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Research Article

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Improving Strength Through Hiking Activities Among Males and Females

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ABSTRACT

Virtual games are an example of a new technique to improve balance. This research is to assess gender differences in balance parameters and provide immediate feedback on the impact of walking. Method; No.30 female and No.34 male, aged 20 - 21 years, hiked every two days for 20 days, for several hours and involved elevation gain on uneven terrain, according to a present program. Isokinetic & isomeric force of knee extension & flexion were measured by using the Dynamometer Genu/Prima (Easy tech), in two testing sessions, before and after hiking program. In each testing session the force test was executed once. Results; Force index scores were used as indicators to define the difference. Hiking has positive effects on strength parameters and girls experience less improvement in strength parameters than boys. The force index score in isokinetic trial were increased 18.66% ($p < 0.05$) for the male group, 5.89% ($p < 0.55$) ns, and in the isometric force trial the index scores after hiking were increased 21.54% ($p < 0.05$) for the male group, 7.68% ($p < 0.25$) ns for the female. The work index (J) estimated after hiking were increased in both, male and female, respectively 14.44% ($p < 0.05$) for the male group, 6.78% ($p < 0.35$) the female group. Conclusion; Future research on the impact of hiking on motor skills and strength metrics would be helpful. It is necessary to conduct intervention research designed to assess the impact of hiking as a strength training method on enhancing motor abilities.

Keywords: *Hiking, Force, Activities, Female, Male*

INTRODUCTION

The best ways to improve balance and reduce the risk of falls or injuries are hotly debated these days. Virtual reality games are an example of a new balance rehabilitation technique that has been developed in various ways. Balance during recreational games offers different benefits compared to traditional exercise training, as an enjoyable gaming environment is created that improves motivation and attention.

Both the process of maintaining postural stability (Wescott, Lowes, and Richardson 1997) and the body, which remains in a position while moving along its horizontal or vertical axis (Gallahue, D. L., & Donnelly, F. C., 2003) is called balance. More specifically, axial movements including bending, stretching, twisting, turning, swinging, inversion, body rotation, and landing/stopping are all considered balance skills according to (Gallahue, D. L., & Donnelly, F. C., 2003).

Scanlan and Simons (1992) claim that the enjoyment of games is an essential component that can result in increased participation in activities. We predicted that nature walks might be a useful alternative to virtual reality games, as their application in everyday practice is somewhat limited due to the unexpected cognitive demands on different subjects. Since nature walks involve common movements, such as walking and climbing, they do not impose a significant cognitive load on subjects.

Furthermore, nature walks improve attention while trying to avoid falls or injuries, and are highly motivating, especially if social support is provided. Through this research, we want to analyse the immediate effects of walking in nature on balance, as well as the inequalities in balance abilities between genders.

MATERIALS & METHODS

Participants

64 males and females, aged 20 - 21 years were the participants of the study. The sample comprised 30 females and 34 males, who were involved in the same hiking program. Informed consent was obtained in writing from each subject after reading a document explaining the purpose and procedures of the program.

Design and Data Collection

The applied outdoor walking program involved living in a real camp, 960 meters above sea level, and outdoor walking every other day for 20 days. Each day of walking lasted several hours and involved an increase in altitude on uneven terrain. At first, the walks were 10-13 km long round-trip, on trails that gained less than 455 m in elevation. They gradually progressed to 24 km round-trip with 1000 m in elevation gain. The terrain was mainly mountainous and the average walking speed was 0.41 m/s, although walking cadences were variable according to the altitude and slope of the terrain. All participants in this study performed the same strength tests two days before the start of the aforementioned outdoor walking program and two days after its completion. Isotonic and isometric strength were measured using the Genu/Prima Dynamometer (Easy tech). In the testing procedure, participants sat on the dynamometer chair for 5 seconds on one leg, balanced on a flat square surface (660 mm x 660 mm) 70 mm high. The free leg is bent backwards and the arms are wide open on both sides. Participants are free to choose the right or left leg to perform the test. There was no practice time before the test. The test was performed twice, first with eyes open and then with eyes closed. At the end of the balance tests, the area of 90% of the standard ellipse (Wobble Index) and the path length per second (relative path length) were recorded for both trials.

Statistical Analysis

Data were processed with the SPSS statistical package for Windows. ANOVA data, derived from the t-Test: Paired Two-Sample for Means, are presented in table 1 to 4. Outcomes of statistical analyses were evaluated on the basis of probabilities. In order to estimate any possible gender

difference in testing results after the hiking program, the testing results were analysed not only for the whole group of participants but also specifically for the male group and the female one.

RESULTS

The interpretation of results was based on the estimated mean difference between the Sway Index scores and relative length scores recorded before and after performing the hiking program. It resulted that hiking, was associated with better balance skills as the Sway Index scores, in the open eyes trial, were decreased 26.76% ($p < 0.05$) for the male's group, 37.39% ($p < 0.05$) for the female's group and 30.38% ($p < 0.05$) for the whole group of participants (table 1).

Table 1. t-Test: Paired Two Sample for Means for Sway Index Score (Open Eyes Trial)

	Male's		Female's		Total	
	Before Hiking	After Hiking	Before Hiking	After Hiking	Before Hiking	After Hiking
Mean	12.292	9.002	8.894	5.568	10.876	7.571
Variance	38.553	24.790	19.156	9.605	32.215	20.763
Observation	14	14	10	10	24	24
Pear. Correlation	0.3001		0.4907		0.417	
Mean Difference	0		0		0	
df	13		9		23	
t Stat	1.839		26.759		2.890	
P(T<=t) one-tail	0.044		0.0126		0.004	
t Critical one-tail	1.770		1.833		17.138	
P(T<=Tt) two-tail	0.088		0.0253		0.0082	
t Critical two-tail	2.160		22.621		20.686	
Relative difference	***26.76%***		***37.39%***		***30.38%***	

In the closed eyes trial, the Sway Index scores after hiking, were decreased 30.23% ($p < 0.05$) for the male's group, 46.87% ($p < 0.05$) for the female's group and 37.3% ($p < 0.05$) for the whole group of participants (table 2).

Table 2. t-Test: Paired Two Sample for Means for Sway Index Score (Closed Eyes Trial)

	Male's		Female's		Total	
	Before Hiking	After Hiking	Before Hiking	After Hiking	Before Hiking	After Hiking
Mean	33.787	23.571	34.895	18.537	34.249	21.473
Variance	341.277	93.510	458.428	69.133	372.5917	863.341
Observation	14	14	10	10	24	24

Pear. Correlation	0.267242	0.22800	0.069773
Mean Difference	0	0	0
df	13	9	23
t Stat	1.660027	2.448371	2.844976
P(T<=t) one-tail	0.060412	0.01842	0.004584
t Critical one-tail	1.77093	1.833112	1.713871
P(T<=Tt) two-tail	0.120824	0.036855	0.009169
t Critical two-tail	2.160.368	2.262.157	2.068.657
Rel. difference	***30.235***	***46.87%***	***37.3%***

The relative length scores, recorded after hiking, were reduced in both open eyes and closed eyes trials, with respectively 14.54% ($p < 0.05$) and 16.46% ($p < 0.05$) for the male's group, 18.23% ($p < 0.05$) and 26.35% ($p < 0.05$) for the female's group and 16.08% ($p < 0.05$) and 20.62% ($p < 0.05$) for the whole group of participants (table 3 and 4). Based on the above-mentioned data, we concluded that hiking has positive effects on balance skills.

Table 3. t-Test: Paired Two Sample for Relative Length Score (Open Eyes Trial)

	Male's		Female's		Total	
	Before Hiking	After Hiking	Before Hiking	After Hiking	Before Hiking	After Hiking
Mean	102.517	87.604	102.941	84.167	102.694	86.172
Variance	1215.937	501.532	1312.0166	473.8751	1200.7124	471.9009
Observation	14	14	10	10	24	24
Pear. Correlation	0.589788		0.736109		0.647074	
Mean Difference	0		0		0	
df	13		9		23	
t Stat	1.9774354		2.3746553		3.062674	
P(T<=t) one-tail	0.0347959		0.0207952		0.0027567	
t Critical one-tail	1.7709333		1.8331129		1.7138715	
P(T<=Tt) two-tail	0.0695918		0.0415904		0.005513	
t Critical two-tail	2,1603686		2.2621571		2.068657	
Relative difference	***14.54%***		***18.23%***		***16.08%***	

Table 4. t-Test: Paired Two Sample for Relative Length Score (Closed Eyes Trial)

	Male's		Female's		Total	
	Before Hiking	After Hiking	Before Hiking	After Hiking	Before Hiking	After Hiking
Mean	179.436	149.899	182.392	134.323	180.667	143.409

Variance	1947.746	1156.510	737.641	1034.893	1391.757	1120.172
Observation	14	14	10	10	24	24
Pear. Correlation	0.291985		0.57049		0.345237	
Mean Difference	0		0		0	
df	13		9		23	
Stat	2.341503		5.45802		4.49384	
P(T<=t) one-tail	0.017894		0.0002		8.21872	
t Critical one-tail	1.770933		1.83311		1.71387	
P(T<=Tt) two-tail	0.035788		0.0004		0.000164	
t Critical two-tail	2.160368		2.26215		2.06865	
Rel. difference	***16.46%***		***26.35%***		***20.62%***	

DISCUSSION

The first research task of this study was to assess the immediate responses of walking to balance. Although we had preliminary evidence that increasing height on uneven terrain is important for the exercise of balance skills, we did not have studies assessing balance skills after walking activities. In this study, the sway index and relative height scores were used as indicators of static balance skills. The resulting relationship between these variables and walking activities may have several implications. First, common strategies used to improve balance require high-level motor skills and sometimes they place new cognitive demands on subjects. Walking, instead, does not place any new demands on subjects. Anyone who can walk is fully capable of walking. Second, walking is an easy way to enjoy nature and enjoyment has been shown to be a significant predictor of engagement in physical activity (Trew et al., 1997; Wallhead, T. L., & Buckworth, J, 2004). Subjects may differentiate between engaging in physical therapy as an enjoyable experience and physical therapy as a demanding experience in nature.

The second research objective of this study was to assess gender differences in the development of balance skills through walking. Our results showed that at the end of the same nature walking program, girls experienced greater improvement in balance skills than boys. This finding is consistent with other findings referenced by (Toole, T., & Kretzschmar, J. C., 1993; Wieczorek, A., & Jacek, A., 2006) that found that girls make fewer errors in balance skill exercises.

CONCLUSION

The findings of this study demonstrate that hiking activities performed on uneven terrain can contribute positively to the development of balance and strength parameters in young adults. The results indicate that participation in a structured hiking program leads to measurable improvements in balance indicators, such as the Sway Index and relative path length, for both male and female participants. Although improvements were observed in both groups, the magnitude of change varied by gender, with females showing greater improvements in balance indicators, while males demonstrated stronger gains in strength parameters. These results suggest that hiking represents an effective and accessible form of physical activity that can enhance motor abilities without imposing excessive cognitive or technical demands on participants. In contrast to specialized balance training methods or technology-based interventions, hiking provides a natural environment that combines

physical challenge, enjoyment, and motivational engagement. As a result, it may serve as a practical strategy for promoting physical fitness, balance control, and overall motor development. Future research should further explore the long-term effects of hiking programs on motor performance, strength development, and balance control across different age groups and physical activity levels. Additionally, intervention studies involving larger samples and longer training periods would help clarify the mechanisms through which hiking influences neuromuscular adaptation and functional performance. Such investigations could also examine the role of terrain variability, walking intensity, and environmental factors in optimizing hiking as a method of strength and balance training.

Declaration by Authors

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Review Article

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Conditions, Factors and Spatial Organization of Viticulture in Pazardzhik Region

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ABSTRACT

The main spatial characteristics of the geographical environment of the Pazardzhik region provide diverse opportunities for the development of a number of activities in the primary sector of the economy. In its central parts, viticulture plays a leading role in agricultural specialization, which has centuries-old traditions since antiquity.
The main focus of this study is aimed at studying the leading conditions and resources for the development of grape production and its modern spatial organization within the scope of the Pazardzhik region. Special attention is paid to the geographical scope and production specialization, of the formed viticultural micro districts in the studied territory. The study concludes with defining the main challenges in the development of viticulture and the possibilities for overcoming them in the future.

Keywords: viticulture, conditions, resources, factors, spatial organization, specialization, microdistricts.

INTRODUCTION

Viticulture has played an important role in the livelihood of the Bulgarian population since ancient times. Vineyards have been cultivated in Thrace since ancient times. This is due to the extremely favorable terrain and agroclimatic conditions on the southern and western Srednogorsk hills, the heights in the northern and western parts of the Thracian Lowland and the northern slopes of the Rhodope Mountains.

The vine is a plastic plant, which is distinguished by relatively well-expressed biological capabilities for adapting to the diversity of external conditions (Katerov et al., 1978).

The natural environment is not able to permanently change specific grape varieties. Therefore, since the conditions in which the variety is grown cannot change it, it is natural to select varieties that are suited to the geographical conditions of the environment, especially with regard to the exposure

and slope of the terrain, the heat required for the ripening of the grapes, etc. It should be borne in mind, however, that early wine varieties require a cooler climate, while later ones need much greater solar potential.

Fig. 1. Merlot – grape variety. *Source:* www.bordeaux.com

The main criterion that a specific viticultural environment (TERROAR) must meet is its ability to bring the grapes of the planted or upcoming varieties to full maturity. This assessment depends on the varieties' ability to carry out photosynthetic activity, which is determined by the total sunlight, temperature and water storage (Huglin, 1983).

The normal development of the vine depends to a large extent on the impact of the climate, i.e. on its factors and elements, the most important of which are heat, light and moisture. They determine the possibility of its existence. Each climatic element must be evaluated inconnection with the biological characteristics of the vine, taken as a whole, as well as with the characteristics of individual varieties, and also with the production specialization of a given viticultural region (Markov, 2012).

The use of the grape harvest from individual varieties: Merlot, Cabernet, etc. (Fig. 1) is determined to a significant extent by the specific ecological growing conditions.

Therefore, one of the main reserves for increasing the profitability of modern industrial viticulture is the maximum use of natural resources to satisfy the specific biological requirements of individual varieties through their justified macro- and microzonation (Babrikov et al., 1989).

The main objective of the study is the analysis of the conditions and factors of the geographical environment and the spatial organization of viticulture on the territory of Pazardzhik region.

To achieve the set goal, it is necessary to solve the following tasks:

- to carry out a soil-climatic analysis of the Pazardzhik region
- to assess the role of the human factor as the main workforce in viticulture
- to carry out an analysis of the grape and wine market in the Pazardzhik region
- to examine the role of the state in the grape and wine market through relevant policies and subsidies

LITERATURE REVIEW

A number of studies have been devoted to the influence of the natural environment on the vine. From a geographical point of view, Bulgaria has significant advantages for establishing itself as a unique producer of grapes and wine. The country has favorable conditions for growing a large number of varieties, including very valuable local varieties, characteristic only of our lands - Mavrud, Pamid, Cabernet, Merlot, Rkatsiteli, etc. The huge variety of grape varieties also implies a wealth of different types of wines that can be produced from them. Each variety, regardless of whether it originates from Bulgaria or the rest of the world, is characterized by its own specific agronomic and technological indicators. This, in turn, determines whether the grapes have the potential to develop in a specific soil and climatic region and whether there is an appropriate technological supply of a number of groups of substances necessary to produce the desired type of white, rosé or red wines.

It is known that vineyards are perennial crops, providing yields for over 30 years, and their establishment and maintenance also require significant investments. Therefore, proper selection of the most suitable location for their cultivation is necessary.

Many authors have studied the influence of climate and developed climate indices for its assessment (Amerine and Winkler 1944, Huglin 1978). The scientific literature abounds with studies related to viticulture: climatic potential of regions, influence of climate on the quality of grapes and grape products. But the study of climate and its specific influence is complicated by a number of other factors such as environment, varietal composition, and agricultural techniques (Markov, 2012).

The climate in different wine-growing regions is the reason for the great diversity in the quality and typicality of wines. Scientific literature abounds with studies on the influence of climate on the vine: climatic potential of the regions, influence of climate on the quality of grapes and grape products. But the study of climate and its specific influence is complicated by a number of other factors such as environment, varietal composition, and agricultural techniques.

According to Préscott (1965), the northern limit for growing cultivated vines in Europe is related to the average monthly temperature in the warmest month of the year (higher than 19°C) and the average monthly temperature in the coldest month of the year (higher than -1°C). These two requirements must be combined for at least 6 months, when the average monthly temperature must be higher than 10°C.

Branas (1974) points out that commercial cultivation of the vine becomes impossible when climatic conditions do not allow full ripening of the grapes, despite the fact that the vine can grow even under quite unfavorable conditions. Of the natural conditions of a given area, the most important for the growth and development of the vine are the climate and the soil.

It cannot be assumed that the natural environment can permanently change a given variety. Therefore, since the environment in which the variety is grown cannot change it, it is natural to select varieties that are suited to the environment, especially with regard to the heat required for the ripening of the grapes.

Geographical studies of agriculture and agribusiness are the focus of research by Patarchanov (2006) and Patarchanova et al. (2019). A number of authors are actively working and conducting research on the development of rural areas: Patarchanov (2009). The profile of the rural economy, some crisis elements and the possibilities for its diversification are the subject of research interest of Patarchanov (2017) and Patarchanova (2007a, 2007b). The organization and management of rural areas is studied by Patarchanov (2017).

MATERIALS & METHODS

A set of analytical tools was used to analyze the development of processes in the viticulture sector. The nature and strength of the studied processes were determined by the following descriptive indicators:

- geomorphological analysis (relief and rocks)
- soil-climatic analysis
- market analysis
- analysis of state policy and subsidies

RESULTS AND DISCUSSION

General Characteristics

Regional geographical research implies considering space and territory as a complex, dynamically functioning and, most importantly, constantly open geographical system (Patarchanov, 2017). It consists of several main subsystems such as: natural, social, economic and others, which in turn represent a cultural geographical complex (cultural landscape) of constantly interacting and changing components (Patarchanov, 2017).

The factors influencing the efficiency, formation of comparative advantages and competitive capabilities of the viticulture sector can be systematized in the following main areas: natural and climatic, production and technological, socio-economic, market and trade, and institutional. These factors are related to the productivity and efficiency (intensity) of using the main factors of production – land, labor, and capital.

In practice, since ancient historical times, it has been established that the relief of the area has a great influence on the growth, development and fruiting of the vine. This circumstance has long been known to our winegrowers and skillfully used when planting vineyards. The distribution of climatic factors (light, heat, precipitation, wind, etc.) depends to a large extent on the relief, but also on the nature of the soil cover (Penkov, 1962). The diversity in the relief and the exposure, which is characteristic of a number of viticultural micro-regions of our country, brings significant changes in the temperature regime, moisture, solar radiation and soil conditions (Babrikov et al., 1989). The hilly relief is more favorable for growing vineyards. It provides protection for the vines. The direction of mountain ranges and hills, for example from north to south or from east to west, has a different impact on the conditions of vine growth, creating diverse complexes of the main factors (heat, humidity, light, etc.) that determine the success of the vine culture, the quantity and quality of yields (Merzhanian, 1953).

In the lowlands and at the base of the slopes, the growing season of the vines is longer, they develop more vigorously, and higher yields are obtained. This is mainly explained by the accumulation of more moisture and nutrients in these places.

The greater amplitude of temperature also has some importance in this regard. During the day, when the temperature increases to certain limits, the intensity of photosynthesis increases, and at night, the more significant decrease in temperature reduces the consumption of assimilates (Kiryakov et al., 1971).

On the ridge and slopes of the hills, the danger of freezing of the vines in winter and from late spring and early autumn frosts is lower, due to the movement of cold air from higher to lower places (Kurtev et al., 1979).

On highlands, the soil freezes deeper than in lowlands, because on highlands the snow is blown away and the snow cover is thinner than in lowlands, where snowdrifts form (Kiryakov et al., 1971). n depressed relief forms (valleys) and flat terrains, due to the small air drainage (prolonged retention of cold air), the danger of frost is always very high, which is why they should not be used for planting vineyards (Penkov, 2009).

In hilly terrain, with increasing elevation gain during the day, the air temperature gradually decreases; at night, and especially in clear and calm weather, the temperature is highest in the upper parts of the slopes, and decreases further down the slopes. The longer duration of the frost-free period on the tops of the hills and in the upper parts of the slopes does not lead to a significant increase in temperature sums, since the beginning and end of the frost-free period here are observed at a reduced temperature background. The decrease in temperature sums in the concave landforms is due to the significant reduction in the duration of the frost-free period.

In mountainous areas, slopes play the role of protective walls depending on their exposure and also on the steepness of the slope. Slopes have different thermal regimes and moistening of different soils, which significantly affects the growth, development and fruiting of the vine.

It is generally accepted that the vine reacts strongly to the conditions of the climatic environment. The meteorological conditions in a given year and in a given area definitely affect the quality of the grape harvest obtained. Of all the climatic factors, the most important for the vital activity of the vine, as for all higher plant organisms, are light, heat, water and air. They determine the possibility of its existence, while the others (secondary) according to Davitaya (1948) only correct the action of the main factors. They acquire independent significance only when they reach high intensity (damage from wind, hail, icing, dry winds, etc.). When assessing each factor, it is necessary to establish the critical periods of the vine during vegetation and dormancy. This can serve as a basis for conducting activities that affect the environment in order to satisfy the requirements of the vine to the highest degree (Davitaya, 1948).

Large bodies of water – lakes and large rivers – influence the temperature and humidity of the air. Winters near them are milder and the risk of frost and frostbite of vines is lower. In addition, they change the amount of thermal energy by reflecting the sun's rays (Rangelov and Nikov 2005).

Proof of the beneficial influence of large water bodies on the development of production is the fact that some of the best vineyards in the world are located in close proximity and on the banks of rivers, lakes and seas. Near large bodies of water, due to evaporation, atmospheric humidity during the summer months is much higher and despite relatively lower rainfall, vines can be grown without irrigation. Higher air humidity has a beneficial effect on the enlargement of the berries, their better coloring and ripening (Babrikov, 1989). The combination of relatively high atmospheric humidity with low diurnal amplitudes near large water bodies slows down to some extent the ripening of grapes and the accumulation of sugars in them and allows the grape harvest to take place later.

Water masses can also have a negative impact on the development of vines. Higher relative humidity creates conditions for the development of certain fungal diseases (oidium and gray rot) on grapes, and in the flowering phase can compromise normal fertilization (Markov, 2012). The evaporated sea drops, falling on the green parts of the vine - shoots, leaves and berries - have a high concentration of salt, causing a burn. The comparative advantages possessed in the production and trade of products of the viticulture sector at the national level are formed on the basis of the comparative advantages at the regional level. The total potential of the Bulgarian viticulture sector is

considered as the sum of the parameters of the production potential of the individual agrarian regions in the country.

The modernization of the structure of the industry is related to the processes of zoning and micro-zoning. They represent an important prerequisite for the development of modern viticulture and increasing the efficiency of production and market realization of the product.

The economic assessment of the significant regional changes that have occurred in Bulgarian viticulture during the period of Bulgaria's membership in the EU leads to the conclusion that they have had an overall negative impact on its production potential. This is manifested both in the overall decline in the area of fruit-bearing vineyards and in the observed changes in the production structure of the sector.

The regional structure of Bulgarian viticulture will continue to change in the future, mainly influenced by market factors. In order to increase the competitiveness of producers, the efforts of those involved in the sector should be directed towards adapting production to market demand and the overall internal and external market conditions.

Competitiveness and efficiency have a particular importance and manifestation in the agricultural sector due to the specifics of the agricultural production process. The same finding is valid with regard to the manifestation of these categories in the viticulture sector, which is distinguished by a number of features of the production activity. Viticulture is a major raw material base for the development of winemaking, which is why the two sub-sectors are inextricably linked in technological, technical and organizational terms.

The influence of markets as a factor has been felt strongly in recent years, after Bulgaria joined the EU and competed in the markets of the community. This largely determines and falls into the sub-sector. The high achievements in the past can in turn be explained by Bulgaria's membership in the CMEA (Council for Mutual Economic Assistance) where its markets were secured. The assortment, diversity and quality of the produce are increasingly influencing marketing.

The influence of demographic resources is reflected not only on the consumption of production, but also in the need for qualified labor in viticulture. For many of the activities, a mechanized way of working has not been found, which requires a larger amount of labor with qualifications and production experience, not only in a short period of time.

The influence of mechanization on the development of the sector is clearly expressed - the country still does not have enough small-sized and specialized equipment that can significantly shorten labor-intensive processes and reduce the cost of production. The strong influence of the transport factor is related to the fact that grapes, especially dessert grapes, are not transportable. They require specialized transportation (containers, refrigerators, etc.) for long-distance transportation, which increases the cost of the final product.

Over the past few years, an increasingly influential factor on the development of the sub-sector has been the environmental one, which is closely related to both foreign and domestic markets.

Geomorphological Analysis

Geographical position - Pazardzhik region is located in Southern Bulgaria and includes parts of several natural geographical areas. (Fig.2) From north to south are located respectively: the southern slopes of Sashtinska Sredna Gora, which are very suitable for viticulture; the western part of the Upper Thracian Lowland with several hills with significant potential for the production of various grape varieties; the northern foothills of the Western Rhodopes, having relatively smaller opportunities for the studied agricultural activities; the southernmost parts of the district include medium and high mountain territories of the westernmost part of the Rhodope massif, where the vine is found extremely rarely only in some valleys (e.g. the Chepina Valley, which is also the largest in the Inner Rhodopes). Administratively, the region borders the Sofia, Blagoevgrad, Smolyan and Plovdiv Region. It covers 4457.0 km2, representing 4% of the total territory of the country. More than half of this territory (57.1%) is forest land, 35.9% is agricultural land, 3.3% is urbanized territory, 2.6% is rivers and water areas, 0.6% is road infrastructure and 0.4% is quarries and mines. The

geographical location determines the overall philosophy for the development of the vineyard, the quality and quantity of the produced produce. As a plant of economic importance, the grapevine successfully develops between 25-50° N. lat. and 30-50° S. lat. The northern limit for growing grapes is related to the average monthly temperature of the warmest month of the year, with the average temperature value being above + 20 °C, and the values of the coldest month, with average values being above 1 °C.

The geological base of the Pazardzhik region reveals formations from the last era - the Neozoic, from its two periods, the Tertiary and Quaternary. Above the crystalline base lie thick Tertiary and Quaternary deposits, and the studied area is made of Proterozoic rocks, overlain by Neogene and Quaternary materials. These geological conditions are a good basis for soil-forming processes, thanks to which sandy and drained soil structures are formed, very suitable for the development of viticulture in the studied territory.

Quaternary deposits (Q) are widespread, overlying Neogene materials from the Akhmatovsk Formation or directly over Proterozoic marbles. Their thickness varies from a few to 60 m. They are mainly represented by sands and gravels. The sands are heterogeneous, loose or weakly bonded, grayish-yellow to yellowish. The alluvial deposits of the middle-mountain tributaries of the Maritsa River - the Topolnitsa River and the Luda Yana River - are mainly represented by variously grained sands with small gravel inclusions and fine to medium-grained gravels with sandy filler.

Fig. 2. Geographic map of Pazardzhik district *Source: Wikimedia Commons*

The relief, as a condition since ancient times, has been established to have a great influence on the quantity and quality of agricultural production. To a large extent, the action of climatic factors depends on it: light, heat, soil moisture, precipitation and the movement of air masses. Vineyards can be created in places that are not suitable for other types of crops on terrain that is more difficult to cultivate: narrow slopes, hilly terrain, places with greater altitude, low plains and valley fields. The hilly relief is favorable for the cultivation of vines.

The location of the vines depending on the mountain ranges and hills: north-south, east-west have different positive influences on the vine, creating a microclimate of a complex of climatic factors. The relief of the region is diverse: lowland (the western part of the Pazardzhik-Plovdiv Plain, representing the western part of the Upper Thracian Lowland) and medium and low mountain in the

separate parts of Ihtiman and Saschin Sredna Gora, and high mountain in the Western Rhodopes and Rila. The most fertile alluvial soils of the Pazardzhik Plain are here. The diverse relief of the area contributes to the development of agriculture and, in particular, viticulture.

Soil-Climatic Analysis

The climate in the Pazardzhik region is characterized as favorable temperate-continental, characterized by summer droughts. This climate is transitional between the temperate continental climate of the Danube Plain and the transitional - Mediterranean climate of Southeast Bulgaria. Negative temperatures in the Thracian Lowland are characteristic of the most typical winter month - January. Due to the protective role of the Stara Planina and the influence of the Mediterranean Sea, the average January temperature of the Pazardzhik region is positive. The summer temperatures of the region are not higher than those of the Danube Plain. The average July temperature is 23.3°C. The long summer, often from April to October, is characterized by sufficiently high temperatures. As a result, the formed agroclimatic conditions become a very important factor in the vegetation process of the vine plantations and especially in the ripening of the grape harvest.

In the lowlands, the natural geographical conditions are more pronounced on the temperature regime and in particular on the duration of frosts and heat. In the Pazardzhik Plain in winter, due to the temperature inversion, it is colder and there are longer frosts than on the Middle Mountains and Rhodope slopes and branches. Early spring allows for early planting of summer crops, and late autumn is very favorable for good ripening and harvesting of grapes. Compared to Northern Bulgaria, in the lowland territories of Pazardzhik region, frost stops falling earlier in spring, and in autumn - later.

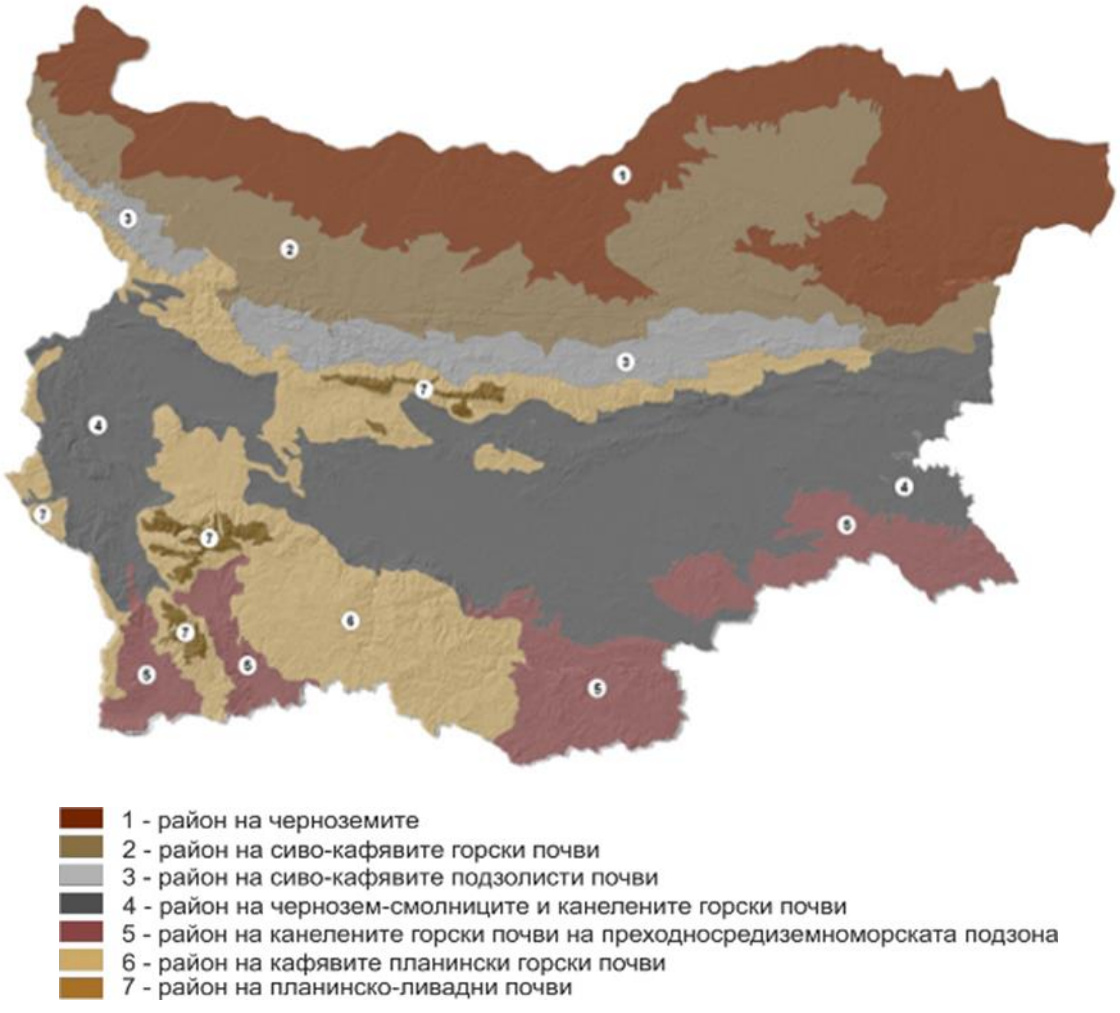

Fig. 3. Soil map of Bulgaria. *Source: nationalsoils.com*

The precipitation in the area depends on the cyclonic conditions that form and the prevailing winds - northwest, southwest and south, northeast and east. The Stara Planina and Sredna Gora Mountains prevent the free penetration of precipitation from the cyclonic winds from the north and northwest, and the Rhodope Mountains from the southern - Mediterranean precipitation. Thus, the Thracian Lowland benefits from less precipitation than the average precipitation amount for Bulgaria. Thus, Pazardzhik region is under the rain shadow of its surrounding mountains, so the annual precipitation amount is only 515 mm. The municipality receives the most precipitation in the summer - 142 mm (27.6%), and in the spring - 27%. Summer rainfall, even the highest, is often torrential and insufficient for agricultural crops, especially for secondary crops. The Pazardzhik Plain is also characterized by frequent droughts, occurring mostly in the second half of July and the first half of August. On the other hand, the water resources from the riverbeds provide sufficient quantities of freshwater, sufficient to meet the needs of the population, agriculture and industry.

Soils influence the overall growth, quantity and quality of grapevines. The life cycle of the underground parts of the vine takes place in it, providing water, all the mineral composition and nutrients for normal functioning. Characteristic properties of the soil are: mechanical, chemical composition, physical properties determining the growth, fruiting, quality and sustainability of the vineyard (Markov 2012).

The region is mainly covered with black earth-tar soils, cinnamon-forest and diluvial-alluvial soils (suitable for growing vineyards, fruit, grain and oil crops, tobacco and essential oil crops). (Fig. 3) Brown forest soils prevail in the mountainous areas, and cinnamon soils prevail in the valley areas (suitable for potato production).

The basins of the Maritsa and Topolnitsa rivers, in turn, abound with another fertile type of soil – dark meadow-marsh. In the northern part of the region, richly saline soils are found. he diversity of fertile soils is a significant prerequisite for the development of crop and livestock farming, combined with sufficient water resources. In order to obtain a certain type of grape production from a given variety with fixed quality indicators, an appropriate soil is also necessary (Markov 2012). It has been proven that in the same microdistrict with the same climate, different soils leave a certain imprint on the quality of the grapes. From many years of experience, the notion has long been established that there are no universal absolute soils that can be suitable for all grape varieties and directions of viticulture (Markov 2012).

Each soil is more or less suitable for a particular direction in viticulture. For example, leached and podzolized chernozems, cinnamon soils, and grey forest soils are considered the most suitable for growing red grape varieties (Markov 2012). It should be noted, however, that, although to a lesser extent, they are suitable for growing other grape varieties. Therefore, when choosing soils for a particular direction in viticulture, the most suitable ones for this purpose should be used first and foremost.

Soils that are suitable for growing wine grape varieties for the production of dessert wines. These soils should be light in mechanical composition, loose, with good heat and air regime and with moderate moisture retention capacity. For obtaining dessert wines, the content of stones and gravel in the soil also has a positive influence. The humus content should be about 1.5-2.5%. In addition, the soil should have enough carbonates, phosphorus and potassium. The following soils, which are found in the northern hilly part of the region, meet these requirements (Table 1).

Table 1. Soils found in the northern hilly part of Pazardzhik region

Soil type	**Characteristics**
Carbonate black soils	weakly powerful, moderately powerful and powerful, weakly humus, loess, eroded and non-eroded
Carbonate black soils	weakly powerful and powerful, on limestone, uneroded and weakly or moderately eroded

Typical black soils	high-micellar, powerful, low humus, loess, medium and highly eroded
Typical black soils	high-micellar, weak and medium-power, weak humus, on loess
Typical black soils	deep micellar, weakly and moderately thick, weakly humus, loess, weakly and moderately eroded
Typical black soils	deep micellar, powerful, weakly humic provided they are heavily eroded
Cinnamon forest soils	typical, slightly humus, slightly, moderately and strongly eroded
Cinnamon forest soils	leached, low humus content, highly eroded

Soils that are suitable for growing wine grape varieties for the production of red table wines.

The most suitable soils for this purpose are moderately moist, well aerated, with a sufficiently good thermal regime. The humus content should be higher compared to soils intended for the production of dessert wines. Soils for red table wines should contain sufficient phosphorus, potassium and iron. These types of soils are found in the hilly and semi-mountainous part of the Pazardzhik region (see Table 2).

Table 2. Soils found in the hilly and semi-mountainous parts of Pazardzhik district

Soil type	**Characteristics**
Weakly leached black soils	leached and heavily leached, weakly powerful, moderately powerful and powerful, weakly and moderately humus, on loess-like sandy clays and on clays, non-eroded and eroded
Typical black soils	deep micellar, weakly and moderately strong, moderately humus, on loess-like sandy clays, non-eroded and eroded
Black soils	deep micellar, weakly and moderately strong, moderately humus, on loess-like sandy clays, non-eroded and eroded
Cinnamon forest soils	typical, leached and podzolized, weakly powerful, moderately powerful and powerful, weakly, moderately and highly humus, eroded and non-eroded
Dark gray forest soils	high carbonate, weakly powerful, moderately powerful and powerful, weakly and moderately humus, eroded and non-eroded
Dark gray forest soils	high carbonate, weakly powerful, moderately powerful and powerful, weakly and moderately humus, eroded and non-eroded
Dark gray forest soils	deep carbonate, weakly powerful, moderately powerful and powerful, moderately humus, on loess-like sandy clays, loess-like clays, weakly and moderately eroded.
Brown forest soils	weakly powerful, moderately powerful and powerful, weakly and moderately humus, on sandy loams and clays, non-eroded and eroded.

Gray forest soils	weakly powerful, moderately powerful and powerful, weakly and moderately humus, on loess-like sandy clays, on carbonate clays, eroded (weakly, moderately and strongly).

Soils that are suitable for growing wine grape varieties for the production of white table wines.

For the production of low-extract white table wines, the most suitable are soils with a light mechanical composition, highly skeletal (containing a large amount of stones of various sizes - gravel, etc.), sandy, with a low content of humus and a high content of phosphorus and potassium. Such soils are found in the region of Pazardzhik region (see Table 3).

Table 3. Soils suitable for growing wine grape varieties for the production of white table wines in Pazardzhik region.

Soil type	**Characteristics**
Alluvial-dilluvial soils	Slightly humusy
Deluvial soils	Високо скелетни, слабо хумусни
Cinnamon typical soils	Leached and podzolized, on clayey-sandy materials

Soils that are suitable for the production of high-quality dessert grapes with the following varietal set: Bolgar, Chaush, Perle de Xaba, Chasla dore, Chasla misketova, Tsaritsa na lozyata are: soils that contain a light mechanical composition; loose, with sufficient water-holding capacity (Markov 2012). The humus content should not be more than 3-3.5%. In addition, it is necessary for the soils to be provided with $CaCO_3$ and with sufficient phosphorus and nitrogen.

The soil conditions in the Pazardzhik region for growing early dessert varieties are the same as for medium-early or late dessert grape production. However, as a rule, early varieties should be planted on slopes with a southern and southwestern exposure (Stoev et al., 1960). Such soils are found in the Pazardzhik region (see Table 4).

Table 4. Soils suitable for the production of high-quality table grapes in the Pazardzhik region

Soil type	**Characteristics**
Carbonate chernozems	weakly powerful, medium powerful and powerful, weakly humus, on loess, eroded and non-eroded.
Carbonate chernozems	weakly powerful, moderately powerful and powerful, weakly and moderately humus, n. limestones, eroded and non-eroded.
Typical black soils	high-micellar, weakly powerful, moderately powerful and powerful, weakly and moderately humic, eroded and non-eroded.
Typical black soils	deep micellar, weakly powerful, medium-powerful and powerful, weakly and medium humic, on loess and loess-like materials, eroded and non-eroded.

Black soils	weakly leached and leached, weakly powerful, medium powerful and powerful, weakly and medium humic, on loess and loess-like materials, eroded and non-eroded.
Podzolized chernozems	weakly powerful, medium powerful and powerful, weakly and moderately humus, on loess and loess-like materials, eroded.
Cinnamon forest soils	typical, leached, weakly and moderately humus, eroded and non-eroded.

The water resources in the region are rich in rivers and lakes. The influence of water bodies on the temperature and humidity of the air is of great importance for the development of viticulture in the region.

The main drainage artery in the region is the Maritsa River and, together with its catchment area, provides a significant part of its water potential, with its larger left tributaries - the Topolnitsa and Luda Yana rivers and right tributaries - Chepinska and others. A major challenge in the river runoff of the Maritsa River is that its high water level is delayed in the spring due to the later melting of snow in the Rila and Western Rhodope Mountains.

The waters of the large left tributary of the Maritsa River - the Topolnitsa River, receiving waters from the Medetska, Bereiska, Mativir, Pavel, Bunuvska and Zlatishka rivers, as well as the Topolnitsa dam of the same name, built along its banks, cannot actually be used for irrigation, but they have energy potential. The other left tributary of the Maritsa River – the Luda Yana River, which collects the waters of the Moley, Magareshka Reka, Svinarsko Dere rivers, and further downstream the Banska and Strelchenska rivers, is sometimes heavily polluted due to the fact that the river receives untreated wastewater from the town of Panagyurishte, the town of Strelcha and other smaller settlements located along its course, which also makes them risky for irrigation of the agricultural vineyards of the region.

Demographic Analysis

The assessment of the role of the human factor as the main workforce in viticulture is related to the labor intensity of this agricultural production. A major factor in the formation of employment levels, as well as the qualitative characteristics of the individuals involved, is the demographic crisis in the country and its progressive development over time. Insufficient employment levels in the sector have been reported, as well as a lack of opportunities to acquire adequate professional education and qualifications for employment in viticulture. Limitations in the quantity and quality of labor resources lead to a decrease in the quality of the final product produced, a reduction in the efficiency and competitiveness of production, and a deepening of the crisis in the sector.

The ongoing negative demographic processes at the national and regional level are most affected by dessert grape production, which is more labor-intensive (with a lower degree of mechanization of agrotechnical activities) and highly dependent on the human factor.

Another negative demographic problem is emigration waves, especially of young people of working age, which proves to be negative for the local viticulture sector, especially in rural areas where it is concentrated. The factors that stimulate migration processes are mainly economic and social (Table 5). n this regard, the influence of the political factor in internal migration needs to be studied, because the problems it causes, of a demographic, social and economic nature, affect an increasingly large part of the population and territory of our country, and often determine the general demographic situation (Patarchanova, Nikolova 2019).

The lack of good remuneration and prospects in the sector forces young and able-bodied people from the region to seek suitable employment in larger cities or abroad. This is one of the main problems to be solved and for the future development of the viticulture sector in the Pazardzhik region.

In addition to aging, the deterioration of the age structure and age ratios of the workforce in viticulture, its qualification is also a problem. There is an increasing shortage of qualified personnel to work with complex mechanized equipment and to apply new technologies in viticulture.

Table 5. Mechanical movement of the population in Pazardzhik district (2024). *Source: National Statistical Institute of Bulgaria (nsi.com)*

MECHANICAL POPULATION MOVEMENT IN 2024 BY REGIONS, MUNICIPALITIES AND SEX* (NUMBER)									
Regions, Municipalities	Settled			Evicted			Mechanical growth		
	All	Men	Women	All	Men	Women	All	Men	Women
Pazardzhik	**3420**	**1746**	**1674**	**3284**	**1478**	**1806**	**136**	**268**	**-132**
Batak	74	31	43	53	22	31	21	9	12
Belovo	78	43	35	122	57	65	-44	-14	-30
Bratsigovo	126	72	54	141	70	71	-15	2	-17
Velingrad	404	187	217	422	170	252	-18	17	-35
Lesichovo	108	51	57	113	56	57	-5	-5	0
Pazardzhik	1342	614	728	1332	619	713	10	-5	15
Panagyurishte	197	86	111	300	144	156	-103	-58	-45
Peshtera	209	105	104	166	63	103	43	42	1
Rakitovo	518	398	120	182	86	96	336	312	24
September	254	111	143	291	128	163	-37	-17	-20
Strelcha	60	29	31	61	27	34	-1	2	-3
Surnitsa	50	19	31	101	36	65	-51	-17	-34

The negative demographic processes in the district are a consequence of the accumulated, over a number of years, unresolved problems in the fields of healthcare, education, employment policy, demographic and migration policy. They have a direct impact on the two main reasons for the deteriorating demographic characteristics in the district. The negative natural growth rate of the villages of the rural areas in the district, which exceeds that of the cities, is the main reason for the continuing decrease in the total number of the rural population, and hence in its share of working age.

Market Analysis

The market as a factor for the development of viticulture is of extremely important importance for the realization of production at the local, regional and even national level.

A significant role in this direction is played by improving the competitiveness and sustainability of vineyard holdings by improving the age and varietal structure of plantations, with a view to meeting market demand and requirements, and improving management techniques to optimize production costs.

Of great importance for the sale of production in the region are the wine exchanges in the villages of Vinogradets and Ognyanovo, etc., where, during the active harvest season, various grape varieties with good overall quality, ripeness and high sugar content are offered.

The existing wineries, as well as the newly established wineries located in the region, play a key role in purchasing the production. They are crucial for the production and sale of high-quality wine and brandy on the domestic and international markets.

In this regard, a good example is the winery "Vintechprom" AD, which is among the most authoritative producers of wine and high-alcohol beverages in the region. The high quality of the winery's products is due to the spirit of ancient winemaking traditions preserved over time, which is skillfully combined with modern winemaking technologies.

The company has established partnership relationships for the processing of grape must of typical grape varieties ("Pamid", "Rkatsiteli", "Dimyat", "Merlot") with wineries in Northern Bulgaria - the Pleven region, and Southern Bulgaria - the Sandanski-Petrich region. The winery's products are distinguished by high quality and are well received on the domestic market, as well as on the markets in Russia and Belarus. The company has well-established traditions and authority in the wine business. It is the winner of many prestigious awards at the national and international level. The products have been awarded numerous medals from our and international competitions. The role of the non-governmental sector is extremely important for viticulture in all wine-growing regions of the country.

The National Chamber of Viticulture and Winemaking is the only organization in Bulgaria that unites on a professional basis everyone involved in viticulture and winemaking. It was established in February 2000. The mission of the chamber is to protect the professional interests of its members, the quality, authenticity and origin of grapes and wine.

Table 6. Annual reports of Pazardzhik district 2015-2024 Source: *Pazardzhik District Directorate of Agriculture*

Annually	Vineyards in general	Wine vineyards	Dessert vineyards	Wine vineyards	Dessert vineyards
2024 г.	21 991 dka	18 656 dka	3 335 dka	yield 485 kg/dka per year	yield 493 kg/ dka per year
2023 г.	21 991 dka	18 656 dka	3 335 dka	yield 262 кg/dka per year	yield 281 kg/dka per year
2022 г.	21 364 dka	18 076 dka	3 288 dka	yield 482кg/dka per year	yield 529 kg/dka per year
2021 г.	32 354 dka	31 928 dka	3 256 dka	yield 470кg/dka per year	yield 450 kg/dka per year
2020 г.	35 224 dka	31928 dka	3 256 dka	yield 411 кg/dka per year	yield 414 kg/dkaper year
2019 г.	39 440 dka	36 570 dka	2 870 dka	yield 554 кg/dkaper year	yield 975kg/dka per year
2018 г.	39 440 dka	36 570 dka	2 870 dka	yield 539 кg/dka per year	yield 988kg/dka per year
2017 г.	39 440 dka	36 570 dka	2 870 dka	yield 830 кg/dkaper year	yield 494kg/dka per year
2016 г.	39 720 dka	36 850 dka	2 870 dka	yield 597кg/dka per year	yield 928kg/dka per year
2015 г.	40 755 dka	37 850 dka	2 905 dka	yield 649кg/dkaper year	yield 1 211kg/dka per year

In the studied area, the Regional Chamber of Viticulture and Winemaking (RLVK) "Trakia", which is headquartered in Plovdiv, plays the greatest role. With its legal status, it is called upon to work for the development and competitiveness of viticulture and winemaking in the region. For the first time, the state is granting part of its powers to the non-governmental sector. The RLVK "Trakia" maintains a register of grape and wine producers in the Pazardzhik region. The Viticulture and Winemaking Chamber issues certificates of origin for quality wine and authenticity of grape brandy and brandy and forms tasting committees to carry out mandatory organoleptic analysis.

The Regional Chamber of Viticulture and Winemaking prepares a strategy for the development of viticulture and winemaking and implements the policy of this sector. The data from the study on the status and trends in the varietal composition of viticulture in the area clearly highlight the need to renew the production potential, especially in terms of the spread of local wine vineyards. A negative trend is the reduction of the area of cultivated vineyards by half in the last ten years in the Pazardzhik region, which is an extremely unfavorable trend (see Table 6).

Analysis of State Policy Regarding Viticulture

The role of state policy for the development of viticulture is very important. The influence of this significant factor on the development of viticulture is expressed both in the adoption of laws serving the general policy in the agricultural sector and those related to this traditional production in the region and the country. Another essential tool for influencing economic activities is the specific financial policy related to supporting the various stages of the production process and the purchase of produce and other economic levers (e.g. tax breaks to stimulate viticulture).

In 2002, following changes in the Wine and Spirits Act (Wine and Spirits Act), relating to the creation of real conditions for effective control and management of the viticultural potential, texts

were developed and adopted regulating the rights to new planting of wine grape varieties, replanting, grafting and uprooting of existing grape plantations. In 2005, a National Strategy for the Development of Viticulture and Winemaking in the Republic of Bulgaria 2005-2025 was adopted, and in 2006 a National Program for the Promotion of the Production of Table Grapes in the Republic of Bulgaria was created.

Unfortunately, after our full membership in the EU, the way in which part of the subsidies under the CAP (Common Agricultural Policy) per unit are received has a negative impact on the development of viticulture area, because it mainly stimulates the production of extensive agricultural crops, which is at the expense of a number of traditional agricultural activities, the main of which is viticulture. Serious financial support should be provided for the sector, which would create favorable conditions for increasing production and establishing it as a secure livelihood in the viticultural regions.

Of great importance for the development of viticulture is that the National Chamber of Vine and Winemaking has created the "Bulgarian Wine" fund, the purpose of which is to support the organization of advertising campaigns, participation in fairs, exhibitions, organization of promotions and other activities aimed at popularizing Bulgarian wine. The fund can also finance individual advertising campaigns under the motto “Bulgarian Wine”. This fund is the first example of a partnership between the state through the State Fund “Agriculture” and the private sector, which unites efforts to raise the prestige of Bulgarian wine. The funds under the fund are raised by voluntary annual contributions from wine producers and an annual target subsidy granted by the State Fund "Agriculture" in an amount equal to the amount raised from the voluntary contributions.

In connection with the great dynamics of changes in agroclimatic conditions, there is a growing need to improve the adaptability of grape producers to income losses and support risk management by promoting crop insurance.

It is increasingly urgent to provide additional tools to influence the market in the viticulture sector, in case of indications of crisis situations related to both natural processes and other extraordinary challenges, such as the 2020 crisis with the COVID 19 pandemic.

CONCLUSION

The complex of natural geographical conditions and resources in the research area has significant potential for sustainable development of viticulture. The favorable agro-climatic conditions and suitable soil types are the basis of centuries-old traditions in the production of various grape varieties that allow the completion of the entire cycle of viticulture and wine agribusiness in the Pazardzhik region. Modern demographic processes are one of the main limiting factors for the development of viticulture in the studied area. The aging population limits the possibilities of the workforce in the main agricultural production activities. The increasing lack of interest in continuity between generations has a detrimental effect on the production experience and qualifications of those employed in viticulture. This, together with the decreasing potential of the workforce, indirectly reflects on the volumes of production, as well as on its quality.

In recent years, there has been a reduction in the number of wine farms, a deterioration in the economic indicators of production, and an increase in the age of those employed in viticulture. he reasons for this are complex and there is no single answer to what is happening in the sector. First of all, one of the main reasons is the decrease in grape and wine exports from our country in recent years. The reasons for this are complex and there is no single answer to what is happening in the sector. First of all, one of the main reasons is the decrease in grape and wine exports from our country in recent years. The loss of market positions gained, both within the EU and in third countries, inevitably leads to an increase in the level of uncertainty regarding the final financial result of the activity for grape growers. There are no or limited at least the previously concluded contracts for the purchase of grape production.

The analysis of the geomorphological, soil-climatic and demographic conditions in the Pazardzhik region shows that there are very good conditions for the cultivation and development of viticulture. The hilly terrain, black earth-tar soils, cinnamon-forest and diluvial-alluvial soils, high annual temperatures and the dry climate in general are a prerequisite for almost exclusively red varieties - mainly Merlot, Cabernet Sauvignon, Pamid. With the development of viticulture and winemaking, traditions in agriculture, and in particular vineyard estates, would be preserved, and funds would be provided for development and investment in rural areas.

Among the main problems of the viticulture sector in the region is the low purchase price of grapes. It is mainly due to the lack of real and lasting interaction between grape growers and wine producers, as well as the relatively small capacity of wineries. There is a tendency for wineries to have their own vineyards, and the grapes produced on their farms have a high cost, so if their owners need additional quantities of grapes, they strive to buy them at the lowest possible price. This In turn, it adversely affects the economic efficiency of vineyard owners, especially the smaller ones, and in most cases they are forced to sell their production even below its cost price.

The lack or insufficient degree of association (cooperatives, producer organizations), as well as preliminary contracts with wine producers, especially for small farms, leads to low prices, non-purchase and disposal of the harvest and lack of funds for the next grape production cycle. This demotivates wine grape producers and reduces their desire to grow wine vineyards, which in turn leads to losses for all participants. First of all, grape producers suffer the greatest losses, and secondly, wine processors and producers. Ultimately, the state and the tax authorities are also harmed, because tax and excise contributions are reduced because the sector is not developing stably and its opportunities and resilience to survive are reduced.

Another serious problem in the studied area turned out to be the high degree of fragmentation of the vineyard massifs. There is a lack of desire for association between the owners of vineyard farms, a total lack of trust and, last but not least, difficulties of a purely administrative nature. There are quite a few producers who do not meet the minimum requirements for applying for any of the measures, but there is also a significant number who meet the conditions but do not apply for support due to the lack of timely and up-to-date information. In this sense, it can be said that the role of state institutions in raising awareness among agricultural producers is not at the necessary level, in view of the absorbability of the financial resources provided to support the sector.

The stabilization of the viticulture sector in the Pazardzhik region requires land consolidation, the planting of new and high-quality grape varieties, as well as regulated binding of grape producers. The poor condition of the vineyards is due, on the one hand, to their deteriorated age structure and, on the other hand, to the inconsistent and untimely implementation of the necessary agrotechnical measures for them. Grape varieties are a determining factor in the development of viticulture. The key to improving competitiveness and developing viticulture in the area is the production of more quality and bottled wines and diversification of production, and the state's agricultural policy must be focus on promoting productions other than traditional winemaking, such as the production of grape juice, raisins and table (dessert) grapes. An important condition for the stabilization of the viticulture sector in the Pazardzhik region is the development and implementation of a technological scheme for planting new vineyards on old uprooted ones. Ensuring healthy, pure varietal vine planting material, ensuring the production of grapes, which in the future will bring high yields of quality harvests in the region. Important future processes in the structure of viticulture in the area are improving the quality of the resulting production, providing employment and gradually increasing the competitiveness of the viticulture sector in the context of the current economic environment in the studied territory.

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Bridging the Divide: Digitalization and Young Rural Women in Bulgaria

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ABSTRACT

Digitalization has emerged as a transformative force, reshaping economies and individual opportunities, yet its benefits remain unevenly distributed. Marginalized groups, such as young rural women in Bulgaria, face compounded barriers stemming from limited infrastructure, digital literacy, and societal norms. This study explores these intersections using semi-structured interviews with 43 young women from the South West and Central West regions of Bulgaria, supported by quantitative insights. Findings reveal that unreliable internet access (73%) and insufficient digital literacy programs (67%) significantly hinder their engagement with the digital economy. Rooted in theoretical frameworks by Bourdieu, Collins and Castells, the analysis highlights how structural inequalities reinforce exclusion, while also revealing the resilience and agency of these women. This research underscores the urgency of gender-sensitive rural policies focused on expanding broadband infrastructure, scaling digital literacy initiatives, and addressing societal norms. By empowering young rural women, digitalization can bridge the rural-urban divide, foster social mobility, and drive regional economic growth. These findings contribute to understanding the digital divide and highlight the need for equitable digital inclusion strategies as a pathway to sustainable development.

Keywords: *Youth marginalization, Rural women, Gender inequality, Digitalization, Social capital, Digital divide*

INTRODUCTION

In contemporary society, digitalization has emerged as a transformative factor reshaping economies, social interactions, and individual opportunities. However, its benefits are unequable distributed, with specific demographic groups facing compounded challenges in accessing and using digital technologies. This study examines the unique circumstances of young rural women in Bulgaria, who are doubly disadvantaged by their gender and geographic marginalization. Many factors influence these complex connections, but two of the most important are globalization and the move toward digital public services (Popova & Karadzhov, 2023). By exploring the structural barriers

that hinder these women's digital inclusion, the research highlights the urgent need for targeted interventions that address their specific needs.

Rural women represent a population particularly vulnerable to multidimensional inequalities resulting from the intersection of gender disparities and rural-urban divides. Limited access to services, infrastructure, and digital technologies increase these disadvantages, restricting their socioeconomic opportunities in comparison to urban areas. This issue is particularly intensive in rural areas of Europe, notably within Eastern European EU Member States, where gender-sensitive approaches to public services and employment policies remain insufficient. Scientific literature highlights rural NEETs (Not in Employment, Education, or Training) as one of the most marginalized youth demographics, with disproportionately higher rates in rural areas compared to urban settings (Simões & Erdoğan, 2024). Similarly, according to Alfieri et al. (2015) parental education and support are critical in mitigating NEET status, underscoring the systemic nature of these challenges.

The multiplied structural barriers faced by rural women, encompassing limited access to education, employment, and technology, necessitate multidimensional policy interventions. These interventions must simultaneously address infrastructure deficiencies, enhance digital literacy, and adopt gender-sensitive approaches to bridge the gaps in access and opportunity. Bridging these divides is critical to achieving equitable socioeconomic development across gendered and geographic dimensions.

The theoretical foundation of this research relies on several established frameworks to analyze the experiences of young rural women in Bulgaria. Pierre Bourdieu's theory of social capital (1986) provides an essential lens for understanding how restricted access to digital resources limits their capacity to accumulate economic and cultural capital, which are fundamental for social advancement. Furthermore, the intersectionality framework articulated by Kimberlé Crenshaw (1989) and Patricia Hill Collins (2000) clarifies the compounded nature of inequalities faced by women marginalized by both gender and geographic location. Within this context, Manuel Castells's theory of the network society (2000) and Jan van Dijk's analysis of digital divides (2005) highlight how digital technologies often exacerbate pre-existing disparities for marginalized populations, rather than mitigating them.

By situating the life course of young rural women within these theoretical paradigms, this research provides a complex, multi-dimensional view of the structural barriers hindering their digital inclusion and broader socioeconomic participation. The findings underscore the critical need for intersectional, evidence-based policies that account for the interconnected effects of gender and geographic marginalization, ensuring that digitalization serves as a tool for empowerment rather than exclusion.

LITERATURE REVIEW

The analysis of young rural women's challenges in navigating the digital landscape in Bulgaria is related to several key theoretical frameworks. These frameworks illuminate the multifaceted nature of their experiences and the structural conditions that sustain their marginalization. Pierre Bourdieu's concept of social capital is pivotal in understanding the dynamics of power and privilege in society (Bourdieu, 1986). Social capital refers to the networks, relationships, and norms that facilitate collective action and access to resources.

In the context of young rural women in Bulgaria, limited access to digital resources significantly prevents their ability to accumulate social capital. Rural areas often lack the necessary infrastructure, such as high-speed internet and digital literacy programs, which are critical for building connections and engaging with broader social networks (van Dijk, 2020). This deficit not only restricts their access to information and opportunities but also reinforces existing power imbalances. Bourdieu posits that social capital is instrumental in gaining other forms of capital, including cultural and economic capital (Bourdieu, 1986).

For young rural women, the inability to engage with digital platforms decreases their chances of participating in educational and economic opportunities that are increasingly mediated through

technology (Hilbert, 2011). As a result, these women find themselves caught in a cycle of disadvantage, where the lack of social capital reinforces their marginalization in both local and global contexts (Nussbaum, 2000).

Intersectionality presumes that various forms of social stratification such as gender, class, and geographic location, intersect to create unique experiences of oppression and privilege. In the case of young rural women, their gender identity opposes with their rural status, producing distinct axes of inequality that shape their experiences in the digital sphere. The digital divide is increased by cultural expectations and traditional gender roles prevalent in rural Bulgaria, which often prioritize domestic responsibilities over educational and professional aspirations.

This cultural context further limits young women's opportunities to engage with digital technologies, as they may lack the time, resources, and social support to pursue digital literacy. Consequently, the multidimensional nature of their identities makes them particularly vulnerable to exclusion from the digital economy, educational resources, and social networks that could facilitate their empowerment. Recent studies highlight the persistence of the gender digital divide. Globally, women are less likely than men to receive technical education or be employed in technology-intensive work, leading to underrepresentation in the tech industry (Gurung, 2018). In Bulgaria, while women constitute a significant portion of the tech workforce, traditional gender roles still influence their participation in digital spaces (Davies, 2019). These disparities are intensified by socio-cultural norms that restrict women's access to technology, further entrenching their marginalization in the digital sphere.

From the other side, Manuel Castells's theory of the network society provides critical insights into the implications of digitalization for social structures and individual agency (Castells, 2010). Castells argues that the rise of digital technologies has transformed the way individuals and groups interact, creating a new social framework characterized by networks rather than traditional hierarchies. However, this networked society also highlights the disparities in access to digital resources, which can strain existing social divides. For young rural women in Bulgaria, the lack of access to digital networks limits their ability to participate in the opportunities afforded by the digital economy.

As Castells suggests, individuals who are integrated into digital networks can leverage their connections for social mobility and economic advancement. In contrast, those without access remain marginalized, unable to benefit from the social capital that comes from being part of these networks. This dynamic illustrates how digitalization, while offering new directions for engagement, can simultaneously strengthen existing inequalities (van Deursen & van Dijk, 2014). Young rural women face compounded barriers in accessing digital resources, influenced by their geographic isolation and gendered expectations (Fuchs & Horak, 2018).

The lack of infrastructural support and digital literacy programs perpetuates their exclusion from digital networks. This exclusion not only limits their educational and professional opportunities but also affects their ability to engage with broader social and economic systems (van Laar et al., 2020). Additionally, the gendered nature of digital spaces in rural contexts contributes to the systemic marginalization of women. Research shows that cultural expectations often restrict women's engagement with technology, reinforcing traditional roles and limiting their ability to benefit from digital advancements (Zillien & Hargittai, 2009). These systemic challenges align with Castells's observation that those excluded from networks face compounded disadvantages in the information society.

According to Popova & Karadzhov “the implementation of some of these responsibilities is characterized by perplexed challenges in the context of globalization and digitalization of relations in every sphere of life” (Popova & Karadzhov, 2023).

Ulrich Beck's risk society thesis offers a valuable perspective on the implications of digitalization for socially and economically disadvantaged groups (Beck, 1992). Beck posits that contemporary society is characterized by the emergence of new risks and uncertainties, often exacerbated by technological advancements. In the context of young rural women in Bulgaria,

digitalization can leads to unique forms of risk, including cyberbullying, social isolation, and exposure to misinformation. The digital landscape can be particularly risky for young women, as they navigate potential threats to their safety and well-being. Moreover, the lack of support systems and resources in rural areas can heighten their vulnerability to these risks. Beck's framework underscores the need to address not only the structural barriers that inhibit digital inclusion but also the new forms of risk that arise in a rapidly evolving digital environment. By recognizing these challenges, policymakers can develop targeted interventions that mitigate the risks associated with digitalization for young rural women.

Digitalization in rural Bulgaria

Bulgaria, situated in Southeast Europe, is marked by a rich cultural heritage and diverse geography. However, it has also experienced significant socio-economic transformations since the fall of communism in 1989. The country's rural areas, which are home to a substantial segment of the population, face unique challenges that compound the effects of digitalization (World Bank, 2020). The rural landscape is characterized by dwindling populations, economic stagnation, and a lack of infrastructural development, all of which contribute to a digital divide that disproportionately affects young women (European Commission, 2018; OECD, 2019).In the context of digitalization, Bulgaria has made strides in increasing internet connectivity and access to digital technologies; however, these advancements are not evenly distributed (Eurostat, 2022). Urban centers enjoy better infrastructure, higher levels of digital literacy, and greater access to online resources compared to their rural counterparts.

This disparity is particularly pronounced for young women, who encounter additional barriers rooted in gender norms and expectations (UN Women, 2021). Digitalization has the potential to empower individuals through access to information, educational resources, and economic opportunities. These opportunities are often mediated through digital platforms, thus the ability to navigate this new landscape is crucial for social mobility (Simões, 2024). However, for young rural women, the process towards digital inclusion is filled with obstacles.

The intersection of gender and geographic location leads to a double disadvantage, as these women often find themselves marginalized not only by their rural status but also by the societal expectations placed upon them as females (Franić & Kovačićek, 2019). The rural context, characterized by traditional values and gender roles, further complicates their engagement with digital technologies (Copa Cogeca, 2020).

As a result, while urban youth may thrive in an increasingly networked society, their rural counterparts face a complex web of barriers that hinder their ability to fully participate in the digital economy (UNESCO, 2019). Amidst these challenges, digitalization is reshaping social dynamics in rural Bulgaria. The integration of technology into everyday life offers opportunities for connection, education, and entrepreneurship. However, the potential benefits are often overshadowed by the structural inequalities that persist in these communities (ILO, 2020).

The lack of access to reliable internet, inadequate digital literacy training, and limited exposure to technology create a landscape where young rural women struggle to harness the advantages that digitalization presents. This context sets the stage for a deeper exploration of the specific challenges faced by these women as they navigate the complexities of a rapidly changing digital environment.

Gender and Geographic Marginalization

Young rural women in Bulgaria experience a unique form of marginalization that arises from the intersection of their gender and geographic location. Gender roles in rural communities are often deeply entrenched, with societal expectations that women prioritize family responsibilities over personal ambitions (Shortall, 2002; Bock, 2015). These traditional mindsets limit their opportunities for education and employment, shaping their engagement with digital technologies. Studies have shown that such norms discourage women from pursuing careers or educational paths requiring digital skills, perpetuating cycles of disadvantage (Simões, 2024; European Commission, 2020). Geographic isolation further exacerbates these issues. Many rural areas lack the necessary infrastructure to support

digital engagement, including high-speed internet and access to technology (OECD, 2018; UNESCO, 2019). This isolation often leads to feelings of disconnection and helplessness, as young women find themselves cut off from resources and networks essential for personal and professional development (ILO, 2020). Such disconnection is particularly evident in peripheral regions of Europe, where rural communities face systemic challenges in accessing digital education and employment opportunities (Franić & Kovačićek, 2019). The intersection of gender and geographic marginalization thus creates a formidable barrier, hindering young rural women's ability to participate in the digital economy and access opportunities for empowerment and social mobility (Copa Cogeca, 2020). Addressing these challenges requires targeted interventions that focus on both improving digital infrastructure in rural areas and dismantling gender-based societal barriers, as emphasized by researchers such as Marta and Alfieri (2015).

Limited Access to Digital Resources

Access to digital resources is a critical factor in determining the ability of young rural women to engage with the digital world. In Bulgaria, rural areas often suffer from inadequate technological infrastructure, which limits internet connectivity and access to devices (European Commission, 2020; OECD, 2019; World Bank, 2020). Many households in these regions may not possess the necessary tools, such as computers or smartphones, to facilitate online learning or job searching (Eurostat, 2022; van Dijk, 2020). Furthermore, even when technology is available, the lack of digital literacy skills can hinder effective usage (Hargittai, 2002; UNESCO, 2019).

The absence of formal training programs and educational initiatives aimed at enhancing digital skills disproportionately impacts young women, who may not have the same opportunities as their male counterparts to acquire these competencies (UN Women, 2021; Helsper & van Deursen, 2017). This limited access to digital resources not only affects their immediate ability to engage with technology but also has long-term implications for their career prospects and social networks (Simões, 2024; Franić & Kovačićek, 2019). Without the ability to navigate digital platforms, young rural women are at a distinct disadvantage in an increasingly digital job market, where employers often prioritize candidates who possess technical skills and online experience (Helsper, 2021; DiMaggio et al., 2001; Copa Cogeca, 2020)

Cultural Expectations and Social Norms

Cultural expectations and social norms play a significant role in shaping the experiences of young rural women in Bulgaria. Traditional gender roles continue to dictate the behavior and aspirations of women in these communities, often relegating them to domestic duties and caregiving roles (Shortall, 2002; Bock, 2015; Franić & Kovačićek, 2019).

This societal framework discourages young women from seeking opportunities outside the home, including education and employment that require digital engagement (UN Women, 2021; European Commission, 2020). Moreover, the stigma associated with women who challenge these norms can lead to social ostracism, further entrenching their marginalization (Helsper & van Deursen, 2017; Hargittai, 2002).

The fear of judgment or backlash from the community may prevent young women from pursuing digital literacy programs or engaging with online platforms that could facilitate their personal and professional development (Simões, 2024; UNESCO, 2019). As a result, cultural expectations not only limit their access to digital resources but also create a hostile environment that discourages innovation and ambition (ILO, 2020; van Dijk, 2020).

Opportunities for Social Mobility

Despite the numerous challenges faced by young rural women in Bulgaria, digitalization also presents opportunities for social mobility. The rise of online education, remote work, and digital entrepreneurship has the potential to empower these women by providing access to resources and networks that were previously out of reach. Online learning platforms enable them to acquire new skills and knowledge, which can enhance their employability and open doors to new career paths.

Additionally, digital platforms can serve as a means of connection, allowing young women to engage with peers, mentors, and industry professionals beyond their immediate community. This expanded network can provide support, encouragement, and collaboration opportunities that are essential for personal and professional growth. As they become more integrated into the digital economy, young rural women may find pathways to financial independence and empowerment that were once unattainable.

Exacerbation of Existing Inequalities

While digitalization offers potential benefits, it simultaneously exacerbates existing inequalities faced by young rural women. The digital divide, characterized by disparities in access to technology and digital literacy, creates a two-tiered system where those with resources thrive while those without are left behind. In rural Bulgaria, where infrastructure and educational support are lacking, young women find themselves at the mercy of systemic inequalities that hinder their ability to participate in the digital economy.

Moreover, the rapid pace of digitalization can create a sense of urgency and competition that is difficult for marginalized individuals to navigate. As opportunities shift increasingly online, those without the necessary skills or access may miss out on job prospects and economic advancement. This widening gap reinforces existing social and economic disparities, making it increasingly difficult for young rural women to overcome the barriers they face.

Cyberbullying and Isolation

The digital landscape, while offering opportunities for connection, also presents new risks for young rural women, particularly in the form of cyberbullying and social isolation. The anonymity of online interactions fosters a culture of harassment, where young women often face bullying or negative comments based on their gender or rural status (Ditch the Label, 2022; Barlett & Coyne, 2014). Research indicates that such experiences can lead to emotional distress, reduced self-esteem, and a reluctance to engage with digital platforms, further entrenching their social isolation (Tokunaga, 2010).

Additionally, the nature of social media amplifies feelings of inadequacy and comparison, as young women are exposed to idealized representations of life that may be unattainable, especially in rural settings with limited resources (Chou & Edge, 2012; Fardouly et al., 2015). This phenomenon exacerbates feelings of exclusion, particularly in rural areas where social connections are already constrained (Robinson et al., 2020). The interplay between digitalization and social dynamics creates a paradoxical situation in which increased connectivity does not necessarily lead to a sense of belonging or support. Instead, it often leaves young rural women vulnerable to mental health challenges, deepening their marginalization and further deterring them from engaging with digital technologies in a meaningful way (Twenge et al., 2018).

MATERIALS & METHODS

This study employs a qualitative approach to explore the challenges faced by young rural women in Bulgaria as they navigate the digital landscape. The methodology is based on the sociological framework of Grounded Theory (Glaser & Strauss, 1967), which is well-suited for studies aimed at generating insights from participants' lived experiences. Grounded Theory emphasizes iterative data collection and analysis, allowing patterns and themes to emerge directly from the data rather than being predefined. This approach aligns with the study's goal of understanding the nuanced and intersectional challenges these women face in their interactions with digital technologies.

Qualitative Data Collection

The primary method of data collection was semi-structured interviews conducted with 43 young rural women aged 18-35 from the South West and Central West regions of Bulgaria. These regions were selected due to their distinct socio-economic profiles and varying levels of digital infrastructure. Participants were recruited through purposive sampling, ensuring diversity in age, educational

background, and employment status. While purposive sampling was necessary to capture a wide range of experiences, it is important to acknowledge potential biases that may have influenced participant selection. Specifically, the recruitment process relied on the availability and willingness of individuals to participate, which may have inadvertently excluded voices from more marginalized groups, such as women with significant caregiving responsibilities or limited access to communication channels.

To mitigate these biases, the study employed strategies such as partnering with local community organizations to reach underrepresented groups and conducting follow-up interviews to ensure data saturation across diverse demographic profiles. However, despite these efforts, the findings may still reflect some selection bias, particularly regarding women who are more engaged or willing to share their experiences.

The interview guide included open-ended questions focusing on:

- Access to digital tools and internet infrastructure
- Digital literacy and self-perceived technological proficiency
- Experiences with online platforms for education, work, and social interaction
- Cultural and societal expectations influencing their engagement with technology

Each interview lasted approximately 45-50 minutes and was conducted in participants' native language, either in person or via video conferencing. With consent, all interviews were recorded and transcribed verbatim for analysis.

Data Analysis

The qualitative data were analyzed using MAXQDA software, following the principles of Grounded Theory. Thematic coding began with open coding, where significant concepts and patterns were identified. This was followed by axial coding to explore relationships between themes and categories, and finally, selective coding to develop overarching narratives that addressed the research questions. Grounded Theory's iterative approach ensured that emergent themes were consistently refined and validated throughout the analysis process.

Key themes included:

- Limited infrastructure in rural areas and its impact on digital access
- Societal norms and gendered expectations influencing women's engagement with technology
- The potential of digital literacy programs to empower rural women and improve their socio-economic mobility

While the methodology was carefully developed, acknowledging these limitations in participant selection enhances the study's transparency and reliability. Future studies could employ complementary sampling techniques, such as random or stratified sampling, to further reduce selection bias and improve the representativeness of findings.

RESULTS

Resilience and Strategies for Overcoming Challenges

Young rural women in Bulgaria demonstrate remarkable resilience in the face of systemic barriers to digital inclusion. Interviews revealed that despite challenges such as unreliable internet access, societal expectations, and limited digital literacy, these women actively seek out opportunities to enhance their skills and knowledge. Many participants reported pooling resources with friends and family to share devices or internet access. For instance, a 22-year-old respondent from the South West region mentioned:

"*We have one computer at home, but my siblings and I take turns using it. It's not ideal, but we make it work*."

This resilience highlights their ability to adapt to resource constraints, underscoring the importance of communal efforts in overcoming digital challenges. Several women also described innovative ways to overcome barriers. A 20-year-old participant noted:

"*When the internet is down, I download materials when I visit the library in town. It's inconvenient, but it keeps me on track with learning*."

Informal social networks were another crucial strategy. Many participants described relying on friends or neighbors to share knowledge about digital tools and opportunities. A 26-year-old respondent shared:

"*My neighbor taught me how to use email. Now I can send applications for jobs I couldn't before.*"

These accounts illustrate how community reliance fosters resilience and learning, even in resource-constrained environments.

Community-Based Initiatives

Community-based initiatives were consistently identified as transformative by participants. Local NGOs and grassroots organizations have played a pivotal role in bridging the digital divide. For example, workshops organized by programs such as Digital Skills for Rural Women not only teach technical skills but also instill confidence and inspire women to pursue further digital education. One participant, a 27-year-old from the Central West region, described how a single workshop changed her outlook:

"*Before the training, I thought technology was too complicated for me. Now, I'm not afraid to explore new things online, and I've even started teaching my younger sister*."

Others echoed similar sentiments, with one participant noting:

"*The training helped me understand that I could learn technology step by step. It's not as overwhelming as I thought."*

Participants also highlighted the role of community centers in providing access to devices and reliable internet. These centers are often the only places in rural areas where women can work on projects, apply for jobs, or attend online courses. A 24-year-old woman shared:

"*I go to the community center twice a week to use their computers. Without it, I wouldn't have the tools to apply for remote jobs*."

However, some participants expressed concerns about the sustainability of these initiatives. One respondent commented:

"*These programs are great, but they come and go. We need something permanent to rely on.*"

This underscores the need for long-term investment in such programs to ensure their continued impact.

Personal Perseverance and Agency

Personal perseverance emerged as a recurring theme in the interviews. Many young women showcased a strong sense of agency, taking proactive steps to improve their digital skills despite systemic barriers. For instance, several participants described how they used their smartphones to access free online resources like tutorials, e-books, and webinars. A 19-year-old respondent stated:

"*I use free apps and YouTube to learn everything from basic computer skills to graphic design. It's slow because of the internet here, but I don't give up*."

Another participant recounted:

"*I learned to edit photos on my phone by watching tutorials. Now, I do small freelance jobs for local businesses*."

The study also found that self-directed learning often stemmed from the desire to achieve financial independence and contribute to household incomes. Some women reported exploring remote job opportunities, such as virtual assistant roles or online tutoring, as viable alternatives to traditional employment, which is often scarce in rural areas. A 25-year-old woman shared:

"I got my first remote job as a data entry assistant after teaching myself Excel. It felt like a big achievement."

Intersectionality and Systemic Marginalization

The study revealed that intersectional factors significantly influence the degree of exclusion experienced by young rural women. Participants from minority ethnic backgrounds or those with limited formal education faced compounded challenges. For instance, a respondent from the Roma community shared:

"I don't see many people like me in these training programs. It feels like they're not made for us."

This systemic exclusion underscores the importance of designing inclusive programs that consider the diverse needs of rural women. Additionally, women with caregiving responsibilities faced unique barriers to engaging with digital tools. A 25-year-old participant noted:

"*Between taking care of my children and helping on the farm, I have little time to sit down and learn something new on the computer."*

Another woman emphasized:

"*Sometimes, I feel like I'm choosing between family and my own growth. It's a tough balance*."

These findings highlight the need for flexible training schedules and support systems to accommodate the realities of rural women's lives.

The Transformative Potential of Digital Skills

While challenges persist, the study also revealed the transformative potential of digital skills in the lives of young rural women. Several participants who had completed digital literacy programs reported significant improvements in their socio-economic conditions. For example, one participant secured a remote administrative role after attending a workshop on digital tools:

"*The workshop taught me how to use Microsoft Excel and other software. Now, I earn more working from home than I ever could locally."*

Another woman highlighted the psychological benefits:

"*Learning digital skills gave me confidence. I feel like I'm part of the modern world now."*

These success stories illustrate how targeted interventions can break the cycle of exclusion and empower women to achieve greater economic and social mobility.

QUANTITATIVE ANALYSIS OF QUALITATIVE DATA

The quantified insights from qualitative data underscore the systemic barriers young rural women face while highlighting areas of resilience and potential intervention. This mixed-methods approach bridges qualitative richness with quantitative rigor, enabling a holistic understanding of the challenges and opportunities related to digital inclusion. The qualitative interviews with 43 young rural women were systematically coded to identify recurring themes and narratives. Using MAXQDA software, responses were categorized into major themes, and the frequency of these themes across interviews was quantified.

Table 1 summarizes the key themes identified and the percentage of respondents who mentioned each:

Table 1. Key Themes and Their Frequencies

Theme	Frequency (%)
Limited digital infrasrtucture	73 %
Societal norms restricting technology use	74%
Lack of digital literacy programs	67%
Engagemnet in self-directed learning	58%
Positive impact of communiy initiatives	65%
Barriers to caregiving roles	40%
Intersectional challenges (minority status)	35%

The analysis of qualitative data provides measurable insights into the challenges faced by young rural women in Bulgaria and the strategies they use to navigate the digital world. Limited infrastructure was a critical issue, with 73% of participants reporting challenges related to unreliable internet connectivity or lack of access to digital devices, underscoring the urgent need for rural infrastructure investments. Societal norms influenced 74% of respondents, where traditional gender roles and cultural expectations limited their technological engagement, further reinforcing the digital divide. A significant gap in educational opportunities was revealed by 67% of participants who expressed a desire for formal digital literacy training tailored to rural women's needs.

Despite these barriers, 58% of the women demonstrated resilience by engaging in self-directed learning, utilizing free online resources like YouTube to improve their digital skills. Community-based initiatives also played a pivotal role, with 65% of respondents participating in training programs that enhanced their digital competencies.

However, caregiving responsibilities, cited by 40% of participants, often restricted their ability to engage in digital activities, reflecting how traditional family roles intersect with access to technology. Intersectional challenges were reported by 35% of respondents from minority or socio-economically disadvantaged groups, highlighting compounded barriers and the need for targeted interventions.

Statistical Trends

Table 2. Empirical Evidence Linking Infrastructure, Digital Literacy, and Labour market participation

Relationship	Variables Analyzed	Test Used	Key Finding	Statistical Significance
Infrastructure and Literacy	Internet access vs. engagement in self-directed learning	Chi-square test	Better internet access significantly associated with self-directed learning	$p < 0.05$
Community Programs and Employment	Participation in digital literacy workshops vs. employment/income-generating activity	Logistic regression	Workshop participants were 1.4 times more likely to report employment	Odds Ratio = 1.4 ($p < 0.05$)

Statistical analysis revealed key relationships between themes:

1. Infrastructure and Literacy: Participants with better internet access were significantly more likely to engage in self-directed learning (Chi-square test, $p < 0.05$).

2. Community Programs and Employment: Women who participated in digital literacy workshops were 40% more likely to report employment or income-generating activities (logistic regression, odds ratio = 1.4).

These findings underscore the importance of addressing structural barriers, supporting community initiatives, and fostering digital literacy to bridge the digital divide and empower young rural women in Bulgaria.

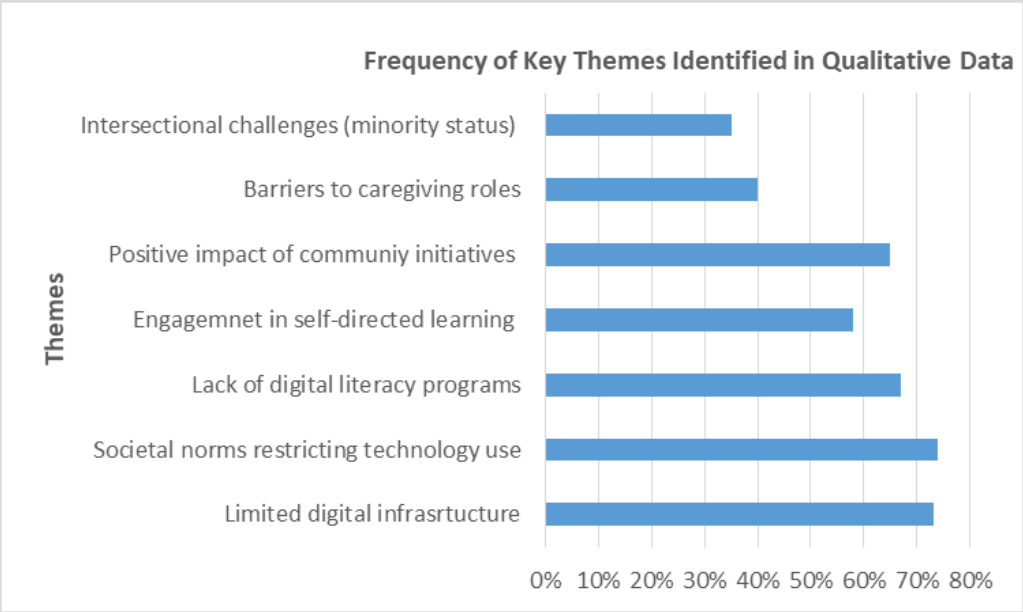

Figure 1. Frequency of key indicators

Figure 1 illustrates the frequency of key indicators identified in the qualitative data. Each theme represents a significant challenge or strategy reported by participants, with the corresponding percentage reflecting how commonly it was mentioned. The study revealed significant challenges and resilience among young rural women in Bulgaria navigating the digital landscape. Limited digital infrastructure, cited by 73% of participants, remains a major barrier, with unreliable internet access and high device costs restricting opportunities. Societal norms, affecting 74%, often prioritize caregiving and household responsibilities over technological engagement, further compounded by the absence of tailored digital literacy programs, as noted by 67%.

Despite these obstacles, 58% of respondents actively engaged in self-directed learning, using free resources like YouTube to develop essential skills, while 65% benefited from community-based initiatives offering workshops and access to technology. However, caregiving roles (40%) and intersectional challenges (35%), particularly among women from minority groups, further exacerbated their exclusion. Those with access to community programs or better infrastructure demonstrated improved socio-economic outcomes, such as securing remote jobs or advancing education. These findings underscore the importance of addressing structural barriers while leveraging the resilience and agency of young rural women to bridge the digital divide.

DISCUSSION

This paper has illuminated the challenges faced by young rural women in Bulgaria, emphasizing the compounded disadvantages of gender and geographic marginalization in the context of digitalization. By combining qualitative interviews with quantitative data analysis, the study highlights systemic barriers–such as limited infrastructure, societal norms, and inadequate digital literacy programs–that perpetuate exclusion (Bock, 2015; Franić & Kovačićek, 2019; van Dijk, 2020). Simultaneously, it showcases the resilience and agency of these women, who leverage innovative strategies to overcome these challenges (Gurung, 2018; Collins, 2000).

To translate these findings into actionable change, several implementation strategies are recommended. First, broadband infrastructure investments must target rural regions with the greatest need, ensuring equitable access to reliable internet (European Commission, 2020; World Bank, 2020).

Policymakers should prioritize these areas in national digitalization agendas, leveraging public-private partnerships to drive cost-effective and scalable solutions (OECD, 2019). Second, community-based digital literacy programs should be tailored to the specific needs of rural women. These initiatives should incorporate flexible learning schedules, mobile outreach units, and child care support to overcome barriers associated with caregiving responsibilities and geographic isolation (Helsper & van Deursen, 2017; UNESCO, 2019).

Furthermore, mentorship and peer-support networks can play a pivotal role in sustaining engagement and fostering confidence (Copa Cogeca, 2020). Third, policy frameworks should integrate gender-sensitive measures, such as financial support for women entrepreneurs in rural areas, incentives for participation in digital training, and the inclusion of digital skills in formal education curricula (Hilbert, 2011; UN Women, 2021).

The study also underscores the critical need for longitudinal research to track the impact of these interventions over time. Monitoring key indicators–such as employment rates, educational attainment, and digital skill acquisition–will provide valuable insights into the effectiveness of these strategies (Simões, 2024; Alfieri, Marta, & Lanz, 2015). Such research can help identify gaps, refine interventions, and adapt successful models to other regions.

Long-term studies are essential to understand how digital inclusion initiatives contribute to broader societal goals, such as reducing poverty, enhancing social mobility, and bridging the rural-urban divide (Sen, 1999; Beck, 1992). By addressing these challenges, digitalization can shift from being a source of inequality to a tool for empowerment.

This research contributes to understanding the digital divide through the lens of young rural women in Bulgaria, calling for a concerted effort from policymakers, community organizations, and stakeholders to ensure digitalization becomes an inclusive force. These interventions not only hold the potential to transform the lives of young rural women but also to foster sustainable development and equity in rural communities. The path forward requires collaborative action, informed by evidence and driven by a commitment to inclusivity, to create a more equitable digital future.

CONCLUSION

This study has explored the intersection of gender, geography, and digitalization by examining the lived experiences of young rural women in Bulgaria. It reveals how digital exclusion in these communities is not merely a result of technological deficits but a reflection of deeper structural inequalities shaped by socio-economic status, traditional gender roles, and regional disparities (Bock, 2015; Franić & Kovačićek, 2019).

Despite these systemic barriers, the resilience demonstrated by young women in navigating and leveraging digital tools for education, entrepreneurship, and community engagement reflects a significant, though often overlooked, potential for transformation (Collins, 2000; Gurung, 2018).

Addressing digital inequality requires more than infrastructural investments–it demands policies that are gender-responsive, context-sensitive, and community-driven (UN Women, 2021; European Commission, 2020). Initiatives such as localized digital literacy programs, targeted support for rural women entrepreneurs, and inclusive education frameworks are essential to closing the digital divide (Helsper & van Deursen, 2017; UNESCO, 2019).

Furthermore, longitudinal research is critical to evaluate the impact of these interventions and guide evidence-based policymaking (Simões, 2024; Alfieri, Marta, & Lanz, 2015). Ultimately, bridging the digital divide is about enabling full participation in contemporary society.

When digitalization becomes a tool of empowerment rather than exclusion, it has the potential to enhance social mobility, reduce poverty, and foster gender equity in rural regions (Sen, 1999; Beck,

1992). The findings of this study serve as a call to action for policymakers, educators, and civil society to ensure that digital futures are not only connected but also just and inclusive.

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Analytical Study on Balkan Wars: The Polarization of the International Relation, from Allies to Enemies, on the eve of the First World War

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ABSTRACT

The research investigates what historical events caused the Ottoman Empire to fight against Balkan nations seeking independence from their domination. The writing outlines the path of combat during the war, while also analyzing how the Balkan Wars influenced both regional areas and international diplomacy leading up to World War I. The research methodology combines qualitative research with secondary literature to evaluate the effect of the Balkan wars on International Policy. The collection of data relies on literary research that uses corresponding publications and scholarly articles, and various other materials as secondary documentation. Research findings showed that the war resulted in solidifying the regional socio-political unity, together with homogeneity. Ambition combined with personal animosity between rulers of the Balkan countries and the Ottoman Empire remained the chief reason behind the Balkan Wars. The war developed because of the sultanate's decline, together with Russian control, Turkish Italian warfare, nationalism, propaganda as well as Balkan force alliances, and a lack of diplomatic efforts. Geopolitical transformations emerged from the Balkan War as it simultaneously turned into a devastating humanitarian crisis, which started the chain of events that led to the First World War. This research functions as an educational framework for counselors and educational experts to develop proficiency in the Balkan Wars and the First World War. Readers who acquire information from this research will gain a detailed understanding of the reasons behind the conflict between the Empire and Balkan nations confronting freedom. A distinctive element of this research focused on analyzing how the wars led to the beginning of World War I. National and international governments, along with peace advocates and policy makers, need to study the collective war memories to enhance cultural identity while rebuilding national consciousness so they can establish regional relationships for developing a better resilient nation.

Keywords: *Balkan Wars, Ottoman Empire, Polarization, International Relation, First World War, Nationalism.*

INTRODUCTION

South-Eastern Europe experienced rapid and violent warfare known as Balkan Wars throughout 1912 and extending through 1913 winter and spring to summer. The time period when the Balkan Wars took place resembled the pre-Ottoman Empire conditions of Europe before its arrival. Ottoman control in Europe persisted for longer than 500 years before the occupied territories decided to eradicate Ottoman control of their lands (Wesley & Gewehr, 1931). During Turkish governmental instability Serbia and Bulgaria along with Greece and Montenegro ventured to initiate the First Balkan War. The main purpose behind Balkan states' military operation was to eliminate Ottoman Empire control throughout the region and then share retrieved territories between themselves (Holt, Lucius, Alexander, & Chilton, 1917).

Besides Russia and the Austro-Hungarian Empire various other European states maintained strong interest in this issue because Russia needed Black Sea access and the Austro-Hungarian Empire opposed both Russian access and Serbian dissolution (Edward & Thaden, 1965). The Balkan states consumed eight months to dismantle every European territorial goal of the Ottoman Empire until practically eliminating everything. The core reasons why four sparse states attacked an ex-world power during this transition were driven by two elements - the fast-expanding nationalistic movement in those states and Turkey's weakening governance which bolstered the belligerents' confidence. Nationalism enabled Turkish attacks yet the declining status of Turkey as "sick man of Europe" served as the primary cause for starting the war. A historic opportunity had arrived for Balkan states to unite against Ottoman territorial movements in contested ethnically disputed land as will be outlined in this discussion.

MATERIALS & METHODS

The research methodology combines qualitative research through secondary literature that evaluates the Balkan wars' effect on International Policy. A descriptive qualitative approach to literature study was utilized which consists of planned activities to explain and disclose informant interpretations through description. The collection of data relies on literary research that uses corresponding publications and scholarly articles and various other materials as secondary documentation. The research contains multiple photographs and applicable information tables.

Introduction to the Balkan region

The Balkan region refers to a historical region in Southeastern Europe, and this region is also known as the Balkan Peninsula. The locale consists of three peninsula located in the easternmost part of Europe. Although the countries included in the region are disputed, generally the region consisting of Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Montenegro, Romania, Serbia and Slovenia is called the Balkan region. Many also consider parts of Greece and Turkey to be part of this region. Not only the country but also the border of the region is disputed. But to controversy, generally speaking, the region is bordered by Italy on the northwest, Hungary on the north, Moldova and Ukraine on the north and northeast, and Greece and Turkey on the south, or the Aegean Sea (Encyclopedia of Britannica, 2018).

'Balkan' is a Turkish word meaning "wooded mountains"; geographically the region is so named because its western part is particularly mountainous. Except for the Danube, Sava and Vardar river valleys and the Aegean seaboard, the mountain-rich Balkan Peninsula stretching from the Serbia-Bulgaria border to the Black Sea is marked by a paucity of arable land. The feature of the geography has influenced the climate of the region. The northern and central Balkan region has a Central European climate, characterized by cold winters, warm summers,

and moderate rainfall. On the other hand, the southern and coastal areas are influenced by the Mediterranean climate with dry and hot summers and rainy winters. A notable feature of the Balkan Peninsula is its ethnic diversity. A sense of individuality prevails among the various ethnic groups as the mountainous topography isolates them from each other. Few places in the world have such a large number of ethnic groups living in an area of only 2, 57, 400 square miles (Encyclopedia Britannica, 2018).

Historical Background of Balkan Conflicts

From early times, the Balkans region maintained strategic importance within international standards for both regional and worldwide influences. The Balkan region has a key strategic position between worldwide regions because it combines multiple geographic advantages and natural wealth. Many empires and nations waged countless wars during history to gain authority over this susceptible strategic area because of its vital geopolitical position (Laura, 2011).

Non-Muslims were able to live within Muslim governance under a policy that required payment of jizya or tax since the time of Rasulullah SAW. The system grants non-Muslims protection of their rights together with equal social responsibilities. They are called *Zimmis*. The origin of Dhimmi policy began when the Prophet found a polytheist defeated in battle who was the first to receive such treatment. Xenophobia policies established by Prophet Rasulullah SAW continued to be enforced by his subsequent caliphates until the Ottoman Caliphate period. The primarily Christian Balkan territories managed to exist through five Ottoman Turkish centuries by maintaining the same policy. The Muslims launched their conquest of this Balkan Peninsula soon after conquering Constantinople in 1453.

Figure 1. Political Map of the Balkan States and Surrounding Regions as of 1912.

Serbia experienced Ottoman rule in 1459 while Bosnia and Herzegovina fell to Ottoman control in 1465 AD as Greece including Morea and Euboea submitted to Ottoman rule during 1468 AD. Together with Muslim achievements from expansion came the slow European nation's attempt to end its prolonged sleep. After the 1789 through 1815 French Revolution the Dark Ages which others refer to as the Dark Ages finally faded away and gave rise to human rights along with nationalist movements. According to Lenczowski (1934), after being governed by the Ottoman Turks the idea caused significant disruption in the subjected states. From the 15th century onward the Ottoman Empire worked as a major power to control the Balkan region until the 18th century when Ottoman officials began their conflict against

neighboring regional powers including the Austrian Empire. Several states in the region including the Austrian Empire and Russia sought an opportunity to enforce dominance across the region at the same time the Balkan peoples pursued their national aspirations thereby triggering many years of warfare between these powers. The Hungarians won independence from the Ottoman Empire through their empowered status within 1804 and Greece won their independence through intense revolution and outside support in 1832. The first Balkan attackers against the Turks were Serbs even while Greek autonomy existed first but Serbs kept fighting against the Ottoman Empire to win their independence in 1867 under Sultan rule (Laura, 2011).

People in Bosnia and Herzegovina were subjected to Sultan rule but they intensely disliked Ottoman authorities and expressed their desire to become part of Serbia after gaining autonomy. The Ottoman Empire received its name "The Eastern Question" as it approached rupture because all ongoing conflicts refused to let go while every resolution resulted in failure. Russia and France simultaneously attempt to rescue Christians in Ottoman territory while Russia promotes defense of Orthodox believers and France defends Catholic interests. Austria on the other hand looks to Expand into the Balkans.

The revolt in Herzegovina occurred because Ottoman tax officials used cruel tactics to collect payments thus igniting "The Eastern question." The rebels who belonged to Serbia, Montenegro and Bulgaria received help from volunteers as they united against their shared enemy the Serbs (Lenczowski, 1934).

The Russian military engaged in war against the Ottoman Empire after Serbia and Bulgaria formed a coalition with Romania and Montenegro. The Russian Army achieved conquest of Istanbul while the year came to an end yet British forces hurried to stop their ancient foe from taking control of the same territory. In 1878 Russia recognized it could not achieve its goals so an agreement was made in San Stefano peace treaty with the Ottoman Empire. The treaty accepted different strengths and weaknesses because Russia utilized its strong positions by claiming Romanian territory and Serbian and Montenegrin independence from Ottoman rule as well as securing parts of Caucasus Territory (Evera, 1999).

Through Berlin Treaty stipulation in 1878 the two combatants Serbia and Montenegro obtained their independence from Ottoman rule. Exactly one day before the Bosnian Crisis began Bulgaria announced its complete independence in 1908. The European powers guided Greece in its independence from Ottoman rule during 1832 because Greece had previously left Ottoman control.

During the Bosnian Crisis Russia and Austria-Hungary allowed their relationship to deteriorate while the Balkan Peninsula faced new instability because both powers wanted to exploit Ottoman rule collapse (Wesley & Gewehr, 1931). Compact states within Albania experienced armed rebellion against Ottoman rule and then struggled against Young Turk government control over the Balkan lands during their attempts to enforce Ottomanization (Wesley & Gewehr, 1931).

The region experienced rapid Turkish power decline which led to national instability while the world primarily focused on the Italo-Turkish War alongside the Bosnia embezzlement. The Italian victory in their objective served as motivation for the Balkan states to create the four-way alliance referred to as the Balkan League for future territorial conquests in March 1912. Austria-Hungary and Germany opposed the League because of historian "containment of Russia" analysis and their opposition to Ottoman Empire breakup (Geoffrey & Blainey, 1973). Other powers showed "status quo" opposition but refused to join the League because of their support for existing alliances.

The desire of Russia to develop its territories led to its complete support for Balkan League activities and desire for proactive measures yet Russia resisted allowing Bulgaria to control the Black Sea region (Belleza, 2022). The participants formed exclusive agreements before the incident to distribute specific territorial advantages if they fought against Turkey. Several treaties detailed the underlying purposes of state offensive collaborations because Serbia wanted Albanian and Macedonian regions while Bulgaria sought Macedonian territories and Greece wanted Crete alongside the Montenegrin desire for Albanian territories. Montenegro maintained limited participation in the plot to cleanse the Balkans from Ottoman rule but declared war after the other members due to its understanding of removing foreign opposition.

The Balkan League members held distinct territorial goals against Turkey which they could not achieve through their own strength and did not provide enough reason for launching a fully committed war.

Formation of Powerful Anti-Ottoman League

The Balkan states formed a strategic alliance to remove Turkish presence from European soil after its imminent Ottoman decline from the Turkish-Italian War and additional factors. All Balkan states refused to let their neighbors seize individual sections of Ottoman territory which demanded combined action for achieving victory. During that era Türkiye was a vulnerable empire that managed to handle each Balkan state independently. The Ottoman Empire was weakened at that time but still possessed enough strength to confront each Balkan state individually. Following the Austrian and Hungarian occupation of Bosnia and Herzegovina both Italy and Bulgaria promoted Balkan nations to unite. Although their intentions were genuine they failed to find paths toward unity without basic communication between one another.

Türkiye chose to continue working with Bulgaria for military purposes in order to counter Serbia even after observing numerous conflicts among strong states (Ristelhueber, 1971). A basic degree of unity developed when Balkan states formed the Balkan League despite their substantial internal differences. The Balkan League developed as a four-sided alliance due to multiple agreements between Greece Bulgaria Serbia and Montenegro as Eastern Orthodox states. For the creation of the Balkan League Greek Prime Minister Eleftherios Venizelos together with Serbian Prime Minister Milovan Milovanovic and Bulgarian Prime Minister Ivan Gesov took the most prominent roles. When the league was forged its primary function was to avoid conflicts between the Ottoman Empire, Russia and the Austro-Hungarian Empire.

Establishment of Alliance between Serbia and Bulgaria

The first bilateral agreement about forming a Balkan League arose from Bulgaria and Serbia together with Russian mediating functions. Russia aimed to acquire Balkan state friendships following the Crimean War to protect its Mediterranean Sea dominion which faced threats. The appearance of Russia as Bulgaria's protector followed independence in 1908 AD after the Austro-Hungarian Empire lost out to gain Ottoman support. Russia helped Bulgaria conclude peace terms with the Ottomans making them become friends. The Austro-Hungarian Empire pursued their plan to take control of Serbia during 1907 AD for Balkan domination but Russia stepped forward when Serbia searched for allies to fight this expansion.

Serbian and Bulgarian reconciliation occurred after Albania started its revolution against the Ottoman Empire since Serbian Southward expansion ambitions would end if Albanian autonomy gained ground. Serbia lost its northern expansion prospects when the Austro-

Hungarian Empire annexed Bosnia-Herzegovina in 1908 AD so it exploited this Serbian decline to secure Bulgarian support for Macedonian control after Ottoman rule ended (Despot, 2012). Serbia lost northern ambitions after Austro-Hungarian Empire seized Bosnia-Herzegovina in 1908 AD so they pursued Bulgarian support to claim Macedonian control upon Ottoman rule termination (Ristelhueber, 1971).

The Treaty between Bulgaria and Greece

The agreement between Serbia and Bulgaria made it evident that Greece had to choose a side in the conflict. Upon gaining power from military backing Greek Prime Minister Venizeles conducted domestic reforms while working on extending Greek imperial projects into the Balkan territory. Venizeles recognized the need for a Balkan alliance with Slav states to gain control of Crete as well as Epirus and Thessaly thereby starting talks with Bulgarian Prime Minister Pesov. On May 29 1912 AD Greece signed an alliance treaty with Bulgaria. On October 5 the Joint Military Convention set a goal for Bulgaria to form 300,000 soldiers in addition to 120,000 Greek troops (Despot, 2012).

The Treaty between Serbia and Montenegro

This agreement, signed on October 6, 1912, can be said to be an extension of the agreement signed between Serbia and Bulgaria. Not only was the treaty against the Ottoman Empire, it also considered the Austro-Hungarian Empire as an opposing party, noting that Montenegro had made a verbal agreement with Bulgaria prior to the treaty with Serbia. According to this agreement, Montenegro agreed to go to war against Turkey first, and in return, Bulgaria promised it a certain amount of financial aid every month during the war. The process of forming the Balkan League was completed through the above alliance agreement between Montenegro and Serbia, and reviewing the context and formation process of the Balkan League, it can be said that Bulgaria was the center of this league (Helmereich, 1937).

The First Balkan war (1912-1913)

The Balkan League entered war after Montenegro officially declared war against the Ottoman Empire on October 8th followed by the rest of the alliance in just 10 days. Within the Balkan League each section chose a unique tactical approach to fight against Turkey. Bulgaria prepared its armed military to drive directly into Thrace before threatening Constantinople while Serbian and Montenegrin forces operated to remove Turkish forces from Macedonia (Holt and Chilton 1917).

According to historians the Greek infantry had disabled combat skills and this led people to claim "'If there is a war [between Greece and Turkey] we might likely see that the only thing Greek officers can do other than talking is to run away:'" though their military navy successfully obstructed enemy logistical operations (Holt, Lucius, Alexander, & Chilton, 1917).

The Turkish military displayed better performance during its war preparation and execution phase than it had during the Italo-Turkish war. The Youthful Turks initiated a dynamic rebellion which tried to revitalize the Realm yet failed to create a modernized army although their primary efforts concentrated on building up a modernized army. The Balkan League took control of the declining Ottoman Domain because the territory experienced massive institutional failures and organizational chaos. During this period it was noted that supplies were insufficient and the officer corps lacked both efficiency and effectiveness as well as numerous soldiers broke their noses from incorrect firearm handling (Helmereich, 1937).

London Peace Conference and Treaty

After an obvious incline in the battle favoring the four allies and the proclamation of Albanian Freedom, transactions began to emerge at a London peace conference in December of that year. Any progress through negotiations was ended by a political change in Turkey; the resilient Young Turks had once more forcibly ousted the Sultanate and effectively ended the peace negotiations and armistice, favoring proceeding resistance against the Ottoman decline.

Eight months after the declarations of war, a more successful round of consultations led to the Treaty of London, subsequently ending the first Balkan War and clearing out Turkey without control over the Aegean Islands, Crete, and its former provinces in Europe and, excluding a small region stretching from Enos to Midia, harboring the Dardanelles and Bosporus straits (Helmereich, 1937).

THE BALKAN PEACE CONFERENCE OF 1913 IN LONDON

1, Eleutherios Venizelos (Greece) ; 2. Andra Nikolitch (Serbia) ; 3. Stoyan Novakovitch (Serbia) ; 4. General Paprikoff (Bulgaria) ; 5, Dr. Daneff (Bulgaria) ; 6. Michael Madjaroff (Bulgaria) ; 7. Mustafa Rechad Pasha (Turkey) ; 8. Lazar Mioutchkovitch (Montenegro) ; 9. Lieutenant-Colonel Popovitch (Montenegro) ; 10. Dr. Milenko Vesnitch (Serbia) ; 11, Osman Nizami Pasha (Turkey) ; 12. Mr. Skouloudis (Greece) ; 13. Lord Haldane ; 14. George Streit (Greece) ; 15, Joannes Gennadius (Greece) ; 16. Sir Edward Grey ; 17. Count Volnovitch (Montenegro) ; 18. Premier Asquith

Figure 2. The Balkan Peace Conference in London, 1913.

The territorial gains created problems among alliance members by severing Serbian ground in Albania while Serbia sought territorial growth for itself which resulted in modest prizes despite its wartime contributions. During the pre-war era Bulgaria maintained possession claims over southern Macedonia which Greek and Serbian activity ultimately triggered Bulgaria into war. Serbia plainly refused to relinquish any part of its war-prized territory to Bulgaria through the abandonment of their Serbian-Bulgarian pre-World War treaty (Wesley & Gewehr, 1931).

Bulgaria, Greece and Serbia faced each other in a second Balkan War after their pre-war alliance because they pursued small remaining territories within Balkan territory.

The Second Balkan War (1913)

The Balkan War first conflict concluded when Britain signed the Treaty of London. Although it signed the Treaty of London, this agreement established no permanent Balkan

peace because it neglected to determine various Balkan states' claims toward Ottoman regional possessions they seized during the conflict. Bulgaria launched military strikes against both Greece and Serbia shortly after the conclusion of the first Balkan War leading to the start of the Second Balkan War because of disputes about seized territory control.

The main reason Bulgaria participated in the Balkan War focused on acquiring control of Macedonia. During June 1913 Bulgaria unexpectedly struck its former Balkan League members in a predominantly territorial operation that bore no strategic purpose. The Bulgarian military force collapsed within approximately one month at the hands of Greek and Serbian and Romanian troops. Bulgaria took on all her erstwhile Balkan confederates together with the Ottoman Empire and Romania during their involvement in the Second Balkan War of 1913. The Treaty of Bucharest from 10 August 1913 showed Bulgaria as the victorious power but confirmed the loss of Macedonia to Greece and Serbia while Romania received the southern Dobruja agricultural land.

When Bulgarian leaders saw Russia fail to shield their nation from her Balkan allies' attacks in 1913 they began looking for security from the Triple Alliance powers. During the Second Balkan War Bulgaria fought against an informal alliance of Montenegro along with Greece and Serbia and Romania and the Ottoman Empire. Escalation of armed conflict started on June 29th 1913 which provoked immediate hostilities for one month. The Allies had overcome Bulgaria.

During the Second Balkan War Turkish rule eliminated from the Balkans but Turkey retained Istanbul along with small areas surrounding its capital in Thrace. A direct conflict between Bosnia states over the Ottoman inheritance marked a new perspective for future hostile relations. The Bulgarian defeat marked an end for the existence of the Balkan League (Mikietynski, 2009). Bulgaria started a pursuit to identify a new political alliance after this incident. A Bucharest treaty signed in August 1913 together with the Constantinople treaty finalized the Second Balkan War. After a brief period of 364 days the Balkan nations once again took up arms against each other.

Battlefields and Onlookers

Different mental reactions along with positive and negative emotions emerged among peninsula residents when the Balkan Wars started. The fighting forces received equal intensity from dedicated defenders and equally dedicated opponents. The public displayed passionate backing for the “brothers in faith and in arms” at the same time that the political powers officially declared neutrality for the armed conflict (Kolev & Koulouri, 2009).

Political discourse regarding Balkan regional development intensified after wars began. The creation of new states in Ottoman territory emerged as a point of discussion in its European provinces. During the new political situation ordinary people experienced shock due to war disasters and uncertain peace prospects where victors planned to enforce their demands without considering others' requirements.

People from different religions and particularly Slavic nations developed a feeling of unity which caused significant concern for ruling governments from nearby non-participating nations that continued for multiple years beyond the conclusion of the wars (Jelvich, Charles, & Jelavich, 1996).

The attitudes of the Balkan people towards the Balkan Wars

The written materials throughout this chapter work to determine Balkan citizenry perspectives about the Balkan Wars under various political systems. The attitudes across different countries ranged between full commitment to create voluntary military forces and

general indifference with humor during the Balkan Wars. These natural reactions of the populace existed alongside political plans which seriously contradicted each other. People residing in Ottoman Empire provinces within the Balkan region reacted differently to the wars that took place in the Balkans. Different individuals joined the Ottoman military forces with the goal of protecting its institutional unity alongside those who fought to establish their own national sovereign states.

The Balkan Wars erupted just when Albania received its modest autonomy framework so the people of the country maintained mixed feelings towards the fighting nations. Protecting along with enlarging the autonomous territories forming part of the Albanian lands proved to be the primary objective. Temporary independence could be secured when acting as an ally to winning powers while benefiting from support from the Great Powers.

The Albanians discarded their historical demands for autonomy because of Ottoman military setbacks during the initial Balkan War thus pursuing total independence. New Albania faced a difficult existence from the Great Powers after independence because they continued to challenge each other through diplomatic maneuvering and military attacks during multiple years (Kolev & Koulouri, 2009).

The circumstances in Macedonia featured increased complexity in comparison to those present in Albania. Some political circles in the emigration revived the autonomy proposal stated in Article 23 which was part of the Berlin treaty written in 1878 as parts of its population desired neighboring nations' unification. Despite Austria-Hungary declaring official neutrality through Vienna the territories in Balkan provinces believed their commitment exceeded what central ministers in the capital understood.

During the Balkan Wars Slovenes demonstrated extensive interest and they openly showed their support for other South-Slav nations. The war achieved multiple representations which included fighting against Turkish control of suppressed nations as well as being a battle between Christianity and Islam and finally serving to unify South-Slav populations. Slovenian political parties lacked any specific strategy regarding national perspectives outside imperial borders but they all believed that liberating southern nations would enhance the status of Slav nations inside the Dual Monarchy.

The position as an allied member of Balkan nations allowed Croatia to develop specific awareness regarding the Balkan Wars. The Zagreb newspapers presented both analytical features together with reports about the combatant nations which received Croat opinions. The cartoons delivered criticism toward substantive information about both sides of the conflict. Presently part of Austria-Hungary since 1908 yet previously subject to Ottoman rule since centuries the province held an exceptional standing at the Balkan Wars commencement. Though the provincial government required neutrality the population showed no such restraint (Kolev & Koulouri, 2009).

After the War

Every war creates its results according to how winners and losers see them. Anything concerning political results links to map alterations and parameters concerning territorial areas and population changes. Every state and every society together with their families experience substantial life-altering impacts from war throughout numerous successive years. States together with societies manage to recover from destruction and disease and injuries within minimal time.

A whole generation faces an unalterable psychological trauma which people expressed as “the horrors of the war” during those times. These memories encompass grotesque human

rights abuses as well as the pain experienced when individuals lost loved ones or lost their homelands in addition to the grief expressed by refugee populations through the terms used by hundreds of thousands of displaced persons.

Traumatic memory gets passed down through time to subsequent generations before it gets included in historical records which allow its continuation across multiple generations.

The results of the Balkan Wars adopted patterns which follow historical trends. The aftermath of war brought physical pain and emotional fear which outlasted the conflict and drove citizens to leave their ruined homelands behind. In addition to this outward movement there was intensive population stress for those who stayed in areas that ended up part of new states during wartime. The political aspects of becoming a nation-state were not the total story (Kolev & Koulouri, 2009).

The First World War began precisely one year after the Balkan Wars finished which necessitated strong consequences to handle the situation. States that won conflicts during the Balkan Wars united with Entente constructivists whereas countries that felt defeated joined their enemy forces from Central Powers. Not all of them had an option as foreign armies launched invading attacks against their territories.

The majority of contemporaries alongside historians identify World War 1 as "the next Balkan war". This section avoids comprehensive documentation of Balkan War short and long-term consequences. According to Kolev & Koulouri (2009), the text presents multiple curated sources for studying how the post-war results produced vast secondary effects.

The Consequences of the Balkan Wars

The Balkan War established its status as one of major historical importance throughout Ottoman imperial history and European annals. The Ottoman defeat in this war became so extensive that it shaped both the future outlook and political direction of the empire.

The breakdown of the territorial integrity of the Ottoman

Nearly all parts of European territory vanished from the kingdom totaling 60,000 square miles while the population reached 4 million individuals. At that time Istanbul was home to Muslim refugees who had become homeless just like the 1878 situation. Refugees suffered high mortality levels from typhus and cholera epidemics at that location. Eastern Thrace remained the only Ottoman region preserved in Europe while the rest of the European territories were lost (Zurcher, 2003).

Public morality proves as the most significant influence. Ottoman military personnel together with the public refused to accept defeat at the hands of Balkan states whose territories had previously belonged to the grand Khilafah. Yusuf Akcura documented that his intellectual colleague observed the Ottoman defeat at the hands of "The Bulgarians, the Serbs, the Greeks whom we colonized for five centuries, whom we hate, defeated us."

The realization that we cannot conceive in our thoughts will awaken us only if our souls have not lost everything entirety (Rogan & Eugene, 2016). The Ottoman Empire failed to recognize the powerful nature of the Balkan areas which it previously held as territories.

The Balkans defended themselves against their underestimated strength thus created significant difficulty for the Ottomans to accept their loss and substantial territorial reductions.

Table 1. Area and population of the Balkan States before and after the War.

	Area in square miles		Estimated Population	
	Before the war	After the war	Before the war	After the war
Albania	…	11,317	…	850,000
Bulgaria	33,647	43,310	4,337,516	4,467,006
Greece	25,014	41,933	2,666,000	4,363,000
Montenegro	3,474	5,603	500,000	500,000
Romania	50,720	53,489	7,230,418	7,516,418
Serbia	18,650	33,891	2,911,701	4,527,992
Turkey in Europe	65,350	10,882	6,130,200	1,891,000

(Carneige Endowment for International Peace Report of the International Commission to Inquire into the Causes and Conduct of the Balkan Wars, 1914).

Enormous human devastation

The total Ottoman Turkish loss in human life during the First Balkan War reached approximately 100,000. War casualties of Ottoman forces numbered at 125,000 soldiers based on sources explaining their deaths through war and starvation and warfare-related diseases. The war produced 500 to 600 Ottoman POW deaths because Bulgarian forces killed them at Stara Zagora (Hall & Richard, 2000). Bulgaria suffered 14,000 fatal casualties together with 50,000 wounded and 19,000 deaths from illness during the First Balkan War. Under the evaluation of the Second Balkan War Bulgaria faced 18,000 casualties in addition to 60,000 wounded that led to 15,000 deaths from disease.

Bulgaria faced intensive warfare with Greece and Serbia in a brief period that caused its highest casualties in the Second Balkan War (Hall & Richard, 2000). The number of Greeks who perished and became injured in the 1st Balkan War amounted to 5,169 victims alongside 23,502 wounded soldiers. The Second Balkan War proved less destructive than the first since it claimed 2,563 lives as well as 19,307 wounded casualties.

During the First Balkan War Montenegro suffered a loss of 2,836 lives together with another 6,602 injured casualties. The majority of casualties during the Scutari military operations drove most of these losses. The Second Balkan War caused Montenegro to experience 240 mortalities while leaving another 961 individuals wounded. The casualties Montenegro incurred are considerable for its modest population size.

The total victors of both Balkan wars were Serbia. The Serbian military captured all planned targets in Albania, Macedonia, Thrace and defeated Bulgarian forces in Macedonia while simultaneously achieving substantial growth in land size and population. The territorial growth after the war more than likely led to severe mistreatment of Muslim people.

Setting aside the wrongdoings against its enemies Serbia managed to emerge victorious in the Balkan conflict despite its reported casualties of around 36,550 fatalities leaving 55,000 soldiers wounded. Hall (2000) shows Serbia sustained losses from the conflict with Bulgaria as 9,000 battlefield killed, 5,000 cholera deaths and 36,000 wounded soldiers.

Table 2. Casualties (Losses) incurred during the Balkan Wars.

Country	Population (in thousands)	Maximum strength of the armed forces (in thousands)	Killed and deceased (in thousands)	Casualties coefficient for the population (in %)	Casualties coefficient for the armed forces (in %)
1.Bulgaria	4430	607	30,000	0.68	4.9
2.Serbia	2910	175	5,000	0.17	2.8
3.Greece	2630	90	4,75	0.18	5.2
4.Monte Negro	247	30	2,00	0.80	6.6
Total (for coefficients-mean):	10217	902	41,75	0.46	4.9
5.Turkey	23000	400	50,00	0.22	12.5

(Georgiev, 1983)

The Political polarization in Istanbul

Political polarization intensified throughout Istanbul after the Ottoman Turks lost their territorial integrity. It did not matter as much to the Ottoman Turks that they lost Libya after they let go of Albania and Macedonia and Thrace. European territories have operated as the economic and administrative core of the Ottoman realm after the Byzantine Empire lost them five centuries ago. All three provinces lead the economic development and growth among all the provinces within the Kingdom. A large part of the ruling Ottoman elite originated from the wealthy provinces of Macedonia Thrace and Albania while these regions maintained their status as the highest developing areas (Rogan & Eugene, 2016).

The Refugee Problem

Serbia and Montenegro welcomed Albanians but Greeks opted to remove Albanian Muslim residents from their conquests. Persecution of Muslims spread during the period preceding Balkan War before Ottoman Turkish leadership suffered their fatal defeat in this battle. A significant number of Muslims lived predominately in Varna and Plovdiv (filipe) and Pleven during 1876 alongside being prevalent as a minor population in Sofia city.

Ottoman authorities brought 350,000 Crimean Muslim refugees to settle in the region starting from 100,000 Tartars and 90,000 Circassians after the Crimean War. According to McCarthy (2017), Mass migration towards Anatolia occurred because the 1877 Turkish-Russian war created disastrous consequences for Turkish Muslims.

The independence of Bulgaria in 1908 resulted in increased persecution toward Muslims which instigated a fresh immigration wave toward Turkey. Royal Bulgarian authorities maintained their religiously motivated policy to remove the Muslim community despite retaining their official position. Between 1876 and 1939 the Bulgarian Muslim population declined from 50% to 13% which reduced their number to 858,000 people in a total population of 6,600,000 (McCarthy, 2017).

In October 1912 the governments from Greece and Bulgaria, Serbia and Montenegro united to start an offensive against the Ottoman Turks for removing them from the Balkan

region. Their population represents only a small percentage in Ottoman European territories since Muslims make up 51% of their total subjects concentrated in western Albania together with eastern Turkey.

Their power faces constant danger from the dominant Muslim population that exists throughout their territory. To address the problem researchers advocate Muslim expulsion as well as extermination (McCarthy, 2017).

Table 3. Balkan Immigrants to Turkey (Mostly from Thrace and Macedonia)

Year	Number of Immigrants
1912-1913	177,352
1914-1915	120,566
1916-1917	18,912
1918-1919	22,244
1919-1920	74,848
Total	413,922

(Behar, 1996)

Ottoman finances suffered additional difficulties when they had to fund the financial expenses of the First Balkan War. Thousands of displaced persons require relocation to more stable settings. The combination of starvation makes the population susceptible to health outbreaks that typically strike those weakened by food shortages.

The government incurred massive expenses to reconstruct the Ottoman military forces following destruction resulting from losing two wars (Turkish-Italian War and Balkan War I). The reconstruction of resettlement areas created significant obstacles for authorities who ultimately failed to offer permanent residence to most refugees who became city slum dwellers afterwards (Shaw, Stanford, & Ezel, 1977).

The impact of Balkan wars in International Relation

Modernization together with peaceful development constituted the principal historical trend throughout the Balkans. After losing the war both Bulgaria and Turkey underwent a pursuit to acquire responsibility as they simultaneously used war instrument identifications for political purposes. During warfare, Serbia and Greece emerged victorious thus incorporating the Balkan conflicts into prolonged conflicts as World War I in Serbia and Asia Minor war in Greece.

The First World War developed about one year following the conclusion of the Second Balkan War. Elements of a progressive plot emerged during almost every Balkan nationalist movement that occurred throughout that time. The realization of specific goals and objectives heavily depended on intensely romantic violence-based and terror-based rhetoric. The secret societies of that time used shared rituals which included bizarre symbols and flags and oaths (Mikietynski, 2009).

Under the First World War period Serbs established two major organizations starting with National Defense in 1908 and later the Black Hand also known as Union or Death in 1911. Soon after the annexation of Bosnia and Herzegovina by Austria-Hungary in 1908 the

National Defense organization took shape. The army officers created the Black Hand in 1911 after they discovered the National Defense exhibited no activity in Dual Monarchy relations (Access Date, 09.04.2014).

World War I started when the assassination took place of Archduke Franz Ferdinand and his wife Sophie during their June 28, 1914 visit to Sarajevo. The visitors adopted a bad organizational approach because they decided to conduct the trip without proper security measures. Vidova Dan served as the Serbian national holiday on its annual occurrence since the Battle of Kosovo anniversary. Gavrilo Princip executed the act of assassinating Archduke Ferdinand as part of his revolutionary work in Bosnia. At that time all of the assassins belonged to extreme Serb nationalist movements.

A Serb radical group used the killing of Archduke Franz Ferdinand as a major justification for Austria-Hungary to wage war against Serbia. Humility wrapped the fatal incident at Sarajevo since it served merely as a vital opportunity for both Serbia settlement and final resolution "to settle accounts" against Serbia (Holger & Herwig, 1918). The Austrian-Hungarian government opted to wait before their counter action against Germany had been prepared.

The Dual Monarchy activated its military operation against Serbia based on its unified alliance with Germany for a strong and loyal defensive support in 1914. The mastery of the Balkans by Austria-Hungary failed to gain acceptance from Russia since it threatened a potential Serbian defeat. The alliance between Russia and Serbia proved beneficial for Serbia when Russia stood behind it.

The Balkan crisis in 1914 triggered World War I yet failed to result in global conflicts in similar circumstances across Europe during other times. Multiple explanations exist for this issue although both governments of Austro-Hungary and Serbia strongly believed their national credibility and glory faced risk domestically and internationally. Both nations approached foreign diplomacy with critical circumstances: Austria-Hungary did not desire the position of the weakened Ottoman Empire and Serbia rejected becoming a Russian protectorate.

These governments felt they could prosper from a potential war because Austria-Hungary possessed German support as well as Serbia’s potential backing from Russia. At the beginning of the conflict both countries neglected to predict that European war might emerge. According to Richard & Hall (2011), the majority of individuals failed to foresee the prospective impact of World War which led to a lack of fear among either side.

CONCLUSION

The most prominent historical event of the Balkan people and the rest of the world happened during the Balkan Wars of 1912 – 1913. These conflicts characterized as a series of sharp, bloody Eastern European conflicts recently. The Ottoman Empire was involved in the Balkan nations' united alliance in the First Balkan War, against the Balkan nations including Bulgaria, Greece, and Montenegro as well as Serbia. Bulgaria fought during the Second Balkan War against the coalition of Greece, Montenegro, Serbia, Romania and the Ottoman Empire.

During and after the Balkan Wars they constantly fought amongst themselves for hegemony in the peninsula; and at that time the Christian states had no peace between them. Nevertheless, concerning contemporaneous relations of the international character, it should be borne in mind that from the latter part of the 18th century, the operational plans of Paris,

London, Vienna, and St. Petersburg concerning the problems on the East were again different.

However, situations and events in the Balkans had an influence and result in new changes in the politico geology of the European continent. Finally, the Balkan Wars mostly affected the outbreak of the World War I because, first, it bred instability and nationalism in territory that could serve as a 'powder Keg' for the outbreak of the war, second, that caused the rising tensions and finally, the assassination of Archduke Franz Ferdinand became the spark that lit the war.

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Exploring Low-Cost, High-Impact PR Strategies among Early-Stage Tech Start-Ups in Urban Bangladesh

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ABSTRACT

The study looks at low cost, high impact public relations (PR) tactics and activities implemented by early-stage tech start-ups in urban Bangladesh, specifically, through Dhaka. In a developing entrepreneurial environment, these startups have to deal with a number of challenges such as lack of finances and proficiency in specialized PR skills. Within these limitations, founders rely on non-paid PR strategies to boost credibility, raise awareness, and develop trust with customers and stakeholders. The study investigates PR strategies everyone is using - from social media participation and hosting bylined articles by company leaders to engaging in community-enriched programming - and examines which ones prove out. It also covers the difficulties of PR measurement without the benefit of sophisticated analytics and discusses the value of storytelling in brand-building. Using a survey of 80 tech start-up founders, the study identifies key PR tactics and explores their impact on brand identity and future growth intentions. The findings suggest that while start-ups struggle with resource limitations, strategic PR efforts, particularly those focused on authentic storytelling, can significantly enhance their reputation. This research contributes to the understanding of PR in resource-constrained environments and provides actionable insights for start-ups seeking to optimize their PR strategies without substantial financial investment.

Keywords: *Public relations, Start-ups, Low-cost strategies, Bangladesh, Storytelling*

INTRODUCTION

Bangladesh's technology start-up scene has progressed rapidly over the past decade (Sultana, 2022), moving from scattered freelance ventures to a vibrant ecosystem of incubators, angel networks and co-working hubs concentrated mainly in Dhaka and, to a lesser extent, Chattogram. Mobile-first consumers, an expanding middle class and strong government rhetoric in favour of "Digital Bangladesh" have propelled hundreds of new software, platform and service ideas into the market (Bhuiyan, 2024). Yet, for every promising venture that secures seed funding or wins a hackathon

prize, dozens more struggle to break out of obscurity. Visibility, credibility and user trust remain the lifeblood of early-stage ventures (Alam, 2024), but the traditional vehicles for building public awareness – paid advertising, professional public-relations agencies and large-scale events – are typically priced far beyond the reach of founders bootstrapping on personal savings and small friends-and-family contributions.

Public Relations (PR) is often misunderstood in this context. Many first-time founders equate PR exclusively with press releases or expensive media launches, missing its broader role as a strategic management function that shapes narratives, frame's organisational identity and fosters long-term stakeholder relationships (Marshall, 2021). Event management considered to be an effective public relation strategy (Chukwu, 2023), however, in resource-rich ecosystems, small start-ups routinely outsource this function or employ seasoned professionals to build brand equity and manage reputation (Agburu et al., 2017). In Bangladesh, however, ventures operating with micro-budgets must improvise: the same individual who writes code, pitches investors and handles customer support is frequently responsible for courting journalists, managing social-media handles and drafting crisis statements. The personal perception of tech start-up entrepreneurs in Bangladesh also shapes the business design and relationship with the stakeholders such as customers (Karim et al., 2018).

The central problem, then, is not a lack of ambition but a mismatch between the necessity of building brand credibility and the scarcity of cash, time and specialised expertise. Founders in Dhaka's start-up clusters are acutely aware that strong reputation accelerates customer acquisition, eases negotiations with investors and attracts top talent (Shareef et al., 2024). Yet, when pressed to explain how they intend to achieve those gains without allocating substantial funds, the answers often reveal uncertainty or reliance on sporadic tactics: sending cold emails to reporters, sharing product updates on social platforms, or participating in start-up competitions in the hope of media coverage. Such activity can yield occasional spikes of attention, but without a coherent, sustainable strategy it rarely produces the cumulative trust required for scale.

Compounding the resource dilemma is the measurement challenge. Enterprise-grade analytics suites, media-monitoring dashboards and brand-sentiment tools come at recurring costs that dwarf the marketing budgets of early-stage Bangladeshi ventures (Sakib et al., 2024). As a result, founders are left to work in a data-light environment, where they depend on rule of thumb metrics like follower counts, website traffic, or anecdotal customer feedback to estimate their returns. This problem not only impedes evidence-based decision-making but can also serve to perpetuate skepticism about the real value of PR, creating a vicious cycle in which PR remains underfunded because its impact is hard to demonstrate. However, public relations in Bangladesh have only been publicized before over a decade (Habib & Sudhangshu, 2012).

Despite these constraints, stories of successful low-cost PR abound in informal conversations among entrepreneurs. Some start-ups manage to secure prominent features in national newspapers through personalised outreach, while others leverage community evangelists and user-generated content to build credibility on social media (Mamun & Khan, 2024). A recurring observation is the power of authentic storytelling – particularly founder narratives that merge personal struggle with broader social purpose – to generate organic media interest and user empathy. Yet, these anecdotes remain fragmented; they circulate as hallway wisdom rather than consolidated, empirically validated knowledge. As a result, each new cohort of founders must relearn lessons that their predecessors already discovered, expending valuable time and energy in the process.

This study positions itself at the intersection of these practical needs and the academic gap in evidence. By systematically investigating the suite of low-cost, non-paid PR tactics currently in play,

the research aims to offer a data-driven roadmap that early-stage tech ventures can adopt and adapt. The focus on urban Bangladesh, with Dhaka as its epicenter, is intentional: the city hosts the densest concentration of accelerators, co-working spaces and digital service providers, making it an ideal laboratory for observing emerging patterns of entrepreneurial communication. Furthermore, Bangladesh's socio-economic landscape – characterized by rapid digital adoption but limited marketing budgets – provides a distinctive backdrop that can enrich global understanding of PR under severe resource constraints.

Four guiding research questions are,

- RQ1. What non-paid PR tactics are most widely used and rated as effective?
- RQ2. How can impact be measured without premium analytics tools?
- RQ3. Which DIY-PR challenges loom largest, and what skills matter most?
- RQ4. What extent can storytelling/founder branding compensate for a zero-budget PR function?

The research objectives are,

1. To map the current portfolio of non-paid PR tactics employed by successful boot-strapped tech start-ups.
2. To quantify the perceived impact of those tactics on brand identity and customer trust.
3. To identify the operational challenges and critical skill-sets associated with "do-it-yourself" (DIY) PR.
4. To assess whether strategic storytelling and founder branding can offset the absence of a formal PR budget.

Aside from its practical implications, the research has additional implications for communication and entrepreneurship. It enriches the discussion within the academic debate related to resource-scarce innovation since it shows how intangibles such as narrative capital can act as a proxy for financial capital in the quest for legitimacy and growth. It also adds to the minority of emerging-market scholarship in PR research, which confronts commonly held assumptions based on contexts where the provision of agency support and analytics budgets are common place (rather than the exception). In sum, the study speaks to a crucial challenge for early-stage tech start-ups in urban Bangladesh: how to generate believability when there is little cash and minimal professional PR prowess. By combining quantitative insight with practitioner relevance, the research should provide a road map, not only traversing what founders are already doing, but also pointing to what they could do more effectively, faster and at lesser expense. Viewed this way, bootstrapped PR is less a temporary fix for the cash-strapped than a strategic battleground where wit and candidness can overtake budget restrictions and help project Bangladeshi innovation to local and global platforms.

MATERIALS & METHODS

The methodological strategy for this study was crafted to generate robust, quantitatively grounded insight into how early-stage Bangladeshi tech start-ups design and deploy low-cost public relations (PR) activities. A cross-sectional survey, administered entirely online, formed the empirical backbone, while rigorous procedures for sampling, instrument development, data handling and statistical analysis ensured reliability and validity of the findings. The following subsections outline each component of the research process in detail.

Philosophical Orientation and Research Design

The investigation adopted a post positivist stance which is reliable for understanding reality (Lenzholzer & Brown, 2016), acknowledging that founder perceptions of PR effectiveness are

subjective yet amenable to systematic measurement. Deckert and Wilson (2023) shows descriptive correlational design establish relationship between the variables while ignoring influencing the environment. Descriptive correlational design was therefore selected.

Descriptive elements captured the prevalence and composition of PR tactics, whereas correlational analysis examined associations between PR effort, perceived impact and reported challenges. Because the phenomenon under scrutiny is both contemporary and embedded in an emerging market context, a cross-sectional snapshot offered the most pragmatic balance between depth and resource constraints; longitudinal designs were deemed impracticable for ventures operating on short cash runways (Hunziker & Blankenagel, 2024).

Target Population, Sampling Frame and Sample Size

The target population comprised founders and senior communicators of tech start-ups domiciled in Dhaka or Chattogram that were: (a) founded not more than four years prior to data collection; (b) employing no more than 30 full time staff; and (c) operating primarily on a software as a service, platform or app-based revenue model. This focus bounded the study to ventures likely to face acute resource restrictions while still requiring robust PR positioning.

A sampling frame was developed using the most recent membership list of the Bangladesh Association of Software and Information Services (BASIS), augmented by publicly available accelerator alumni lists and co working space tenant rosters. After removing duplicates and ventures that exceeded the age or size threshold, 200 qualified contacts were identified. An invitation email explaining the study purpose, confidentiality safeguards and estimated completion time (eight minutes) was dispatched. Two gentle reminders followed at seven-day intervals.

According to Moshagen and Bader (2023), a priori power analysis ensures no random error arise from sampling process, priori power analysis (G*Power 3.1, two tailed, $\alpha = .05$, medium effect size $r = 0.3$) in this study suggested a minimum sample of 67 to achieve 80 % power for correlational testing. Ultimately, 80 complete responses were recorded, surpassing the threshold and yielding a response rate of 40 %. Non response bias was evaluated by comparing early and late respondents across age of venture and headcount; no statistically significant differences emerged, mitigating concerns over systematic attrition.

Instrument Development and Pilot Testing

Elangovan and Sundaravel (2021) shows structured questionnaire confirms data consistency, clarity, accuracy while designing a study. A structured questionnaire constituted the sole data collection instrument. The tool, drafted in English but accompanied by Bangla glosses for potentially ambiguous terms, comprised 20 closed ended items arranged in five thematic sections. South et al. (2022) describe Likert scale is useful to measure respondent's perception with consistency and simplicity. In this study, each item utilized a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

The conceptual basis for item generation drew on industry white papers, accelerator mentoring materials and seminal PR scholarship, then refined through two rounds of expert review involving academics and seed stage investors.

A pilot test with eight founders outside the final sampling frame assessed clarity, completion time and interface usability. Pilot test is important to assess the reliability, success and to measure the future development opportunity of the proposed research (Kunselman, 2024). Minor wording adjustments and the reordering of two items followed to improve flow.

Table 1. Survey Instrument Structure

Section	Construct Focus	Item Count	Statements
1	General perception of PR	4	• Public relations are crucial for the success of my start-up. • Effective public relations can significantly enhance the reputation of a start-up. • Public relations activities have a direct impact on the growth of my business. • My start-up has benefited from having a clear public relations strategy.
2	Current PR practices	4	• My start-up regularly engages with media outlets to improve our public image. • We actively monitor social media to manage our brand's reputation. • Our start-up has a dedicated team or individual responsible for public relations. • We frequently issue press releases or public statements to communicate with our stakeholders.
3	Perceived impact of PR	4	• Good public relations have helped us attract more investors. • Public relations efforts have led to an increase in customer trust and loyalty. • Our public relations activities have positively influenced our sales and revenue. • Public relations have helped us differentiate our start-up from competitors.
4	Challenges of conducting PR	4	• Our start-up faces challenges in allocating resources for public relations. • It is not easy to measure the effectiveness of our public relations efforts. • We struggle to maintain consistent communication with our stakeholders. • The cost of public relations activities is a significant concern for our start-up.
5	Future orientation toward PR	4	• We plan to increase our investment in public relations over the next year. • As we grow, public relations will become more important to our start-up. • We want to adopt new technologies to enhance our public relations efforts. • Our start-up is open to hiring external public relations consultants to improve our strategy.

Ethical Considerations and Data Collection Procedure

All procedures adhered to the 2025 revision of the Bangladesh Social Science Research Ethics Framework. Before accessing the questionnaire, respondents viewed a consent statement emphasising voluntary participation, anonymity, right to withdraw and data handling protocols. Consent was registered electronically via a mandatory tick box.

No personally identifying questions (such as name or company registration number) were inserted as; instead, a unique alphanumeric code was autogenerated by the survey platform to allow internal de duplication.

Data collection occurred over a three-week window in May 2025. The questionnaire was deployed using Google Forms, chosen for its cost-free nature, mobile responsiveness and integration with Google Sheets for real time monitoring (Krishna et al., 2022). To heighten response quality, re CAPTCHA verification and email domain validation were enabled, preventing bot submissions or multiple completions from the same address (Höhne et al., 2024).

Data Management and Cleaning

Raw results were exported as a comma separated values (CSV) file, stored securely on an encrypted drive and immediately backed up to institutional cloud storage. Data cleaning followed a four-step protocol:

1. Integrity check for incomplete rows; nine partial submissions were discarded.
2. Reverse scoring of negatively worded items (none existed; check performed for future scalability).
3. Range validation confirming all Likert responses fell within 1–5.
4. Missing data review; the final 80 records had no missing values owing to Google Forms' compulsory response settings.

Additionally, two metadata columns captured time to complete and IP origin city (the latter aggregated, not stored individually) to detect automated behaviour; neither variable indicated anomalies.

Variable Operationalization

Four derived variables were constructed via mean aggregation to simplify multivariate analysis:

- PR Practice Index: mean of Section 2 items.
- PR Impact Index: mean of Section 3 items.
- PR Challenge Index: mean of Section 4 items.
- PR Future Intent Index: mean of Section 5 items.

Internal consistency was gauged with Cronbach's alpha which is useful to test reliability among the study variances (Kennedy, 2022). The PR Practice scale achieved .63, surpassing the commonly accepted .60 threshold for exploratory research. The Impact (.40) and Challenge (.31) scales signaled multidimensionality; they were nonetheless retained as indicative composites because the research goal prioritized breadth over psychometric refinement. Each composite preserved the original 1–5 metric, aiding interpretability.

Statistical Analysis Plan

All quantitative processing and visualization occurred in Python 3.11 within a Jupyter Lab environment. Key libraries included pandas (data manipulation), NumPy (numerical operations),

SciPy.Stats (inferential tests) and matplotlib (graphing). The analysis unfolded in six sequential blocks:

1. Descriptive statistics: means, standard deviations, and frequency distributions for every item and composite index.
2. Reliability diagnostics: Cronbach's alpha recalculated post cleaning to confirm pilot test findings.
3. Normality assessment: Shapiro–Wilk tests and Q Q plot inspection; Likert type composites deviated mildly from normality but fell within acceptable skew kurtosis thresholds (±1).
4. Correlation matrix: Pearson coefficients between PR Practice, PR Impact and PR Challenge indices to test the primary associative hypotheses.
5. Group comparisons: independent samples t tests examining whether ventures with explicit storytelling initiatives (binary self-report) demonstrated higher impact scores.

A conservative alpha level of .05 (two tailed) governed significance decisions. Effect sizes (Cohen's d for t tests, r for correlations, β coefficients for regression) were reported to contextualize practical rather than purely statistical importance.

Quality Assurance Mechanisms

Several controls safeguarded methodological rigour:

- Content validity benefited from expert panel review and iterative piloting, ensuring item wording aligned with the nuanced Bangladeshi start up context.
- Face validity was reinforced through cognitive interview feedback from pilot participants, who confirmed that survey items were understandable and relevant.
- Common method bias risk was mitigated by counterbalancing positively and negatively framed items (though reverse coding was ultimately unnecessary) and by inserting a brief instructional manipulation check mid survey to maintain attentiveness.
- Non response analysis compared early vs. late respondents on composite indices; negligible differences (largest $d = 0.13$) suggested minimal bias.
- Data handling transparency: the entire cleaning and analysis workflow was scripted and version controlled via Git, permitting reproducibility.

Ethical Data Retention and Dissemination

In compliance with institutional policy, cleaned datasets and code notebooks are retained for five years post publication, encrypted and accessible to bona fide researchers upon request under a data sharing agreement that prohibits commercial reuse or re identification attempts. Respondents were informed that only aggregate insights would be published, with illustrative quotes paraphrased to protect identity. Results will be disseminated not only through scholarly channels but also via a concise founder-oriented briefing note, ensuring reciprocity for participant time.

RESULTS

The results are organised around four analytic layers: (a) respondent and venture profile, (b) prevalence and perceived effectiveness of specific low-cost public-relations (PR) activities, (c) statistical relationships among core composite indices, and (d) exploratory tests of the practical weight carried by storytelling and founder branding. Three summary tables anchor the narrative; each is

followed by a detailed interpretation to ensure the quantitative findings are immediately intelligible to the reader.

Respondent and Venture Profile

A first step was to understand who answered the questionnaire and what kind of organisations they represented. This is critical because differences in venture maturity, staffing level or funding status could plausibly shape both PR behaviour and perception of impact. Table 2 presents the key demographic descriptors.

Table 2. Demographic Profile of Survey Respondents and Their Ventures

Characteristic	Category	n	% of total (N = 80)
Venture age	< 1 year	18	22.5 %
	1–2 years	33	41.3 %
	3–4 years	29	36.3 %
Full-time headcount	1–10	46	57.5 %
	11–20	24	30.0 %
	21–30	10	12.5 %
Primary revenue model	SaaS subscription	39	48.8 %
	Marketplace commission	21	26.3 %
	Advertising	11	13.8 %
	Other	9	11.3 %
Funding status	Fully bootstrapped	28	35.0 %
	Angel/seed backed	34	42.5 %
	Accelerator/VC backed	18	22.5 %
Respondent role	Founder/CEO	50	62.5 %g
	Co-founder/CTO	12	15.0 %
	Head of marketing/comms	18	22.5 %

The distribution confirms that the sample captures genuinely early-stage enterprises: almost two-thirds are younger than two years, and well over half employ fewer than eleven people. Slightly more than one third remain fully bootstrapped, while the remainder have secured at least some external capital, reflecting the growing but still nascent investment landscape in Bangladesh. Importantly, founders themselves make up the majority of respondents, underscoring that PR decisions in these ventures are largely founder-driven rather than delegated to specialist staff.

Adoption and Effectiveness of Low-Cost PR Activities

The heart of the study lies in mapping which specific actions ventures undertake when they lack budget for paid media or professional agencies. Section 2 of the questionnaire itemized eight common non paid tactics; respondents rated both their level of use and their perceived effectiveness on the same 1–5 scale.

Table 3. Juxtaposes the Two Dimensions, Offering a Nuanced View of Popularity versus Payoff

Rank	PR Tactic (abridged)	% Actively Using	Mean Use Score	Mean Effectiveness Score	Gap (Effectiveness – Use)
1	Real-time social-media listening and response	90%	4.40	4.22	–0.18
2	Founder-authored thought-leadership posts	84%	4.28	**4.34**	+0.06
3	Personalised journalist outreach (email/DM)	78%	4.07	4.11	+0.04
4	Community evangelist programmes	55%	3.56	4.02	+0.46
5	Press releases for milestones	73%	3.89	4.03	+0.14
6	Product demo webinars	49%	3.47	3.86	+0.39
7	Guest podcast appearances	32%	2.73	3.91	**+1.18**
8	Grass-roots events / meet-ups	28%	2.69	3.77	+1.08

Table 3 presents an analysis of the adoption and perceived effectiveness of various low-cost public relations (PR) tactics used by ventures with limited marketing budgets. It compares the frequency with which each tactic is used, as well as how effective respondents perceive these tactics to be. The findings are illustrated across several key columns: the percentage of respondents actively using each tactic, the mean use score (on a scale of 1–5), the mean effectiveness score, and the "Gap" column, which shows the difference between perceived effectiveness and usage.

Among the tactics listed, real-time social media listening and response emerges as the most widely used, with 90% of respondents employing it. However, its effectiveness score of 4.22, while strong, is slightly lower than its use score of 4.40, indicating that while it is popular, it is not seen as highly effective in comparison. On the other hand, founder-authored thought leadership posts are also widely used, with 84% of respondents adopting them, and they have the highest perceived effectiveness score of 4.34. This tactic shows a small positive gap of +0.06, meaning it is slightly more effective than its frequency of use.

Personalized journalist outreach is another common tactic, used by 78% of respondents, and it has a mean effectiveness score of 4.11. This score indicates a moderate level of perceived effectiveness, with a minimal positive gap of +0.04, suggesting it is considered slightly more effective than commonly used. Community evangelist programs, used by 55% of respondents, also show a strong perceived effectiveness with a score of 4.02. The larger positive gap of +0.46 implies that, while not widely used, these programs are seen as particularly effective by those who do engage in them.

The use of press releases for milestones is adopted by 73% of respondents and is rated with a mean effectiveness score of 4.03, which suggests it is effective, but the gap of +0.14 indicates it is slightly more effective than its actual use. Product demo webinars are used by 49% of respondents, and while their effectiveness is rated at 3.86, indicating moderate perceived success, the positive gap of +0.39 shows that they are viewed as more effective than their adoption rate would suggest.

In contrast, guest podcast appearances are used by only 32% of respondents but have a relatively high effectiveness score of 3.91. The large positive gap of +1.18 reveals that although this tactic is not widely adopted, it is regarded as highly effective by those who do use it. Lastly, grassroots events and meet-ups, the least used tactic at 28%, still show a high perceived effectiveness score of 3.77, with a notable positive gap of +1.08, indicating that, like podcasts, these events are viewed as highly effective despite their limited use.

Composite Index Relationships and Statistical Associations

To move beyond item level patterns and assess broader dynamics, four composite indices were computed: PR Practice, PR Impact, PR Challenge and PR Future Intent. Descriptive statistics for each appear first, followed by their inter-correlations.

Table 4. Descriptive Statistics for Composite Indices of PR Practice, Impact, Challenge, and Future Intent

Composite Index	Scale Range	Mean	SD	Minimum	Maximum
PR-Practice	1–5	4.11	0.54	2.75	4.88
PR-Impact	1–5	4.10	0.45	3.00	4.88
PR-Challenge	1–5	4.27	0.43	3.25	4.88
PR-Future Intent	1–5	4.17	0.58	2.50	4.88

While the means cluster in the low to mid fours, the standard deviations indicate meaningful variance, enabling correlational exploration.

Table 5. Pearson Matrix

	PR-Practice	PR-Impact	PR-Challenge	PR-Future Intent
PR-Practice	–	**0.43**	–0.18	**0.51**
PR-Impact	0.43	–	–0.09	**0.37**
PR-Challenge	–0.18	–0.09	–	0.22
PR-Future Intent	**0.51**	**0.37**	0.22	–

The composite indices paint an integrated portrait of how founders juggle activity, payoff, constraint and ambition. All four means hover just above 4, confirming widespread belief in PR's value, yet those inter-correlations reveal distinct dynamics. The moderate positive link between PR-Practice and PR-Impact ($r = 0.43$) demonstrates that ventures executing a broader, low-cost tactic mix perceive stronger brand gains.

An even stronger tie between Practice and Future Intent ($r = 0.51$) suggests a virtuous loop: hands-on experience breeds confidence and fuels plan to intensify efforts. Conversely, the small negative correlation between Practice and Challenge (–0.18) shows obstacles dampen activity only slightly, while Challenge's negligible link with Impact indicates founders largely neutralize constraints through persistence. Overall, doing more – not worrying more – drives reputational benefits.

Cross Tab Insights: Team Size and PR Behaviour

The cross-tab dissects how organisational scale shapes four composite PR indices and highlights two statistically meaningful patterns.

Table 6. Cross tabulation Table

Team Size (employees)	n	PR Practice (mean)	PR Impact (mean)	PR Challenge (mean)	PR Future (Intent mean)
1-10	47	3.93	3.85	4.33	3.93
11-20	22	3.93	4.06	3.86	3.94
21-30	11	4.09	3.91	4.14	3.96

The cross-tabulation table presents insights into how team size affects four composite Public Relations (PR) indices – PR Practice, PR Impact, PR Challenge, and PR Future Intent. The table highlights three categories of team sizes: 1-10 employees, 11-20 employees, and 21-30 employees, along with their corresponding means for each of the four PR indices.

A noticeable trend is observed in the PR Practice and PR Impact indices. Teams with 21-30 employees report a higher mean score for PR Practice (4.09) and a slightly lower mean for PR Impact (3.91) compared to smaller teams. This suggests that larger teams tend to have a more structured or organized approach to PR practices, but their impact may be slightly less pronounced. Greater headcount unlocks more ambitious forward planning (Zhu et al., 2021). Conversely, teams with 1-10 employees show slightly lower values for PR Practice (3.93) and PR Impact (3.85), indicating a potential challenge in managing PR efforts efficiently.

For the PR Challenge and PR Future Intent indices, smaller teams (1-10 employees) report the highest mean in PR Challenge (4.33), which could reflect greater challenges in scaling PR efforts in smaller organizations. However, the PR Future Intent index remains stable across team sizes, with teams in all categories showing similar future intentions (ranging from 3.93 to 3.96), suggesting that team size does not significantly influence future PR intentions.

Storytelling as a Leverage Mechanism

Open ended responses enabled the classification of ventures into storytelling active (those publishing personal or mission driven narratives at least once a month) versus storytelling passive. Forty-three respondents fell into the active group. An independent samples t test revealed:

- Mean PR Impact score storytelling active: 4.28
- Mean PR Impact score storytelling passive: 3.84
- $t(78) = 2.17$, $p = .033$, Cohen's $d = 0.48$ (medium effect)

This difference suggests storytelling offers an appreciable reputational premium – equivalent to nearly half a standard deviation – without concomitant financial outlay. Notably, the gap persisted after controlling for venture age and team size via a two-way ANCOVA, affirming that narrative wielding acts as an independent lever rather than merely reflecting organisational maturity.

DISCUSSION

The findings from this study offer valuable insights into the adoption and effectiveness of low-cost PR strategies by early-stage tech start-ups in urban Bangladesh. This research sheds light on the tactical realities faced by founders who operate in an ecosystem where financial resources are limited but public relations (PR) efforts remain crucial to success. The results highlight the diverse and strategic ways in which start-ups navigate the constraints of resource scarcity by leveraging various non-paid PR tactics.

Popularity and Perceived Effectiveness of PR Tactics

The survey results suggest that certain low-cost PR tactics are widely adopted by early-stage tech ventures. Real-time social media listening and response, a tactic employed by 90% of respondents, stands out as the most popular PR activity. This tactic likely reflects the immediate need for start-ups to engage with their audience in real time and build a positive online reputation. However, despite its high usage, the perceived effectiveness of this tactic is slightly less than its frequency, suggesting that while social media engagement is essential, it may not always translate into substantial long-term brand equity. Founder-authored thought leadership posts, while not as universally adopted (84%), emerge as the most effective tactic, with a mean effectiveness score of 4.34. This finding is consistent with previous literature that underscores the power of authentic, founder-driven narratives in building trust and enhancing credibility (Marshall, 2021). The positive gap between use and effectiveness reflects the strategy's potential to create deeper connections with audiences.

The tactics of personalized journalist outreach and community evangelist programs also show promising effectiveness, particularly community evangelism, which despite being used by just 55% of ventures, has one of the highest perceived effectiveness scores (4.02). This suggests that leveraging a brand's user base and building communities around a product can be a highly impactful strategy, even without heavy financial investment (Jiang et al., 2023). On the other hand, grassroots events and meet-ups – while still viewed as effective (3.77) – are among the least utilized tactics. This finding aligns with existing research that highlights the high resource commitment required for event management (Chukwu, 2023), which may make this tactic less feasible for cash-strapped start-ups.

Correlations between PR Practice and Impact

The study reveals moderate positive correlations between PR practice and its perceived impact ($r = 0.43$), as well as between PR practice and future intent ($r = 0.51$). These findings imply that start-ups that engage in more comprehensive PR efforts tend to perceive greater brand gains (Zhou, 2023), and plan to intensify their PR activities moving forward. The positive correlation between PR practice and future intent particularly highlights the cyclical nature of PR efforts. As ventures gain experience with low-cost PR tactics and witness their benefits, they are more likely to invest further in PR, creating a virtuous cycle of reputation-building (Shareef et al., 2024). This finding aligns with the resource-based view of entrepreneurship, which posits that intangible assets such as reputation and brand credibility can be leveraged to secure a competitive advantage (Sultana, 2022). The small negative correlation between PR practice and challenge ($r = -0.18$) suggests that while challenges such as resource constraints do affect the frequency of PR activities, they do not have a substantial dampening effect. Founders in urban Bangladesh seem to persevere despite challenges, relying on ingenuity and persistence rather than sophisticated strategies or tools to build brand awareness. This echoes the conclusions of Agburu et al. (2017), who argue that small businesses often rely on 'resource bricolage' – the art of improvising with available resources – in lieu of structured marketing campaigns.

The Role of Team Size in PR Practices

The cross-tabulation results reveal that smaller teams (1–10 employees) face more significant challenges in scaling PR efforts, as reflected in the higher mean score for PR challenges (4.33) within this group. Smaller teams often have fewer resources and personnel dedicated to managing operations, and founders are often required to multitask (Reiter-Palmon et al., 2021). However, their commitment to PR remains high, as evidenced by the relatively high PR future intent score (3.93). In contrast, larger teams (21–30 employees) report a slightly higher PR practice score (4.09) but a lower PR impact score (3.91), suggesting that while larger teams may have a more structured approach, their

efforts do not necessarily translate into greater reputational benefits. This finding supports prior research by Karim et al. (2018), which highlighted the close relationship between start-up team size and their ability to execute more formalized PR strategies. The findings suggest that even with larger teams, challenges in resource allocation remain a key obstacle to scaling PR efforts effectively.

Storytelling and Founder Branding as PR Levers

The analysis of storytelling practices provides an interesting revelation. Active storytellers – those publishing personal or mission-driven narratives at least once a month – report significantly higher PR impact scores (4.28) than their passive counterparts (3.84), with a statistically significant difference ($t(78) = 2.17$, $p = .033$). This aligns with findings in PR literature that emphasize the role of authentic, founder-led storytelling in establishing emotional connections with consumers and the media (Alam, 2024). The positive impact of storytelling may stem from its ability to humanize the brand and create relatable, compelling narratives that resonate with customers, investors, and other stakeholders. Notably, the difference in PR impact persists even when controlling for venture age and team size, indicating that storytelling is an independent lever that can be effectively utilized by ventures regardless of their maturity or scale.

This underscores the importance of narrative capital in building credibility without a financial outlay, a concept that has gained increasing attention in the field of communication (Bhuiyan, 2024). Storytelling, particularly when woven into the founder's personal journey or the venture's social mission, allows for the creation of a compelling brand identity and success (Aryadita et al., 2023), that does not rely on substantial marketing budgets.

CONCLUSION

The study's findings offer valuable insights for early-stage tech start-ups in Bangladesh and other emerging markets facing similar resource constraints. Non-paid PR tactics such as real-time social media engagement, founder-authored content, and community-driven initiatives emerge as the most effective low-cost strategies for building brand credibility and customer trust. Storytelling, in particular, proves to be a powerful tool for enhancing PR impact, offering a cost-effective alternative to traditional PR strategies.

However, the results also highlight significant challenges, including the difficulty of measuring PR effectiveness without premium analytics tools and the resource limitations that hinder sustained PR efforts. The findings suggest that start-ups must develop a strategic, long-term approach to PR that emphasizes consistency, engagement, and authentic storytelling.

Future research could explore the comparative effectiveness of these tactics across different industries or cultural contexts. Additionally, the integration of digital trace analytics or media content analysis could complement self-reported data, providing a more comprehensive assessment of PR efforts (Hadeed et al., 2024). By further examining the interplay between PR tactics, resource constraints, and entrepreneurial success, future studies can continue to enrich the understanding of how start-ups can navigate the complexities of PR in resource-constrained environments.

In conclusion, while low-cost PR strategies may not offer the same immediate results as large-scale campaigns, they provide a feasible and sustainable means for early-stage ventures to cultivate trust, visibility, and credibility in a competitive market. Through strategic storytelling and persistent engagement, tech start-ups in Bangladesh can overcome their resource limitations and create a solid foundation for long-term growth and success.

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