular, on September 26–30, 2019 in Varganza village of Kitab district together with the Tourism Development Committee of the Republic of Uzbekistan and the Kashkadarya regional government held an international festival “Anor”. The fact that there are 22 foreign visitors from different countries (as tourists) is a clear indication of the development of tourism in the region.

For the development of tourism potential and infrastructure of Kashkadarya region, for 2020 will be implemented 72 projects for the total amount of 299.3 billion soums (including 206.6 billion soums of own funds, the rest of bank loans) and 944 new job

vacancies are being developed using the experience of developed countries. Including:

- At the expense of 148.5 billion soums 15 hotels, 40 guest houses, yurt and rest houses for 1.8 billion soums, and 4 recreational resorts for 72 billion soums will be built;
- It was planned to purchase seven types of tourism vehicles worth 3 billion soums to strengthen the transport infrastructure. In 2019, 4 of these 7 tourism vehicles were purchased;
- As a result of disbursement of 22 billion soums, it was planned to build several roadside infrastructures such as a motel, parking and shopping mall. Of these, in 2019, 11.2 billion soums were fully disbursed.

The Kashkadarya regional administration together with the Ministry of Culture and the State Committee for Tourism Development of the Republic of Uzbekistan conserve cultural heritage in Shahrissabz and other regions, organize annual public, cultural and entertainment events like folklore bands, festivals of folklore-singer poets and craftsmen, national sports games. Now we can see the practical implementation of these terms.

From abovementioned data, we can conclude that the current tourism development indicators in the Kashkadarya region do not correspond to the existing capacity in the region. Further development of the industry, the solution of problems in the industry is a process that related to many other issues. First, it is worth noting that local governments are neither active nor initiative in the development of the tourism potential of the region. This results in problems in further improving the infrastructure and quality of services. The second is the seasonality of tourist networks. Third, the most drawback is the shortage of potential personnel in the field of tourism industry.

There are such problems in the industry that today we should focus on:

- the level of development of roadside infrastructure facilities and the lack of a favorable tourist information environment (tourist navigation of the signs) and modern information centers;

- condition of highways and plumbing in the area;
- expansion of attraction of investments (by state-owned investors) to the sector;
- development of such types of tourism as eco-tourism, ethno tourism, sports tourism, gastronomic tourism, astronomical tourism, rural tourism, recreational tourism;
- use international experience in improving the quality of hotel services (booking, room services);
- improvement of transport services (rental services);
- improving the quality of catering services;
- conducting mass, cultural and entertaining events (performances by folk groups (“Alla”, “Kelin Salom”, “National Games”), festivals of folklore-singer (bakhshi) poets and craftsmen, national sports games;
- improving the quality of motor roads;
- increasing attention to the preparation of guides (with a deep knowledge of Uzbek, foreign languages and history, with a culture of dressing and dressing);
- expansion of national souvenir production;
- creation of a single web portal with all the information about all tourist organizations, sights, shops, etc., available in the region [2];
- in order to eliminate the shortage of qualified personnel in the tourism sector, it is necessary to establish systematic work to improve the quality of personnel in higher and secondary special and vocational education institutions.

Implementation of these tasks will create favorable economic and organizational conditions for the accelerated development of tourism in the region, the full and effective use of the region's enormous tourism potential, radical improvement of tourism industry management, creation of national tourism products.

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Section 7. Economic security

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FINANCIAL WORRIES OVER NON-EMERGENCY COST AMONG ADULTS IN 2017

Abstract

Aim: This study aims to 1) examine the predictors of adults' financial worries over Non-Emergency Cost in 2017 2) build a predictive model for adults' financial worries over Non-Emergency cost using logistic regression model.

Method: The National Health Interview Survey (NHIS) in 2017 was used. All the participants who were eligible were randomly assigned into 2 groups: training sample and testing sample. Logistic regression model was built using the training sample data. Receiver operating characteristic (ROC) were calculated.

Results: A total of 6618 (25.42%) participants out of 26034 had worried about the Non-Emergency Cost. About 27.70% female participants and 22.67% male participants had worried.

According to the logistic regression, younger population were less likely to worry about monthly non-emergency cost than the elderly population. Male is 22.4% less likely to worried about housing cost. Non-Hispanic population were 58.5% less likely to worry. Compared to the unmarried, married people were 33.2% less likely to worry. Compared to other race while the black population were 72.6% more likely to worry. Compared to people who were looking for a job, the employed and the one not looking for a job were 48.9% less likely to worry about monthly non-emergency cost.

The area under curve was 0.6264. The optional cutoff time is 0.6211. The mis-classification error was 0.2555. the sensitivity rate is about 0.60% and the specificity is 99.87%.

Conclusions: In this study, we identified several important predictors for worries over Non-Emergency Cost in 2017 e.g., age, gender, race and working status.

Keywords: financial worries, Non-Emergency Cost, earing usage

1. Introduction:

U.S. households earned an average of \$74,664 in 2016. Here's how those earnings were used to pay off the following average monthly expenses (<https://www.bls.gov/news.release/cesan.nr0.htm>):

This study aims to: 1) examine the predictors of adults' financial worries over Non-Emergency Cost in 2017; 2) build a predictive model for adults' financial worries over Non-Emergency Cost using logistic regression model.

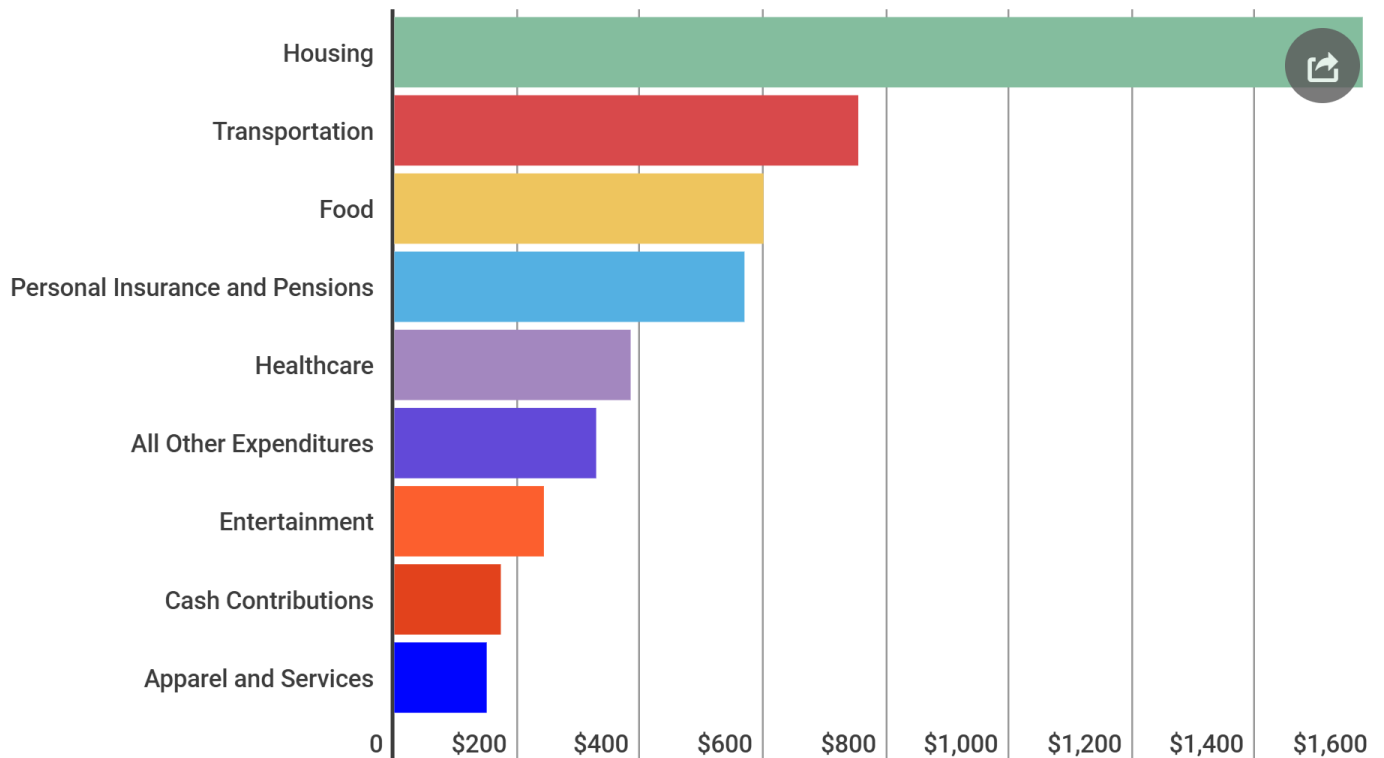


Figure 1.

2 Data and Methods:

Data:

The National Health Interview Survey (NHIS) is the principal source of information on the health of the civilian noninstitutionalized population of the United States and is one of the major data collection programs of the National Center for Health Statistics (NCHS) which is part of the Centers for Disease Control and Prevention (CDC).

The National Health Interview Survey (NHIS) Data 2017 was used in this study.

https://www.cdc.gov/nchs/nhis/about_nhis.htm

Optimal Cutoff for Binary Classification maximizes the accuracy.

Mis-Classification Error is the proportion of all events that were incorrectly classified, for a given probability cutoff score.

Sensitivity: probability that a test result will be positive when the disease is present (true positive rate).

Specificity: probability that a test result will be negative when the disease is not present (true negative rate, expressed as a percentage). e, expressed as a percentage).

Models:

We used logistic regression models to calculate the predicted risk. Logistic regression is a part of a category of statistical models called generalized linear models, and it allows one to predict a discrete outcome from a set of variables that may be continuous, discrete, dichotomous, or a combination of these. Typically, the dependent variable is dichotomous and the independent variables are either categorical or continuous.

The logistic regression model can be expressed with the formula:

$$\ln(P/P-1) = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \dots + \beta_n * X_n$$

Variables:

The outcome variable is percentage of How worried are you about ... paying monthly bills (ASIN-BILL).

Table 1. – Variables used in this study

SEX	1: male 2: female
ORIGIN_I	Hispanic Ethnicity: 1: yes; 2: no
RACRECI3	1: White 2: Black 3: Asian 4: All other race groups*
AGE_P	Age <18 years old 0–17

Region	1 Northeast 2 Midwest 3 South 4 West
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3. Results

A total of 6618 (25.42%) participants out of 26034 had worried about the Non-Emergency Cost. About 27.70% female participants and 22.67% male participants had worried.

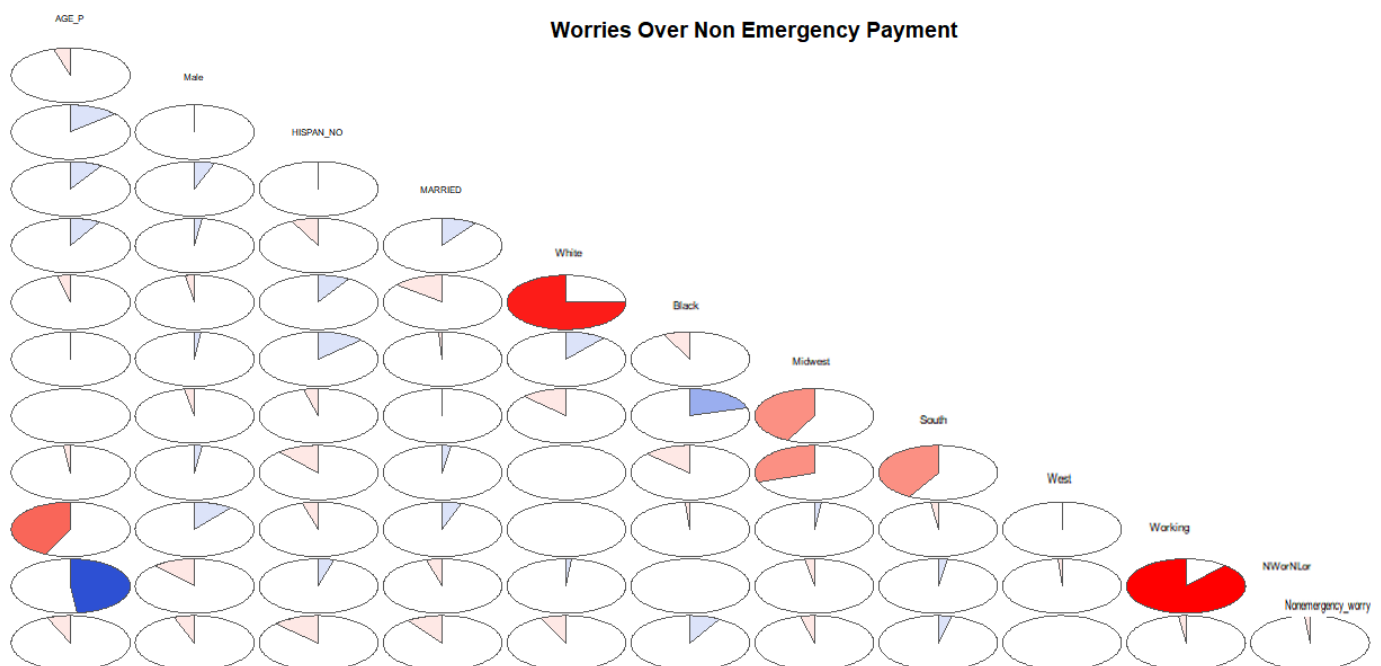


Figure 2. matrix of correlations between variables

Table 2. – Logistic Regression for Non-Emergency Cost

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	0.593	0.135	4.383	0.000	***
AGE_P	−0.212	0.085	−2.486	0.013	*
Male	−0.253	0.042	−6.026	0.000	***
HISPAN_NO	−0.880	0.059	−14.825	< 2e−16	***
MARRIED	−0.404	0.043	−9.359	< 2e−16	***
White	−0.016	0.082	−0.194	0.846	
Black	0.546	0.098	5.592	0.000	***
Midwest	0.003	0.068	0.045	0.964	
South	0.051	0.063	0.812	0.417	
West	0.047	0.068	0.694	0.488	
Working	−0.672	0.083	−8.086	0.000	***
NWorNLor	−0.671	0.088	−7.614	0.000	***

According to the logistic regression, younger population were less likely to worry about monthly non-emergency cost than the elderly population. Male is 22.4% less likely to worried about housing cost. Non-Hispanic population were 58.5% less likely to worry. Compared to the unmarried, married

people were 33.2% less likely to worry. Compared to other race while the black population were 72.6% more likely to worry. Compared to people who were looking for a job, the employed and the one not looking for a job were 48.9% less likely to worry about monthly non-emergency cost.

Table 3. – Odds Ratio According to Logistic Regression

	OR	Risk Increase
AGE_P	0.809	–19.1%
Male	0.776	–22.4%
HISPAN_NO	0.415	–58.5%
MARRIED	0.668	–33.2%
White	0.984	–1.6%
Black	1.726	72.6%
Midwest	1.003	0.3%
South	1.052	5.2%
West	1.049	4.9%
Working	0.511	–48.9%
NWorNLor	0.511	–48.9%

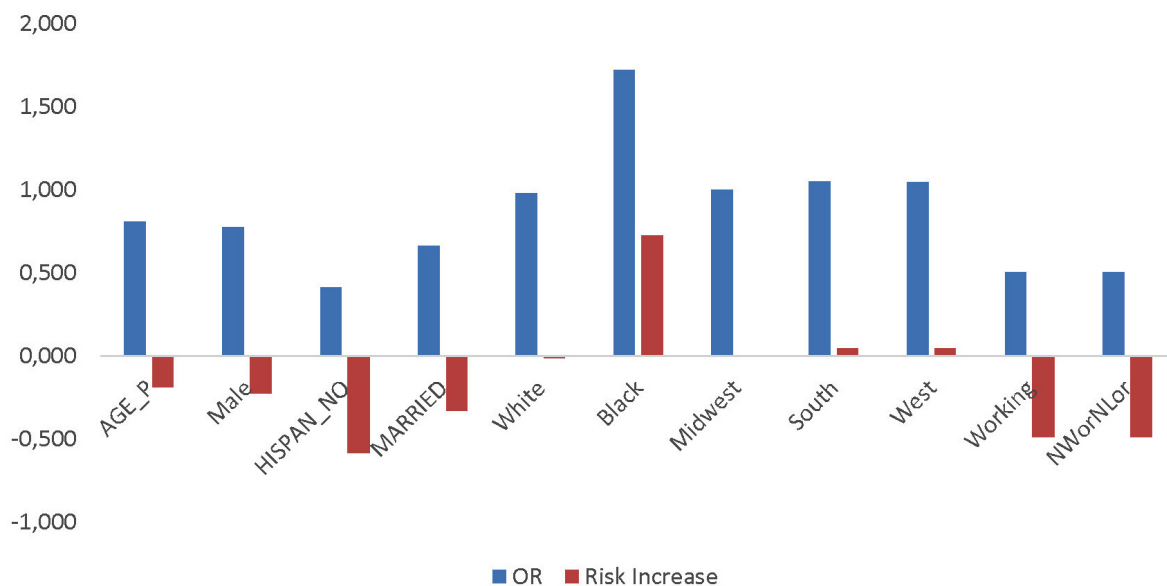


Figure 3. Odds Ratio (blue) and Risk Increase (red) According to Logistic Regression

The area under curve was 0.6264. The optional cutoff time is 0.6211. The mis-classification error was 0.2555. the sensitivity rate is about 0.60% and the specificity is 99.87%.

4. Discussion

A total of 6618 (25.42%) participants out of 26034 had worried about the Non-Emergency

Cost. About 27.70% female participants and 22.67% male participants had worried.

According to the logistic regression, younger population were less likely to worry about monthly non-emergency cost than the elderly population. Male is 22.4% less likely to worried about housing cost. Non-Hispanic population were 58.5% less likely to worry.

Compared to the unmarried, married people were 33.2% less likely to worry. Compared to other race while the black population were 72.6% more likely to worry.

Compared to people who were looking for a job, the employed and the one not looking for a job were 48.9% less likely to worry about monthly non-emergency cost.

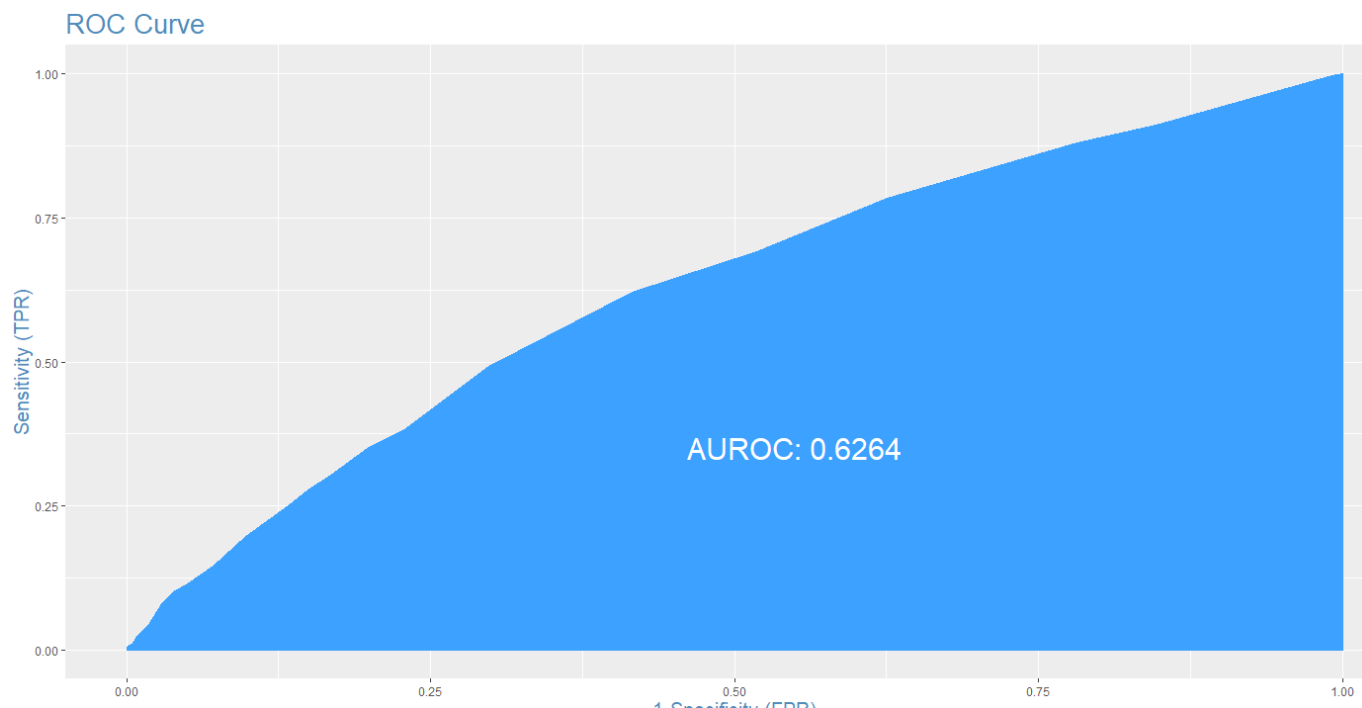


Figure 4. ROC in testing sample for Logistic Regression

The area under curve was 0.6264. The optional cutoff time is 0.6211. The mis-classification error was 0.2555. the sensitivity rate is about 0.60% and the specificity is 99.87%.

There are limitations in this study. For example we did not include the health conditions and family income information in this study when examining the

factors of the financial worries of the Non-Emergency Cost.

In this study, we identified several important predictors for financial worries over Non-Emergency Cost in 2017 e.g., age, gender, race and working status.

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Contents

Section 1. Accounting	3
<i>Barakaev Otabek Otaqulovich</i>	
DIRECTIONS FOR IMPROVING THE EFFICIENCY OF AUDIT IN THE CORPORATE GOVERNANCE SYSTEM	3
Section 2. Accounting	12
<i>Yi Chen</i>	
IS SOCIAL MEDIA MARKETING EFFECTIVE IN CHINA?	12
<i>Rusina Ekaterina</i>	
CONSUMER BEHAVIOUR IN THE ALCOHOLIC BEVERAGES MARKET OF RUSSIA.....	18
Section 3. Economics, organization and management of enterprises, branches, complexes	24
<i>Karzanova Irina Viktorovna, Kasimovskaia Elena Nikolaevna, Roginko Sergey Anatolyevich</i>	
ENERGY EFFICIENCY STRATEGY IN RUSSIA: LOW CARBON CHALLENGES AND CORPORATE RESPONSES	24
<i>Jiang Fangke</i>	
IMPROVING THE OPERATIONAL EFFICIENCY OF THE ELDERLY KITCHEN IN HANGZHOU	32
<i>Mammadova Sabina Ilham</i>	
SME FINANCING PROBLEMS AND FUTURE TRENDS	37
<i>Mishchenko Vladimir Akimovich, Sitak Irina Leonidovna</i>	
FEATURES OF INFORMATION SUPPORT OF ENTERPRISE ECONOMIC SUSTAINABILITY MANAGEMENT	42
Section 4. Environmental economics	46
<i>Zouhair Rached, Ali Chebil, Chokri Thabet</i>	
EFFECTS OF DROUGHT ON TOTAL FACTOR PRODUCTIVITY FOR MOST STRATEGIC CROPS AND REGIONS IN TUNISIA: AN APPLICATION OF THE MALMQUIST INDEX	46
Section 5. Population economics	55
<i>Zhang Tianyi</i>	
HOW TO ECONOMICALLY STIMULATE PEOPLE TO DO EXERCISE.....	55
Section 6. Economics of recreation and tourism	61
<i>Aminov Farrukh Komiljon ugli, Sultonov Shukhrat Adhamovich, Navotova Dilnoza Ibragimovna</i>	
DEVELOPMENT OF TOURISM AND ITS BRIEF ANALYSIS IN KASHKADARYA REGION, UZBEKISTAN	61
Section 7. Economic security	64
<i>Xie Yifei</i>	
FINANCIAL WORRIES OVER NON-EMERGENCY COST AMONG ADULTS IN2017	64