

Northern Cyprus Economy Competitiveness Report

2018 - 2019

Prof. Dr. Hasan Amca
Dr. Yenal Süreç
Aytaç Çerkez



Kıbrıs Türk Ticaret Odası
Turkish Cypriot Chamber of Commerce

Turkish Cypriot Chamber of Commerce
Address: 90, Bedrettin Demirel Caddesi, Lefkoşa
Northern Cyprus
Tel.: 0392 228 37 60 Fax: 0392 228 30 89
email: ktto@ktto.net

Table of Contents

Table of Contents	3	Digitalization in Businesses in the Light of Industry 4.0 ...24	
Preface	4	Introduction.....	24
Executive Summary	6	From Industry 1.0 to Industry 4.0- A Digital Revolution	25
Economic Profile	8	Success Story Analysis in Digitalization Process	28
I. Introduction	12	Digitalization of Businesses in North Cyprus Survey Results	33
Global Developments in the Shadow of Trade Wars	12	Conclusion and Policy Recommendations	37
North Cyprus Economy Under Currency Devaluation and Inflation Spiral.....	13	References	40
A New Method in the 40th Year of the Global Competitiveness Index.....	13		
II. Competitiveness of North Cyprus	16	V. Annexes	41
Novelties of the New Method.....	16	I. Macroeconomic Indicators	41
Global and Regional Competitiveness Performances	19	II. Technical Notes and Sources for Competitiveness Report Hard Data	42
Competitiveness Performance of Northern Cyprus in 12 Pillars	20	III. How to Read the Economy Profiles	44

Preface

Dear Reader,

Turkish Cypriot Chamber of Commerce has pleasure to share with you the eleventh edition of the Competitiveness Report this year.

Today, the most important concept emerging in the global economy is the intensive competition. In contrast to the closure in the traditional economy, developments such as; the elimination of barriers to foreign trade, emergence of new markets, development of economic relations between countries through information and communication has increased globally. Thus, the competition gained importance in the economy. In a country with a competitive economy, businesses will have a greater price in the market and increase their quality, effective utilization of resources and the opportunities empower to drop the prices of competing goods will be ensured.

The Global Competitiveness Report, prepared by the World Economic Forum, has been transformed into fundamental methodologies this year. The Competitiveness Report of our Chamber has developed the eleventh Northern Cyprus Competitiveness Report taking into consideration these changes. In the content of the Report, the average weight obtained from the Executive Opinion Survey results decreased compared to the previous year, while the weight of published economic and social indicators has increased.

The foreign exchange crisis resulting from the global developments as well as the political developments in Turkey in August 2018 has deeply influenced the TRNC economy, and It has once again demonstrated the fragility of the TRNC economy. In This context, the need for resources and equipment to alleviates the impact of the crisis is evident. In order to prepare our economic structure to be stronger against external shocks, we must prepare for strong structural

reforms which needs to be implemented immediately to support real economy, our people in doing business, to invest and to increase employment measures without any delay.

Now days, Industry 4.0, which brings together information technologies and industry activities, 4th Industrial Revolution is being discussed. The Whole World focuses on the use of cyber-physical systems in the machines in the production process and the ' smart facilities ' which can produce production by coordinating and optimizing themselves virtually independently of people, and this system Road maps to integrate into their economies.

In our Competitiveness Report, this year, the theme of "Digitalization in Enterprises in Light of Industry 4.0" was processed. Technology has more space in our lives day by day, and especially in the last period, the concept of the Industry 4.0 has been more prominent and in this year's, theme has created a reason for this topic. The rapid technological developments in the World are more closely related to each one of us as individuals but especially business people. This Year's theme aims to contribute to the discussion of both the Industry 4.0 concept and the knowledge of business people and society, as well as to analyze the stages of digitalization that will be experienced in this process.

This year's report was conducted and write out by Eastern Mediterranean University Academicians; Prof. Dr. Hasan Amca, Dr. Yenal Süreç and Aytaç Çerkez. I would like to extend my appreciations to them and to everyone who has contributed.

The Turkish Cypriot Chamber of Commerce will continue to develop projects and policy proposals to contribute to the TRNC economy.

Yours truly,

Turgay Deniz,
President of the Cyprus Turkish Chamber of Commerce

Executive Summary

Following the financial crisis in 2008, global economies are still unable to achieve the desired level of growth. Besides the crisis, recently we have also been witnessing trade wars launched by the USA against mainly China and many other countries. It is obvious that the economic effects of the tension between the world's two largest economies and exporters will not be limited to them only. It is likely that any country that has commercial and economic relations with these countries will be affected by the tension. It is certain that this war, on protectionism, will have a negative impact on economic indicators. But worse is the fact that the liberalisation process is being threatened by its greatest advocate to date. On the other hand, the Brexit process is also likely to threaten the wealth and cooperation project that the European Union is. This may also be considered as a global threat.

In light of all these global developments, the Northern Cyprus economy, even though it is not a global player, is struggling with different economic crises at its own scale. The devaluation of 2018 arising from the use of Turkish Lira, and the resulting high inflation continue to affect the daily life. Besides, the shrinking domestic demand due to inflation and the shrinking foreign demand in Turkey mainly in the tourism and higher education sectors due to recession, are expected to have a negative impact on economic growth. In addition to all these negative developments, a delay in annual funds from the Republic of Turkey to the TRNC used in the financing of certain investment projects, has led to a halt in many public investment projects. Moreover, structural problems in areas such as agriculture, health, social security, and local administrations, are worsening. These problems, unless radical solutions are found, will continue to adversely affect both economic growth and the country's competitiveness.

Renewed Methodology and the Competitiveness of North Cyprus

The World Economic Forum has renewed its Global Competitiveness study, which was launched 40 years ago, and introduced some changes to the methodology and content. This change is related to the changing lifestyles and business methods as a result of technological developments. A new structure has been formed due to the fact that some variables included in the old methodology have a lesser effect on competitiveness in today's conditions, and that new, more

effective variables have emerged. New concepts such as flexibility, agility and innovation have been introduced within the framework of the concept of 'future readiness.' Many new variables have been introduced to index calculations, while some previously used variables have been eliminated. Previously 114 different variables were being used however the number of variables was reduced to 98 this year. While two-thirds of the 114 variables were obtained from surveys with business people in the past years, only one third of the 98 variables now are obtained through surveys. The changes were not limited to content. The competitiveness scores for example, are now calculated over 100 points as opposed to 7 in the past years. Variables are now grouped under 12 categories according to their subject. The names of some sections changed, while the variables under many sections also changed.

With the change in content the scoring method also changed. In the past, countries were categorised according to their stages of development and would get weighted scores in every section according to their stage of development. This year, equal weight was given to all sections and variables within the sections. The scores of every country were calculated on equal weights. This has been to the advantage of many countries whose scores and ranking increased. On the other hand, some countries were affected by the changes negatively and their scores and ranking decreased. With the new methodology, North Cyprus scored 55.21 out of 100 and it ranked 89th among 140 countries. Although its score is not too different compared with previous years, its ranking improved due to the changed content of certain sections. While the decline in problematic areas such as Infrastructure, Labour Markets and Macroeconomic Stability continued, North Cyprus ranked higher in newly amended sections such as Product Markets, Finance Markets, and Adaptation to Information and Information Technologies.

Digitalization in Businesses in the Light of Industry 4.0

The consumption patterns and business models are changing with technological advancements and forcing businesses to adapt rapidly to technological changes. As the cultures of production and consumption change drastically, the employee needs of businesses are also changing. Therefore,

some professions are gradually disappearing, while new professions, which can be called 'professions of the future' are emerging. For all these reasons, the theme of this year's report is selected as Digitization in Business in Light of Industry 4.0. The fact that the World Economic Forum has named it renewed index as Global Competitiveness 4.0, shows that Industry 4.0 will be one of the most discussed and contemplated concepts in the upcoming period.

Industry 4.0, in other words, the fourth Industrial Revolution, is a collective term that includes many modern automation systems, data exchanges and production technologies. It is expected to lead to the rise of more efficient business models by enabling the collection, monitoring and analysis of each data in the production process. Therefore, the digitalization of enterprises becomes of utmost important in this process. However, it is not possible for the digital transformation to take place on an individual basis or by an individual enterprise. It is necessary to create the infrastructure and to determine and implement the necessary legislation and policies that this transformation will be based on. Besides, there needs to be changes in the education system and methods, so that the new human resource needs can be met.

In the thematic part of the report, global driving force Industry 4.0, and the digitalization process of the enterprises is being analysed. In this context, Singapore which is considered to be the most future ready country due to its successful implementation of digital transformation. Besides, we also looked at Netflix and Turkey's Koç Holding, which have been implementing digital transformation successfully on an enterprise basis in world and in Turkey. The report also looked at the e-signature application and the e-visa application by the Chamber of Electrical Engineers in North Cyprus as examples of successful practices of the digitalisation process. In addition, a survey was given to enterprises in North Cyprus to assess their use of devices, systems and processes in the digitalisation process, and to determine their needs and digital capacities.

As stated by the World Economic Forum, the world has now entered a digital era. Therefore, individuals (private and legal), as well as governments need to take this change into consideration when planning the future. As stated in the report, flexibility, agility and innovation are gaining importance in this process of change. For this reason, it is necessary for the enterprises to be the planners and directors of digital transformation both internally and in the markets in which they operate. The renewed competitiveness method also demonstrates that enterprises will be competitive to the extent

that they can implement these changes. Enterprises that do not transform will not be able to do business with the world or with the new-generation consumers.

Prof. Dr. Hasan Amca

Eastern Mediterranean University

Dr. Yenal Süreç

Eastern Mediterranean University

Aytaç Çerkez

Eastern Mediterranean University

North Cyprus 89th / 140

Global Competitiveness Index 4.0

2018 edition

Rank in 2017 edition : 109th/137

Performans

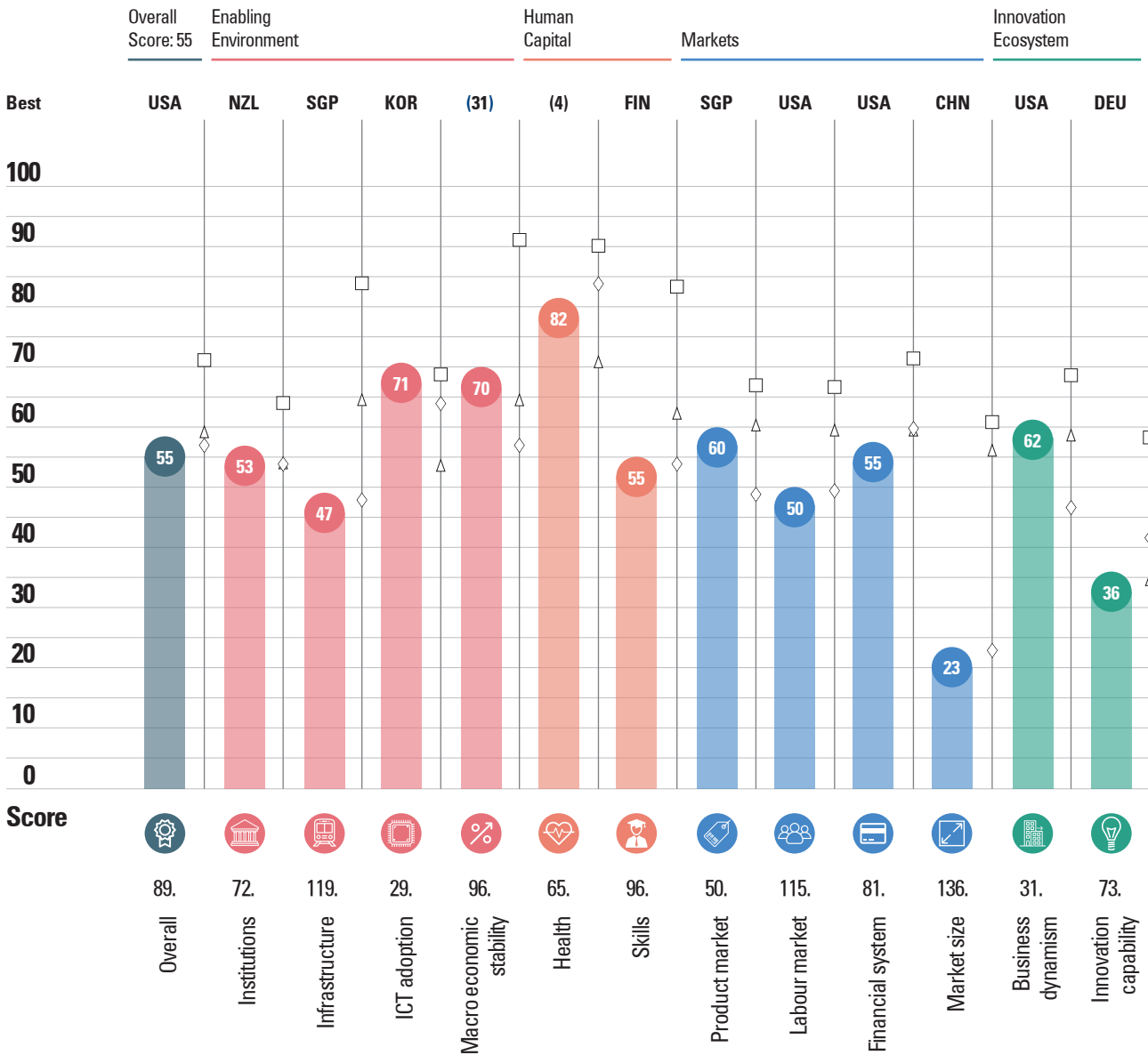
Key

◊ Previous edition

△ Upper middle income group average

□ Europe and North America average

Overview 2018









Selected contextual indicators







Population (thousand)	352	GDP (PPP) % world GDP	0,0043
GDP per capita (US\$)	14,268	Unemployment rate (%)	5,8
10-year average annual GDP growth (%)	1.97		

North Cyprus 89th / 140

Economy Profile

INDEX COMPONENT	VALUE	SCORE**		RANK	BEST PERFORMER
 Pillar 1 Institutions 0-100 (best)	-	52,8	↑	72	New Zealand
1.01 Organized crime, 1-7 (best)	5,09	68,2	↓	63	Finland
1.02 Homicide rate, /100,000 pop. *	2,56	93,0	=	68	Multiple (9)
1.03 Terrorism incidence, 0 (very high) -100 (no incidence) *	100	100,0	=	1	Multiple (24)
1.04 Reliability of police services, 1-7 (best)	3,89	48,1	↑	97	Finland
1.05 Social capital, 0-100 (high) *	n/a	n/a		n/a	Australia
1.06 Budget transparency, 0-100 (best) *	n/a	n/a		n/a	Multiple (2)
1.07 Judicial independence, 1-7 (best)	4,29	54,8	↑	56	Finland
1.08 Efficiency of legal framework in challenging regulations, 1-7 (best)	3,06	34,4	↑	84	Finland
1.09 Freedom of the press, 0-100 (worst)*	29,88	70,1	=	63	Norway
1.10 Burden of government regulation, 1-7 (best)	3,34	39,0	↑	79	Singapore
1.11 Efficiency of legal framework in settling disputes, 1-7 (best)	3,06	34,4	↑	102	Singapore
1.12 E-Participation Index, 0-1 (best) *	n/a	n/a		n/a	Multiple (3)
1.13 Future orientation of government, 1-7 (best)	2,38	23,1	=	134	Singapore
1.14 Incidence of corruption, 0-100 (best) *	n/a	n/a		n/a	New Zealand
1.15 Property rights, 1-7 (best)	3,79	46,5	↑	111	Finland
1.16 Intellectual property protection, 1-7 (best)	3,36	39,3	↑	122	Finland
1.17 Quality of land administration, 0-30 (best) *	18	60,0	=	52	Singapore
1.18 Strength of auditing and reporting standards, 1-7 (best)	2,95	32,4	↓	135	Finland
1.19 Conflict of interest regulation, 0-10 (best) *	6,3	63,0	=	45	Multiple (2)
1.20 Shareholder governance, 0-10 (best) *	6	60,0	=	56	Kazakhstan
 Pillar 2: Infrastructure 0-100 (best)	-	46,9	=	119	Singapore
2.01 Road connectivity index, 0-100 (best) *	n/a	n/a		n/a	United States
2.02 Quality of roads, 1-7 (best)	1,99	16,5	↓	140	Singapore
2.03 Railroad density, km of roads/square km *	n/a	n/a		n/a	Multiple (20)
2.04 Efficiency of train services, 1-7 (best)	n/a	n/a		n/a	Switzerland
2.05 Airport connectivity score	14,03	7,0	↓	127	Multiple (8)
2.06 Efficiency of air transport services, 1-7 (best)	3,57	42,9	↑	115	Singapore
2.07 Liner Shipping Connectivity Index, 0-157.1 (best) *	n/a	n/a		n/a	Multiple (4)
2.08 Efficiency of seaport services, 1-7 (best)	2,8	30,0	=	115	Singapore
2.09 Electrification rate, % pop.*	100	100,0	=	1	Multiple (66)
2.10 Electric power transmission and distribution losses, % output	6,6	97,3	=	38	Multiple (9)
2.11 Exposure to unsafe drinking water, % pop. *	n/a	n/a		n/a	Multiple (23)
2.12 Reliability of water supply, 1-7 (best)	3,51	41,8	=	114	Switzerland
 Pillar 3: ICT adoption 0-100 (best)	-	71,1	↑	29	Korea, Rep.
3.01 Mobile-cellular telephone subscriptions /100 pop. *	232,26	100,0	↓	2	Multiple (68)
3.02 Mobile-broadband subscriptions /100 pop.*	98,4	100,0	↑	30	United Arab Emirates
3.03 Fixed-broadband Internet subscriptions /100 pop. *	51,5	100,0	↑	1	Switzerland
3.04 Fibre Internet subscriptions /100 pop*	0,02	2,1	=	111	Korea, Rep.
3.05 Internet users % pop.*	51,53	53,3	↑	84	Iceland
 Pillar 4: Macroeconomic stability 0-100 (best)	-	70,3	↑	96	Multiple (31)
4.01 Inflation annual, % change *	14,68	70,3	↑	131	Multiple (74)
4.02 Debt dynamics, 0-100 (best)*	n/a	n/a		n/a	Multiple (36)
 Pillar 5: Health 0-100 (best)	-	82,3	↓	65	Multiple (4)
5.01 Healthy life expectancy, years *	66,3	82,3	↓	64	Multiple (4)
 Pillar 6: Skills 0-100 (best)	-	54,5	=	96	Finland
6.01 Mean years of schooling, Years *	n/a	n/a		n/a	Finland
6.02 Extent of staff training, 1-7 (best)	3,21	36,8	↑	129	Switzerland
6.03 Quality of vocational training, 1-7 (best)	2,91	31,8	↓	138	Switzerland
6.04 Skillset of graduates, 1-7 (best)	3,9	48,4	=	84	Switzerland
6.05 Digital skills among population, 1-7 (best)	3,68	44,6		105	Sweden
6.06 Ease of finding skilled employees, 1-7 (best)	2,56	26,0		139	United States

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INDEX COMPONENT	VALUE	SCORE**		RANK	BEST PERFORMER
6.07 School life expectancy, Years *	14,85	82,2	=	58	Multiple (9)
6.08 Critical thinking in teaching, 1-7 (best)	2,48	24,7		132	United States
6.09 Pupil-to-teacher ratio in primary education, Ratio*	11,3	96,8	=	16	Multiple (6)
 Pillar 7: Product market 0-100 (best)	-	59,4	↑	50	Singapore
7.01 Distortive effect of taxes and subsidies on competition, 1-7 (best)	3,65	44,1	↑	77	Singapore
7.02 Extent of market dominance, 1-7 (best)	2,67	27,8	↓	135	Switzerland
7.03 Competition in services, 1-7 (best)	5,73	78,8	=	6	Hong Kong SAR
7.04 Prevalence of non-tariff barriers, 1-7 (best)	3,63	43,0	↑	131	Singapore
7.05 Trade tariffs, % duty *	0,9	94,0	↓	5	Hong Kong SAR
7.06 Complexity of tariffs, 1-7 (best)	n/a	n/a		n/a	Hong Kong SAR
7.07 Efficiency of the clearance process, 1-5 (best) *	n/a	n/a		n/a	Germany
7.08 Services trade openness, 0-100 (worst) *	n/a	n/a		n/a	Ecuador
 Pillar 8: Labour market 0-100 (best)	-	50,1	↓	115	United States
8.01 Redundancy costs, weeks of salary *	5	90,4	=	12	Multiple (8)
8.02 Hiring and firing practices, 1-7 (best)	3,56	42,7	↑	100	Hong Kong SAR
8.03 Cooperation in Labour-employer relations, 1-7 (best)	4,62	60,3	↑	52	Switzerland
8.04 Flexibility of wage determination, 1-7 (best)	5,23	70,5	↑	47	Hong Kong SAR
8.05 Active Labour policies, 1-7 (best)	3,45	40,8	=	65	Switzerland
8.06 Workers' rights, 0-100 (best) *	n/a	n/a		n/a	Multiple (4)
8.07 Ease of hiring foreign labour, 1-7 (best)	3,92	48,6	=	90	Albania
8.08 Internal Labour mobility, 1-7 (best)	3,85	47,4		120	Guinea
8.09 Reliance on professional management, 1-7 (best)	2,69	28,2		135	Finland
8.10 Pay and productivity, 1-7 (best)	4,05	50,9	↑	61	United States
8.11 Female participation in Labour force, ratio *	0,55	44,1	↓	89	Multiple (4)
8.12 Labour tax rate, % *	14,00	91,7	=	62	Multiple (26)
 Pillar 9: Financial system 0-100 (best)	-	55,4	↑	81	United States
9.01 Domestic credit to private sector, % GDP *	77	81,1	=	30	Multiple (29)
9.02 Financing of SMEs, 1-7 (best)	3,16	36,1	↑	118	United States
9.03 Venture capital availability, 1-7 (best)	2,37	22,8	=	82	United States
9.04 Market capitalization, % GDP *	n/a	n/a		n/a	Multiple (12)
9.05 Insurance premium, % GDP *	2,3	38,3	=	53	Multiple (16)
9.06 Soundness of banks, 1-7 (best)	3,64	44,0	=	117	Finland
9.07 Non-performing loans, % loan portfolio value *	5,7	88,6	↑	76	Multiple (2)
9.08 Credit gap, percentage points *	n/a	n/a		n/a	Multiple (97)
9.09 Banks' regulatory capital ratio, ratio *	17,59	100		45	Multiple (72)
 Pillar 10: Market size 0-100 (best)	-	22,8	↓	136	Hong Kong SAR
10.01 Gross domestic product, PPP \$ billions*	5,18	n/a	↓	137	Çin
10.02 Imports, % GDP	47,2	n/a	↓	63	Hong Kong
 Pillar 11: Business dynamism 0-100 (best)	-	62,3	↑	31	United States
11.01 Cost of starting a business, % GNI per capita *	10	95,0	=	78	Multiple (2)
11.02 Time to start a business, days *	26	74,4	=	111	New Zealand
11.03 Insolvency recovery rate, cents/\$*	n/a	n/a		n/a	Norway
11.04 Insolvency regulatory framework, 0-16 (best)*	n/a	n/a		n/a	Multiple (5)
11.05 Attitudes toward entrepreneurial risk, 1-7 (best)	3,24	37,3		129	Israel
11.06 Willingness to delegate authority, 1-7 (best)	3,7	44,9	↑	118	Denmark
11.07 Growth of innovative companies, 1-7 (best)	3,42	40,4		116	Israel
11.08 Companies embracing disruptive ideas, 1-7 (best)	3,23	37,1		101	United States
 Pillar 12: Innovation capability 0-100 (best)	-	35,7		73	Germany
12.01 Diversity of workforce, 1-7 (best)	3,94	48,9	=	114	Canada
12.02 State of cluster development, 1-7 (best)	3,2	36,7	↑	110	United States
12.03 International co-inventions, applications/million pop.*	n/a	n/a	=	n/a	Multiple (7)
12.04 Multi-stakeholder collaboration, 1-7 (best)	3,17	36,2	↑	112	United States
12.05 Scientific publications, H index*	570	66,7	↑	17	Multiple (7)
12.06 Patent applications, applications/million pop. *	53,98	23,5	↑	25	Multiple (8)
12.07 R&D expenditures, % GDP *	n/a	n/a	=	n/a	Multiple (7)
12.08 Quality of research institutions, index *	n/a	n/a	=	n/a	Multiple (7)
12.09 Buyer sophistication, 1-7 (best)	2,77	29,6	↓	114	United States
12.10 Trademark applications, applications/million pop. *	909,18	8,4	↑	49	Multiple (7)

* Hard data

** Scores on a 0 to 100 scale where represents the optimal situation or frontier. Arrows indicate the direction of the change in score from the previous edition if available.

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INTRODUCTION

Global Developments in the Shadow of Trade Wars

North Cyprus Economy Under Currency Devaluation and Inflation Spiral

A New Method in the 40th Year of the Global Competitiveness Index

Global Developments in the Shadow of Trade Wars

A decade after the 2008 financial crisis, also known as the second Great Depression, the aftershocks of the crisis are still felt through. Although the measures introduced after the crisis led to a medium-level growth trend but the growth trend has proven itself not to be a long-term one. International institutions revised their growth forecasts downward, and particularly developed economies display noticeable slower growth. Although the US seems to be the best performing economy among the developed economies, however its economy is expected to slow down due to the contraction in trade volumes stemming from the protective measures launched against primarily China, its neighbour Mexico and many other countries. Particularly, the trade war between the United States and China has had its tolls on other countries as the on-going war is unfolding between the two largest economies and the two largest exporters of the world. Perhaps, a more serious threat that derives from, as a direct implication of the trade wars is the risk of entering into a protectionist period by moving away from the global liberalization trend. The US government is trying to convey to the whole world that the liberalization trend, a trend peaked particularly against the backdrop of World War II during GATT negotiations, could be ended by its own creator.

On the other hand, uncertainties coupled with Brexit increased the doubts not only in economic terms but also over EU's political future. The Brexit uncertainty caused an economic slowdown both in the UK and the EU. Unpredictability of the post-Brexit situation further increases the uncertainties. In particular, the uncertainty in the direction of the UK, a country that has always maintained economic ties with the Turkish Cypriot economy, continues to create concerns on the Turkish Cypriot economy.

Many macro-economic policies need to be revisited as a result of the inflation risk faced by many countries in the global economy. The increase in the inflation rates could be considered as an outcome of the loose monetary policies deployed by FED after the 2008 financial crisis. However the escalation in inflation continued despite FED's announcement on going ahead with interest rate increases and opting for monetary tightening policies. The outflow of funds from developing countries gained pace following certain decisions to increase interest rates. This situation created a pressure on the currencies of some emerging countries and resulted in devaluation. The fact that some economies, particularly Turkey, Argentina and Brazil, experienced a pressure on

their currencies due to their current account deficits which resulted in different levels of currency depreciations. During this period, developing countries displayed different performances. For instance, while energy exporting countries revising their growth forecast figures upwards energy importing countries experienced a further increase in their trade deficits, which mostly accompanied by budget deficits as well. Therefore, growth expectations are being revised downwards not only for developing economies, but also for developed economies due to increasing perception of risk, Brexit and alike political uncertainties, and the negative expectations fuelled by the US-China trade wars. It is noted that the decline primarily in investments and consumption carries the risk of economic stagnation when accompanied by a slowdown in foreign demand.

North Cyprus Economy Under Currency Devaluation and Inflation Spiral

Developments in Turkish Lira and Turkish economy affect the Turkish Cypriot economy more than the global developments do. The underlying reason for that situation stems from the fact that the currency used in North Cyprus is Turkish Lira, and Turkey is the main trading partner for goods and services. Therefore, growth or contraction trends in the economy are more likely to be affected by the developments in the Turkish economy or the Turkish Lira rather than the global developments. The significant depreciation of the Turkish Lira in August last year has had its tolls on the Northern Cyprus economy from various aspects. At first, triggered by TL's depreciation, inflation rates after a long time closed to 30%. Another implication of the Turkish Lira's devaluation has been its potential to negatively affect foreign demand originating from Turkey. The North Cyprus economy relies heavily on export of services. Higher education and tourism, the two main sectors for exporting services, have Turkey as their major markets. Therefore, a slowdown in tourism and higher education, stemming from a decrease in demand in Turkey, could even slowdown the economy to further levels. Economic growth has also started to decline against the backdrop of the current escalation in exchange rates and the consequent increase in inflation rate. This incident affects both consumption and imports negatively. For instance, recorded economic growth for 2017 was 5.4%. However, the growth rate forecast for 2018 displays a drop down in half to 2.5% levels.

Yet, another negative impact of devaluation on the economy is its implications on businesses and households that borrowed

on foreign currency. The non-performance risk of those who earn in Turkish Lira but borrow in foreign currency may create pressure for the banking sector. Although various regulations enabled debt restructuring and restrictions on foreign currency lending have been introduced, the aforementioned risk still prevails. The increase in the budget deficit and the public debt stock are other risks posed by the devaluation of the Turkish Lira coupled with the structural problems of the country. The current public debt stock increased to further levels due to inherent structural problems in the social security system, inefficient subsidies and incentive schemes, and in local administrations, while the need for additional public finance has also emerged along with devaluation. Public finance needs increased due to the interruption faced in the aid and loans coming from Turkey. This has resulted in an increase in the public debt stock. It has been voiced repeatedly that there is a need for reforms that would generate revenues and reduce expenditures. There is a need to reform, on one side, the high current expenditures, particularly salaries and similar transfer payments, and implement a specific reform program, to restructure inefficient public administrations, SOEs and local administrations.

Challenges and structural problems that relate to the functioning of the labour market were thoroughly discussed in the theme section of last year's report. In this context, the results emphasized in this year's findings also highlight the need to have a more flexible labour market and to be effective and agile in the implementation of policies. It is necessary to introduce, as soon as possible, the arrangements and practices required either for raising the qualified workforce that could be sought along with digitalization, or for importing required workforce from abroad with proper conditions. There is a shift in the shape and content of the human capital in global terms; continuous education concept is at the forefront together with formal education, and; labor force training is now provided in the digital environment rather than spatial education environments. It is of paramount importance for the state to lead and support the training programs whereas the private sector must take an active role in designing the required skills.

A New Method in the 40th Year of the Global Competitiveness Index

Developed by the World Economic Forum, the Global Competitiveness Index captures different factors affecting the competitiveness of a country when compared to other countries. These factors could be listed in a wide range i.e. the

functioning of markets, infrastructure, human capital, health, labour market or technological capacity. Competitiveness is an interconnected indicator that demonstrates the income and prosperity creation capabilities of economies. The competitiveness of countries is captured by making use of published statistical data and by taking into account the perceptions and assessments of business people engaged in business within the country. The comprehensive method used for computing the competitiveness levels of countries is based on to what extent the institutions, policies and production resources in the country are used efficiently and effectively.

Humanity is preparing to proceed to a different phase with the concept of Industry 4.0, also named as the Fourth Industrial Revolution. While Industry 4.0 has already come to life as a reality for people living in many parts of the world, it has the potential to bring together new opportunities and threats. As the digitalisation process is rapidly progressing, it also leads to the formation of new concepts and patterns in the economy by bringing conventional patterns to the ground. Not only businesses, but also consumers adapt themselves to different consumption models and methods brought along by such a rapid change. This dynamic and on-going process affects inevitably and unusually the development of countries and their competitiveness performances.

Considering such developments and changes at global level, a decision was made to introduce changes into the Global Competitiveness study of the World Economic Forum in its 40th anniversary. The Forum and Klaus Schwab, the founder of the Competitiveness study, jointly decided that it was high time to change the methodology and content of the study by taking into account the technology led changes in the global production and consumption patterns. While many innovations in the developing and changing world affect economic life, the fact that such innovations were not accommodated in the context of the Competitiveness study. In the wake of the work conducted by a wide team of experts, including primarily Klaus Schwab, the renewed work came into practice in 2018.

In the renewed study, not only methods and data sets were changed, but also new concepts that were considered to have an impact on competitiveness were incorporated. The concepts of innovation, competence, agility and flexibility gained value in the new study. The modifications covered particularly; the variables that are used in index value computations, the composition and the names of the pillars where these variables are gathered, and the computation methods. While some traditional concepts such as physical infrastructure, macro-economic stability and schooling were

maintained, human capital, innovation, flexibility and agility are introduced as the new concepts into to the study. These are the new concepts that have been highlighted as features that particularly entrepreneurs, businesses and policy makers should possess, and are also recognized as the pre-conditions for future readiness. Therefore, a more successful transition is envisaged when not only individuals but also businesses and public administration put them in practice.

Some globally prominent concepts such as innovation, flexibility and agility are established as essential features in preparing economies for the future. This has been the starting point in establishing the new structure whereby variables that are able capture such aspects of economies were selected. Previously, country rankings used to be calculated by dividing countries into three different groups as factor-driven, efficiency-driven and innovation driven. Countries were scored weighted for each pillar based on their development levels. This is one of the most fundamental changes brought under the new method: the weighted scoring of countries according to their developmental levels was terminated. Instead, equal weight was attributed to variables in each section. Besides, another important change introduced in this year's scoring system is the introduction of scoring over 100 points. The fields that used to be scored over 7 points in the past were scored over 100 points this year. In addition, the total number of variables used was reduced from 114 to 98. The change was not confined to numerical changes. Many variables have also been renewed under this effort. 64 (i.e. two-thirds) out of 98 variables used this year are completely new variables. Ratio of the variables arising from the business surveys is reduced and more hard data is introduced.

Table 1: The Global Competitiveness Index 4.0 2018

SECTION I – ENABLING ENVIRONMENT		SECTION III -MARKETS	
	Pillar 1 Institutions A. Security B. Social Capital C. Checks and Balances D. Public Sector Performance E. Transparency F. Corporate Governance		Pillar 7 Product Market A. Domestic Market Competition B. Trade Openness
	Pillar 2 Infrastructure A. Transportation Infrastructure B. Utilities Infrastructure		Pillar 8 LaborMarket A. Flexibility B. Meritocracy and Incentivisation
	Pillar 3 ICT Adoption		Pillar 9 Financial System A. Depth B. Stability
	Pillar 4 Macroeconomic Stability		Pillar 10 Market Size
SECTION II – HUMAN CAPITAL		SECTION IV – INOVATION ECOSYSTEM	
	Pillar 5 Health		Pillar 11 Business Dynamism A. Administrative Requirements B. Entrepreneurial Culture
	Pillar 6 Skills A. Current Workforce B. Future Workforce		Pillar 12 Innovation Capability A. Interaction and Diversity B. Research and Development

Competitiveness of North Cyprus

Novelties of the New Method

Global and Regional Competitiveness Performances

Competitiveness Performance of Northern Cyprus in 12 Pillars

Novelties of the New Method

One of the main underlying reason of the renewal of the Global Competitiveness study stems from the need to accommodate for the mandatory changes created by emerging technologies in the economy. The need to review the study that has been conducted for almost forty years was inevitable. The momentum gained in the digital age created the need to make some touch ups and reviews. Numerous reviews, research and analyses made in this context have revealed the current structure. Some additional fine-tunings may be required as it may be the case to notice for a certain period of time some shortcomings and flaws in the structure.

As mentioned above, the changes were introduced in order to capture emerging concepts of the new methodology, namely flexibility, agility and future readiness. The change was not confined to the content. The scoring method was also changed; firstly, weighted scoring based on countries' development levels was cast aside, and each and every country is now scored on equal weights from each pillar. Besides, scoring over 100 points was applied in this year's report both for country scores and for scoring the variables. Although, past years' scoring over 7 points was still used in certain questionnaire data, a special co-efficient was used to adjust the outcomes to 100-point basis. In addition, the total number of variables used in the Index calculation was reduced from 114 to 98. Out of the 98 variables used, 64 (i.e. two-thirds) were composed of completely new variables, while 34 of them were maintained the way they were used in past years.

While pillars (sub-headings) where variables are grouped did not change in numbers (in total 12 pillars), the contents of most of them have been revised. As an example, Institutions, Infrastructure, Macro-economic Stability, Market Size, Innovation are the pillars that maintained the same name however, most of their variables were renewed. On the other hand, in some pillars both the names and contents were changed. For example: Education pillar was revised as Skills; Technological Readiness was revised as ICT adoption; and Business Sophistication was revised as Business Dynamism. In previous years, pillars were used to be scored according to the development category of the country. For instance, the first 4 pillars, namely Infrastructure, Health, Institutions and Macro-economic stability were gathered under the Basic Requirements component and factor driven economies were used receive higher weighted scores from this pillars. This year, the grouping method was changed and the number of sections was increased from 3 to 4. The newly formed sections, pillars and the sub categories are as follows:

64 out of 98 variables used in this year's study are completely new, whereas the remaining 34 variables were also used last year. A significant change in this year's methodology was the reduction of the number of variables compiled through the questionnaire. In previous years, 84 out of 114 variables were compiled through the questionnaire. This figure represents approximately 70% of the variables. This year the number of variables was limited to only 34 out of 84 (i.e. 36%). Consequently, some significant changes occurred in some countries' scores and rankings. When questionnaire questions tend to capture the perceptions of business people about the various aspects of the economy, occasionally, this approach may lead to misleading results. An indication of this situation may be the case of North Cyprus, where obtained results are more negative than what is published in statistical indicators.

The first of the four main section is the Enabling Environment. This section has four pillars. These are: Pillar1- Institutions; Pillar-2 Infrastructure; Pillar-3 ICT Adoption; and Pillar-4 Macro-economic Stability. 1st section's 1st Pillar, Institutions, brings together a total of 20 variables varying from security, social capital, checks and balances, public sector performance, transparency and corporate governance areas. This pillar is the largest pillar with 20 variables whose 9 variables out of 20 are older ones whereas the remaining 11 are completely new variables. The variables in this pillar are largely composed of questions aiming at capturing the culture of doing business in the country. The section's score is computed based on a scoring system that brings together both the perception of business people and statistics produced in the country in different areas such as security, corruption, property and judiciary. 2nd Pillar, Infrastructure, includes in total 12 variables for transport infrastructure for roads, railroads, air and maritime transport infrastructure as well as electricity and water infrastructure. The infrastructure is an important component for the business environment and consequently for competitiveness. There used to be 9 variables under this pillar whereas it has now been increased to 12 variables this year. A total of 10 new variables were added, while only two variables were carried through from last year. The 3rd pillar of this component, ICT Adoption's place has been changed and it has been renewed. In previous years, Technological Readiness used to be presented in Pillar 9. Yet, the composition of this pillar changed along with digitalisation. Composed of 5 variables, this pillar measures mainly access to the internet. 3 variables out of 5 were existing variables whereas the remaining 2 are completely new variables. The 4th and last pillar of this component is Macro-economic Stability. This

pillar used to have 5 variables to monitor macro-economic stability, however, this year it was limited down to 2 variables, inflation and debt dynamics.

2nd section is "Human Capital" section composed of 2 pillars; Health and Skills. Pillar-5, Health, used to bring together health and primary education indicators. However, this year it was reduced down to one variable as Healthy Life Expectancy. While it used to focus on mortality rates and incidence of epidemics in the past. The goal pursued here seems to express a healthy population with long life expectancy. Pillar-6, Skills, on the other hand, provides room for a total of 9 variables focusing on the skills of current and future work forces varying from the schooling years, skills of graduates etc..

As for the 3rd section, the title selected for this section is Markets and includes the following pillars: Pillar-7 Product Markets, Pillar-8 Labour Market, Pillar-9 Financial Systems, and Pillar-10 Market Size. Pillar-7 Product Markets used to be called Goods Market Efficiency and had 16 variables within the scope of the study. This year the pillar brings together a total of 8 variables to capture competition and openness in trade concepts. Coupled with 6 new variables, the pillar tackles issues such as liberalization in goods and services trade as well as the efficiency of customs controls. As for Pillar-8 on Labour market, the pillar has 12 variables for flexibility and meritocracy issues in the labour market. Workers' rights, active labour market policies and cooperation in labour-employer relations are among the 8 new variables incorporated. 4 variables were carried through from past years. Pillar-9 relates to financial markets and includes 9 variables in total to tackle depth and stability issues. 6 variables out of 9 are new variables whereas the remaining 3 are old variables. Pillar-10 Market Size focuses on Gross Domestic Product and Import with 2 variables.

4th section's name has been changed to Innovation Ecosystem. Although the name of both pillars of this section were changed, their scope is close to past years; Pillar-11 Business Dynamism (used to be called Business Sophistication), and Pillar-12 Innovation Capability. Pillar-11 Business Dynamism groups 2 variables together; Administrative Requirements and Entrepreneurial Culture. This pillar has 8 variables to measure the cost of starting a business, insolvency and attitudes towards risks. The pillar measures both administrative requirements and the perception of business people. Pillar-12 Innovation Capability, on the other hand, brings together 10 variables; Interaction and Diversity, Research-Development and Commercialization. While the content of some variables used in previous years was changed, new variables were also added to this pillar.

The Global Competitiveness Index 4.0

2018 Rankings

Difference from 2017					Difference from 2017					Difference from 2017				
Rank	Economy	Score 1	Rank*	Score*	Rank	Economy	Score 1	Rank*	Score*	Rank	Economy	Score 1	Rank*	Score*
1	United States	85,6	-	0,8	51	Bulgaria	63,6	-	1,2	100	Namibia	52,7	-1	0,3
2	Singapore	83,5	-	0,5	52	Romania	63,5	-	1,3	101	Honduras	52,5	2	1,2
3	Germany	82,8	-	0,2	53	Uruguay	62,7	-3	-	102	Tajikistan	52,2	-5	-0,6
4	Switzerland	82,6	-	0,2	54	Kuwait	62,1	2	0,5	103	Bangladesh	52,1	-1	0,7
5	Japan	82,5	3	0,9	55	Costa Rica	62,1	-1	0,4	104	Nicaragua	51,5	-3	-
6	Netherlands	82,4	-1	0,2	56	Philippines	62,1	12	2,3	105	Bolivia	51,4	n/a	n/a
7	Hong Kong SAR	82,3	-	0,3	57	Greece	62,1	-4	0,3	106	Ghana	51,3	-2	1,4
8	United Kingdom	82	-2	-0,1	58	India	62	5	1,2	107	Pakistan	51,1	-1	1,3
9	Sweden	81,7	-	0,1	59	Kazakhstan	61,8	-	0,7	108	Rwanda	50,9	-1	1,3
10	Denmark	80,6	1	0,7	60	Colombia	61,6	-3	0,1	109	Nepal	50,8	-1	1,3
11	Finland	80,3	1	0,5	61	Turkey	61,6	-3	0,2	110	Cambodia	50,2	-1	0,8
12	Canada	79,9	-2	-0,1	62	Brunei Darrusalam	61,4	2	1	111	Cape Verde	50,2	-6	0,4
13	Taiwan	79,3	-	0,1	63	Peru	61,3	-3	0,2	112	Lao PDR	49,3	-2	0,7
14	Australia	78,9	1	0,7	64	Panama	61	-9	-0,6	113	Senegal	49	-2	0,6
15	Korea	78,8	2	0,8	65	Serbia	60,9	5	1,7	114	Cote d'Ivoire	47,6	n/a	n/a
16	Norway	78,2	-2	-0,8	66	Georgia	60,9	1	1	115	Nigeria	47,5	-3	-0,5
17	France	78	1	0,6	67	South Africa	60,8	-5	-0,1	116	Tanzania	47,2	-2	0,8
18	New Zealand	77,5	-2	-0,6	68	Croatia	60,1	-2	-	117	Uganda	46,8	-4	-0,2
19	Luxembourg	76,6	3		69	Azerbaijan	60	-4	-0,2	118	Zambia	46,1	-3	0,6
20	Israel	76,6	-	0,4	70	Montenegro	59,9	2	1	119	Gambia	45,5	-	0,8
21	Belgium	76,6	-2	-	71	Brazil	59,6	2	1,4	120	Eswatini	45,3	-4	0,2
22	Austria	76,3	-1	0,2	72	Jordan	59,5	-3	-0,2	121	Cameroon	45,1	-3	0,2
23	Ireland	75,7	-	-0,3	73	Seychelles	59,3	-2	0,1	122	Ethiopia	44,5	-2	0,6
24	Iceland	74,5	-	-0,1	74	Morocco	58,5	10	3,3	123	Benin	44,4	-1	0,8
25	Malaysia	74,4	1	1,1	75	Albania	58,5	2	0,8	124	Burkina Faso	43,9	n/a	n/a
26	Spain	74,2	-1	0,4	76	Viet Nam	58,1	4	0,8	125	Mali	43,6	-4	-0,1
27	United Arab Emirates	73,4	-	1,1	77	Vietnam	58,1	-3	0,1	126	Guinea	43,2	-3	0,3
28	China	72,6	-	0,9	78	Trinidad ve Tobago	57,9	-2	0,1	127	Venezuela	43,2	-10	-1,9
29	Czech Republic	71,2	-	0,3	79	Jamaica	57,9	-1	0,5	128	Zimbabwe	42,6	-4	0,6
30	Qatar	71	2	0,6	80	Lebanon	57,7	-5	-0,1	129	Malawi	42,4	-	1,8
31	Italy	70,8	-	0,3	81	Argentina	57,5	-2	0,1	130	Lesotho	42,3	-4	0,9
32	Estonia	70,8	-2	-	82	Dominican Republic	57,4	-	1,8	131	Mauritania	40,8	-3	0,1
33	Chile	70,3	1	0,9	83	Ukraine	57	6	3,1	132	Liberia	40,5	-2	0,6
34	Portugal	70,2	-1	0,5	84	Macedonia	56,6	n/a	n/a	133	Mozambique	39,8	-8	-2,1
35	Slovenia	69,6	-	1,1	85	Sri Lanka	56	-4	-0,4	134	Sierra Leone	38,8	-3	0,1
36	Malta	68,8	-	0,3	86	Ecuador	55,8	-3	0,4	135	Congo	38,2	-8	-2,6
37	Poland	68,2	-	0,2	87	Tunisia	55,6	-1	1	136	Burundi	37,5	-4	-1
38	Thailand	67,5	2	1,3	88	Moldova	55,5	-1	0,9	137	Angola	37,1	n/a	n/a
39	Saudi Arabia	67,5	2	1,6	89	North Cyprus	55,2	20	0,1	138	Haiti	36,5	-5	0,7
40	Lithuania	67,1	-2	0,7	90	Iran	54,9	-1	0,4	139	Yemen	36,4	-4	0,9
41	Slovak Republic	66,8	-2	0,6	91	Bostwana	54,5	-5	-0,5	140	Chad	35,5	-6	-
42	Latvia	66,2	-	1,4	92	Bosnia & Herzegovina	54,2	-1	0,3					
43	Russian Federation	65,6	2	1,7	93	Algeria	53,8	-	0,3					
44	South Cyprus	65,6	-1	0,9	94	Kenya	53,7	-	0,4					
45	Indonesia	64,9	2	1,4	95	Egypt	53,6	-	0,4					
46	Mexico	64,6	-2	0,5	96	Paraguay	53,4	1	0,5					
47	Oman	64,4	14	3,4	97	Guatemala	53,4	-5	-0,1					
48	Hungary	64,3	-	0,9	98	Kyrgyz Republic	53	-	1,1					
49	Mauritius	63,7	-	0,8	99	El Salvador	52,8	3	0,4					
50	Bahrain	63,6	-4	-0,2		Mongolia	52,7	-4	-0,2					

	East Asia and Pacific
	Eurasia
	Europe and North America
	Latin America and the Caribbean
	Middle East and North Africa
	South Asia
	Sub-Saharan Africa

* Rank and score differences with 2017 index, calculated using the GCI 4.0 methodology.

Global and Regional Competitiveness Performances

Application of a scoring system over 100 points this year demonstrated to what extent countries are falling behind the ideal level of 100 points. The scores obtained by each country illustrate the room for improvement, in other words, shows their competitiveness deficit. The leader of this year is the United States of America with 85.6 points among 140 countries. The runner-up is Singapore, the indispensable country of the top 3 of recent years, with a score of 83.5. The third of this year was Germany with a score of 82.8. On the other hand, Switzerland, last year's winner and the successful country of recent years ranked 4th with 82.6 points this year. In addition, Chad received the lowest score, 35.5 out of 100 points, while other countries ranking in the bottom have not changed much when compared to past years. As it has been the case in past years, the significant score gap between developed countries and underdeveloped countries still exists. 17 out of the lowest 20 countries are from sub-Saharan Africa.

The median score for this year was set to 60. On the other hand, inter-regional and intra-region disparities are noteworthy. For example, 7 European and North American countries rank among the top 10. Differences in scores are also noticeable among the countries of the European Union. Germany, the most competitive economy in the European Union, scored 82.8 points whereas the EU's lowest competitive countries; Greece and Croatia scored 20 points below Germany. The disparity is even higher between South American countries. Chile, the most competitive country in the region ranks 33rd with 70 points. However, the score difference between Chile and Haiti, ranked 136th with 36.5 points, is almost half and half. The scores of G-20 countries demonstrate significant differences; the best ranking is the U.S. (85.6) and the least competitive country is Argentina (57.5).

It is evident that information technologies have positive effects on economic efficiency and contribute to economic growth. It is estimated that approximately 4.5 billion smart phones are used in the world. This means that the other half of humanity has not yet met this technology or accessed the Internet. Along with increasing efficiency, information technologies can also be a catalyst for innovation and business dynamism. Certainly, it would not suffice to rely only on technology for innovation and business dynamism. The effectiveness of human capital related institutions such as education, health and the effectiveness of institutions dealing with physical infrastructure is also of paramount importance. It is a clear fact that such institutional weaknesses and skill shortcomings have

negative impacts on economic growth and competitiveness in poorly developed economies.

Global Competitiveness 4.0 focuses on two important concepts that have clear impact on competitiveness. These concepts are agility and future readiness. These are the two concepts considered as key concepts in changing the world within the scope of Industry 4.0. Individuals, businesses and governments, they are all required to internalize agility and future readiness, and they are considered as prerequisites for digital transformations. For example, it is not a coincidence that Singapore, which is also discussed in the theme section of this report, has the highest level of readiness for digital transformation with a competitiveness score of 85.6, and ranks among the top 3 in Global Competitiveness.

The development level in information technologies plays an important role in the skills and competencies of the population and thereby of the workforce. Particularly, when the workforce possesses the sought skills, it climbs them out of being victims of digitalisation and makes them its actors. For instance, Sweden's workforce profile is considered to be the one most prone to grasp technology. It is noted that, the policies put in practice in Switzerland, make the country the fastest to adapt itself to emerging needs in the labour force. The fact that both countries rank continuously high in the competitiveness ranking is an important indicator to prove the impact of transformative and harmonious policies.

Weakness in certain institutional issues such as security, property rights, transparency and governance continue to have their tolls on competitiveness. Institutions Pillar's (Pillar 2) score is the second lowest following the Pillar 12 Innovations, in the Global Competitiveness Report. The median value of this pillar was computed as 53 points. For 117 of the 140 economies studied, their Institutions pillar performance is a drag on their overall competitiveness score. Concerns of Terrorism and crime rates are raising all over the world and definitely it is affecting the business environment. On the other hand as the antidote of corruption transparency and judicial independence is included to the index in order to measure their impact on competitiveness performances. Since most these factors are somehow related with public administration governments must pay attention to both traditional and emerging knowledge about strengthening the institutional environment as a factor of productivity.

The financial system is considered to be an important component of economic growth and competitiveness, and plays an important role in allocating the resources of the

country to efficient and productive areas. Addressed in Pillar 9 in this year's study, Financial system's content has been revised and its scope has been expanded by adding new variables. In previous years, the majority of the relevant variables were based on the perception of the surveyed business people. However, this year's study relies heavily on published statistical data. It is admitted that crisis i.e. the last global financial crisis or the financial and banking crisis experienced at country levels bring along learning outcomes and contribute to the more effective and robust operations of sectors. As a matter of fact, in the aftermath of the banking crisis experienced in North Cyprus in 2000, the Central Bank developed its functional capacity along with legislation amendments and renewed practices. One could say the Central Bank has been efficient in further enhancing the sector. Scores obtained from the variables on non-performing loans and soundness of banks push some countries down in the ranking (i.e. South Cyprus and Italy), and also affect the overall score of the component negatively. The most evident indicator of this fact is South Cyprus; with an NPL 48.7%, ranked 138th among 140 countries.

Table 2: Best Performances & Worst Performances of North Cyprus Economy

BEST PERFORMANCES (Source)	Score (Rank)	WORST PERFORMANCES (Source)	Skor (Sıra)
1.03 Terrorism Ratio (Statistics)	100 (1)	2.02 Quality of Roads (Survey)	16.5 (140)
2.09 Access to Electricity (Statistics)	100 (1)	6.03 Ease of Finding Skilled Employee (Survey)	26.0 (139)
3.03 Fixed Broadband Users (Statistics)	100 (1)	6.03 Quality of Vocational Training (Survey)	31.8 (138)
3.01 Mobile Phone Subscriptions (Statistics)	100 (1)	8.09 Reliance on Professional Management (Survey)	28.2 (135)
7.05 Trade Weighted Tariff (Statistics)	94 (5)	7.02 Extent of Market Dominance (Survey)	27.8 (135)
8.01 Redundancy Costs (Statistics)	90.4 (12)	1.13 Future Orientation of Government (Survey)	23.1 (134)
12.05 Scientific Publications (Statistic)	66.7 (17)	6.08 Critical Thinking in teaching (Survey)	24.7 (132)

There is no one size fits all approach for the Innovation component. Developed countries seem to be by far more successful in this area. Germany, USA and Switzerland could be cited as the world's driving forces for Innovation. The fact that all three countries rank at the top of the overall competitiveness ranking is an important indicator to see to what extent innovation affects competitiveness. The global median for this pillar was computed as 36 points. In many countries, innovation is still limited to specific sectors and regions, and fails to become widespread. The global analysis of this issue demonstrate that the immersive power of innovation is under the pressure of cultural factors. For example, Israel and the United States displayed the highest performance in attitudes towards risk, with 83.1 and 79.4 points, while Korea ranked 77th with 47.5 points.

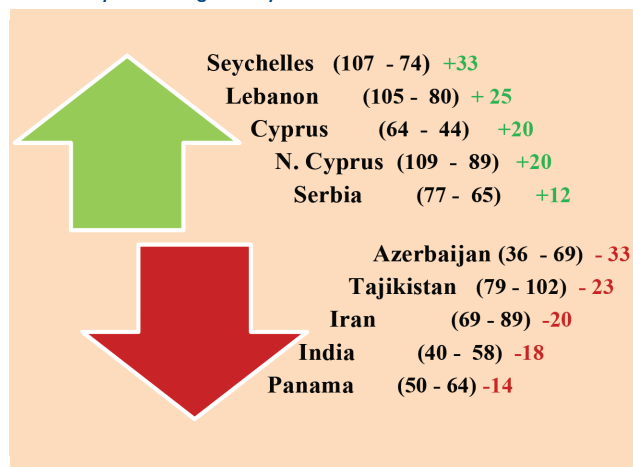
Competitiveness Performance of Northern Cyprus in 12 Pillars

The World Economic Forum (WEF) prepares the Global Competitiveness Index for 140 countries. The Turkish Cypriot Chamber of Commerce also prepares the Index annually for the economy of Northern Cyprus in order to determine North Cyprus's ranking among other countries. WEF's methodology was followed in the endeavour to compute the Country Index, and as much as possible, the same variables were used. As stated in previous sections, some of the variables were obtained through a questionnaire whereas some others were obtained from published statistics. However, some statistics are not compiled in Northern Cyprus, therefore, each year certain variables are either not computed or replaced by the closest indicators. It was not possible, this year either, to find some statistics not only due to methodology changes, but also due to the renewal of significant numbers of variables. Yet, attributing equal weights to the variables of each pillar resulted in obtaining the component scores, followed by country scores.

The Index score was computed this year over 100 points for the first time. Based on this year's methodology, Northern Cyprus's country score was computed as 55.21 points over 100. In other words, when converted, this score would represent 3.88 over 7. The country score is slightly higher than last year's score 3.77. North Cyprus ranks 89th among 140 countries with a Competitiveness Index of 55.21 this year. This ranking is 20 ranks higher than the last year's 109th rank. Such an upward progress in ranking, without a significant change in the

country's score, could be explained from couple of aspects. The most important aspect is the introduction of a scoring system over 100 points. In addition, weighted scoring based on the developmental level of the countries was no longer applied. Creating advantage for some countries to benefit from all variables equally whereas some face with disadvantages of this new methodology. In previous years, country rankings used to be calculated by dividing countries into three different groups; factor-driven, efficiency-driven and innovation driven. Variables used for different groups, determined in accordance with the countries development levels, were computed based on different weights. More importantly, the total share of variables obtained through questionnaires was reduced from 65% down to 40%. Thus, the impact of respondents' subjective or negative entries was relatively reduced. Certainly, all these new developments have affected the country's ranking more than their score. The underlying reason for this is the fact that the effect of the new methodology has been more positive for North Cyprus when compared to the majority of other countries. The following sections provide a comparative analysis of some economies that are positively affected by this situation.

**Table 3: New Methodology:
Positively and Negatively Affected Economies**



Institutions pillar (Pillar1) brings together in total 20 variables to capture security, property rights, transparency and governance related performances. North Cyprus performed a score of 52.8 in this pillar and ranked 72nd, right in the middle of the chart. The lowest scores in this pillar were obtained for the variables on efficiency of legal framework in settling disputes, 34.4 points, and reliability of police services, as 48.1 points. The most successful variable in this pillar is the variable on terrorism incidence: proportion to the population is taken as a basis in the calculations, and

high incidence is considered as a security threat; terrorism incidence rate is %0 and homicide incidence is low (2.5 in 100,000).

Infrastructure pillar (Pillar 2), includes variables for transport infrastructure (air, maritime and land), and utilities of electricity and water resources. North Cyprus's score for this pillar is 46.9. This score is quite close to last year's score, 3.30 over 7 points (%47.1). North Cyprus ranks 119th based on this pillar's score. Last year's ranking was 110th, yet, with a similar score. Given the case, North Cyprus' ranking fell down based on the fact that infrastructure conditions were not improved (though there was a progress in overall ranking). The best performance under this pillar was obtained for access to electricity (100%) whereas the worst was obtained for highway quality (140th), and airport connectivity (127th).

Pillar-3 has been renewed this year and the new title for the pillar was changed to ICT Adoption. This pillar includes the most important variables of digitalisation within the scope of Industry 4.0. North Cyprus obtained its highest ranking for this pillar: 71.1 points, and ranks 29th among 140 countries. This pillar includes 5 different variables on Internet access and all relevant data was obtained from published statistics, thus, the pillar was free from either positive or negative effects of questionnaire respondents. North Cyprus ranked first, in proportion to its population, with 100 points for fixed broadband Internet access, however, scored low and ranked 111th for the number of fibre-internet users. The reasons for such a low fibre-internet penetration level and the reasons behind its lack of roll out are discussed thoroughly in the theme section.

Pillar-4 is Macroeconomic Stability. North Cyprus scored 70.3, and ranked 96th for this pillar. Only two variables were included into this pillar: inflation and debt dynamics. All countries used 2017 data in accordance with the method. Given the case, the study also used 2017 inflation rates. Therefore, high inflation trends of late 2018 did not have any impact on this year's index. As for the second variable, the countries were asked to attribute weights to their public debt in accordance with their country risk scores given by international rating agencies. Given the fact that North Cyprus does not have such a score, the variable was not computed.

Pillar-6 Skills is another area that was modified in terms of its title and content. Skills is an important topic for each and every economy from the vantage point of Competitiveness.

The pillar captures, primarily, the skills of the society and workforce. Divided into two sub topics as; current workforce and future workforce. The pillar also seeks information on how the skills are acquired. North Cyprus scored 54.5 and ranked 97th. Although both the score and the ranking seem to be same as last year, not much progress took place in this pillar, despite the fact that new variables were introduced under this pillar. The best performing variable under this pillar was pupil-to-teacher ratio in primary education with 96.8 points (ranked 16th), whereas the worst performance was displayed for ease of finding skilled employees (ranked 139th) followed by quality of vocational training (ranked 138th). Given the fact that both variables relied on questionnaire responses, they reflect the judgements of business people on the matter. However, the fact that the score and ranking in this pillar does not improve brings along the view that the education system has problems when it comes to creating the workforce of the future.

Markets are covered under the 3rd Section together with its 4 pillars. Pillar-7, Product Market is the first one. The re-organization of this pillar resulted with the addition of new variables expanding the scope of the pillar. North Cyprus scored 59.4, and ranked 51st as far as this pillar is concerned. This pillar covers 8 variables; the best performance was displayed by trade tariffs (ranked 5th), whereas the worst performance was displayed for extent of market dominance (ranked 135th), a variable aiming at capturing the competition environment for businesses. Pillar-8 addresses Labour Markets. The Pillar brings together a total of 12 variables in order to capture the flexibility in labour markets and meritocracy at work. North Cyprus ranks 119th with a score of 50.1 in Pillar 8 labour market. The figure illustrates that North Cyprus is not flexible and does not pursue proactive policies in labour market. The title of this pillar used to be Labour Market Efficiency. However, it's been changed to "Labour Market" in this year's study. While some variables i.e. cost of redundancy, female participation in labour force were preserved some other variables that take into account more the flexibility and agility of the labour market i.e. cooperation in labour-employer relations, active labour market policies, ease of hiring foreign labour were included. In this context, North Cyprus seems to score relatively better in this Pillar; ranked 52nd with 60.3 points when it comes to cooperation in labour-employer relations, and 61st with 50.9 points when it comes to pay and productivity. In this Pillar, the lowest scores were obtained for reliance on professional

management, ranked 135th with 28.2 points, and for internal labour mobility, ranked 120th with 47.4 points.

Pillar-9 covers the Financial System and tries to capture the depth of the financial system and assess its stability through 9 different variables. North Cyprus scored 60.6 and ranked 63rd in this pillar. In previous years, North Cyprus' score and rank for this pillar used to be generally lower (i.e. last year scored 50.7 and ranked 120th). Given the methodology change of this year, and the use of readily available data in most of the variables resulted in casting aside the creation of a negative impact in the scores due to overall negative perceptions expressed through the questionnaire. The most successful performance was displayed for the variable on the loans to the private sector, with 99.7 points ranked 30th. However, in previous years, the responses provided to a similar variable, namely access to finance, were largely negative. Therefore, the scores and the ranking obtained used to remain at low levels (for example, 49.4 points in 2017 and ranked 97).

Fourth section of the study is Innovation Ecosystem comprising of two pillars as Pillar 11 Business Dynamism and Pillar 12 Innovation Capacity. North Cyprus score for Business Dynamism is 62.3 and ranked 53rd out of 140 countries whereas it was at 127th last year. However most of the variables in this pillar were renewed and most of them are based on questionnaire results obtained from business persons. Highest performance under this pillar is obtained by Cost of Starting a Business, which scored 95 out of 100 and ranked at 78th row. On the other hand Attitudes Towards Entrepreneurial Risk was the poorest performance with a score of 37.3 which came at 129th. Attitudes towards entrepreneurial risk which was obtained through questionnaire and considered as an important element in terms of creating innovative ideas but believed that it is closely related with cultural origins.

Among the 12 pillars lowest score is obtained from pillar 12 Innovative Capacity. Not only North Cyprus but all other countries' scores were lowest in this pillar. North Cyprus' score is 35.7 where close to te Global Median of 36 and position is at 76th row. Most of the variables under this pillar is changed as well. One of the newly introduced variable is the diversity of workforce which is considered as a positive factor innovation; Canada and Singapore seem to have the most diverse workforce. The score of North Cyprus in the field of labour diversity was computed 48.9, and ranked 114th. It is an acknowledged fact that the formation of the right corporate culture has a positive impact on innovation.

Table 4: Pillar Scores for Selected Economies

Countries	ENABLING ENVIRONMENT				HUMAN CAPITAL		MARKETS				INNOVATIVE CAPABILITY	
	Pillar 1	Pillar 2	Pillar 3	Pillar 4	Pillar 5	Pillar 6	Pillar 7	Pillar 8	Pillar 9	Pillar 10	Pillar 11	Pillar 12
Albania	53.9	57.3	52.3	70	86.8	68.7	57	64.8	51.3	39.2	64.1	31.7
Seychelles	57.1	67.0	56.6	75	78.0	69.3	60.1	67.8	53.6	16.4	57.6	43.5
S. Cyprus	63.0	74.9	68.8	79	94.4	72.8	63.3	66.9	53.3	39.1	66.9	44.7
Lebanon	45.2	58.5	57.0	68	88.4	63.6	51.2	54.2	66.7	48.9	52.4	38.6
N.Cyprus	52.8	46.9	71.1	70	82.3	54.5	59.4	50.1	60.6	22.8	62.3	34.8
Bosnia	45.6	60.7	45.8	74	85.3	57.5	51.6	51.2	55.1	41.8	52.7	28.2
Egypt	48.1	70.5	40.6	51	68.9	52.8	48.2	46.4	52.3	72.8	54.1	37.7

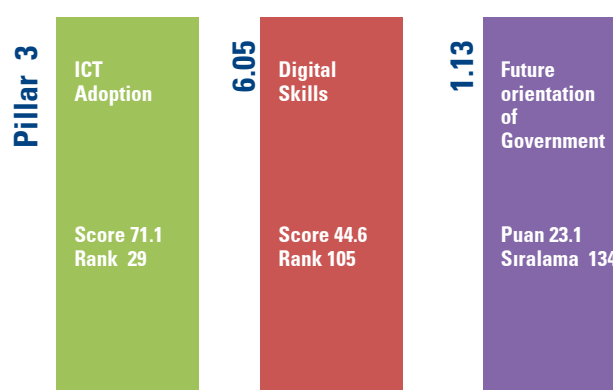
In this context, bringing the creativity of employees to the forefront and encouraging them to experiment contribute also positively to innovation processes. Northern Cyprus achieved the highest success, as far as innovation is concerned, in scientific publications, ranked 17th with 66.7 points, and patent and trademark applications with 23.5 points.

World is evolving towards a digital future. Everything is turning into digital form. Digital transformation process have started, accelerating but not completed yet. Way of life, business formats and even ethical values are changing in this period. We will face with more technological innovations as well as inventions. Not only individuals Daily lives are changing but the format of the businesses who provide goods and services to the markets is changing drastically as the attitudes of consumers and other businesses are changing. Together with this evolutionary changes in the market place regulators and policy makers need to adjust themselves as well.

Competitiveness of many economies is depending on its institutions however together with this report it was discovered that digitalisation of businesses is also closely related with economy's competitiveness. Those countries and businesses who would manage to digitalise will be able to survive and improve their strength. Building competences that is required by digitalisation is utmost important for future economy. That's why the part of Competitiveness Index is devoted to skills and digital infrastructure. Pillar 3 is based on ICT adoption and

includes the way and rate of Access to internet which is one of the main element of digitalisation. Variable 1.13 measures the future readiness of governments since they are the ones who would design and implement necessary policies markets are waiting for. Variable 6.05 measures the digital competences of the society. From the below figures it can be seen that Turkish Cypriots individually are high level user of ICT however when comes to digital skills of graduates or the digital policies of the government it falls far back in the rank compared with other countries.

Table 5: Performance of Digital Variables



Digitalization in Businesses in the Light of Industry 4.0

Introduction

From Industry 1.0 to Industry 4.0- A Digital Revolution

Success Story Analysis in Digitalization Process

Digitalization of Businesses in North Cyprus Survey Results

Conclusion and Policy Recommendations

References

Introduction

Rapid developments in technology bring about rapid changes both in economic life and societal norms. Technological developments do not only pave the way for changes in production schemes of companies, but also change the consumption patterns of consumers and bring along new business models along with different channels and patterns for consumption. Detached from the economic development levels of countries, the use of technology penetrates to each and every individual in the society by means of the social media, thus, embodies the commencement of the digital era. It would be indispensable to isolate the Turkish Cypriot community, at large, and the enterprises that are active in Northern Cyprus, in particular, from such developments.

Hence, the Turkish Cypriot Chamber of Commerce decided to select Digitalisation in Enterprises as the main theme of its annual Competitiveness Report. The Competitiveness Report, prepared by the World Economic Forum and presented under 12 pillars, addresses and analysis different concepts of a given countries competitiveness level. Every year one pillar of the Report is addressed as a theme and is separately and thoroughly analysed as part of the work done in North Cyprus. The theme selected in this year's Report is ICT Adoption in Pillar 3. However, this theme used to be addressed as Pillar 9- Technology Readiness in past years. This year's work reviews the pillar and its content in detail.

The title attributed to the theme is digitalisation in enterprises in the light of Industry 4.0. Thus, the theme is associated with Industry 4.0, a particularly new concept that is being enhanced and put in practice day after day. One underlying reason is the fact that rapid developments in technology relate to all of us as individuals but relates even closer particularly to business people. Thanks to developing technologies, local enterprise concept is slowly losing its standing. Any enterprise could engage in an interaction with business people in other countries and establish business relations be it through international sales or procurements. Therefore, the adoption and implementation of new business models, production, marketing and payment methods that emerge with global technological developments is now a requirement of doing business globally.

It is not possible for an individual or a single enterprise to bring about digital transformation all alone. The

establishment of fundamental digital connectivity infrastructure remains to be vital for further enhancing collaboration among institutions and enterprises. Fulfilling only physical infrastructure wouldn't suffice either; it would also be necessary to have in place legal instruments and relevant policies so that the framework is set. Therefore, these are the justifications that make it inevitable to address digital transformation processes at State level with a centralized approach. Putting together the financial resources required for the initial phases of digital transformation, and also enabling coordination among public authorities renders the whole process faster and more manageable. Central authorities support and its regulations should assist the newly established structure as if it is a living organism, and should enable its development in line with its emerging needs. The most adequate policy and method are to run this process under coordination with the participation of stakeholders.

This part of the study dwells primarily on explaining what the Industry 4.0 concept is all about, how did it emerge and its possible implications. The subsequent parts highlight successful countries and best practices in both Industry 4.0 and digitalisation. In this regard, Singapore is highlighted and analysed as a success story for its rank in competitiveness and its work in the field of digitalisation. The study elaborates on Netflix as a global enterprise, and Koç Holding from Turkey as successful cases of digitalisation process practices. Besides, the Study cites two examples from the Turkish Republic of Northern Cyprus; namely, the electronic signature application and the Chamber of Electrical Engineers' e-visa application as recent success stories. The last part of the Study elaborates on current stages of digitalisation and challenges faced based on the findings of the survey conducted in enterprises in northern part of Cyprus. The findings were used in crafting policy recommendations.

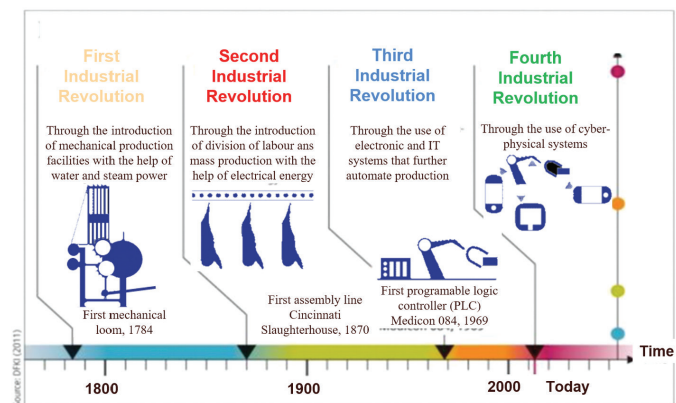
From Industry 1.0 to Industry 4.0- A Digital Revolution

Industry 4.0 or the Fourth Industrial Revolution is a collective term that consists of many modern automation systems, data exchanges and production technologies. This revolution is a whole set of values made up of the Internet of Things, services of the Internet and cyber-physical systems. At the same time, this structure plays an important role in the formation of a smart factory system. This revolution, by enabling each data in the production

sector to be collected, monitored and analysed, will lead to the creation of more efficient business models.

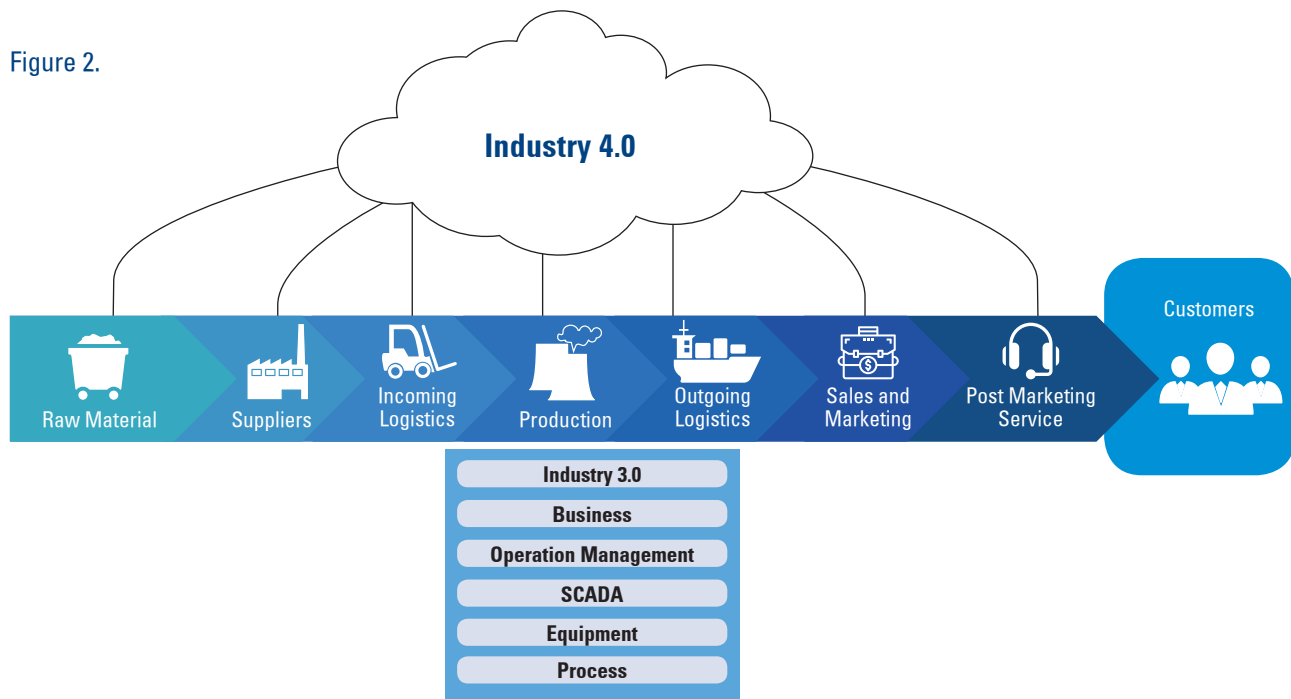
The first industrial revolution (1.0) began through mechanical production systems that used water and steam power. With the second industrial revolution (2.0), mass production began with the help of electric power. The third industrial revolution (3.0) was a digital revolution. Production was further automated through the development of electronic circuits and information technologies. Industry 4.0 is a collective whole of the concepts of technologies and value chain organizations. It is based on the concept of cyber-physical systems, Internet of Things, and the Internet of services. This structure contributes greatly to the formation of the vision of smart factories. These processes are summarized in Figure 1.

Figure 1 Stages of Industrial Revolution



The term 'Industry 4.0' or 'Fourth Industrial Revolution' was first used in the 2011 Hannover Fair in Germany. In 2012, the report prepared by a working group formed by Robert Bosch GmbH and Henning Kagermann was presented to the German Federal Government and the Hannover Fair. The objective with Industry 4.0 is to monitor physical processes with cyber-physical systems, to create a virtual copy of the physical world, and to make decentralized decisions within modular smart factories. The Internet of Things and the cyber-physical systems will be able to communicate and collaborate in real time with each other and with people. With the Internet of services, both internal and cross-organizational services will be provided to and utilized by the users of the value chain. Industry 4.0, which is briefly summarized in Figure 2, includes cyber-physical systems, the Internet of objects, cloud computing and cognitive information technologies.

Figure 2.



What is the objective of Industry 4.0?

Industry 4.0 basically aims to bring together Information Technologies and Industry. Its main component is the New Generation Software and Hardware. These are smaller, more energy-efficient hardware that cost less and produce less heat, but which, at the same time, are highly secure. They operate with resource and memory efficient operating and software systems. The second and perhaps the most important component is the Internet of Things, a smart electronic system with an Internet connection, which is integrated in all devices and vehicles, which is equipped with sensors and operators, and where all the devices in the world exchange information and data. This system can also shortly be called Cyber-Physical Systems. The use of cyber-physical systems in factories in the process of production means the creation of 'smart factories' that can self-coordinate and self-optimize and produce almost totally independently from humans. If the Industry 4.0 strategy comes to life, production time, costs and energy needed for product will decrease and production volume and quality will increase.

Industry 4.0, by redefining the nature of manufacturing, constitutes a huge opportunity for countries. Industry 4.0 will create an intensive and linked network of facilities, providers, partners and clients that will replace independent factories. To manage these intelligent facilities and global supply chains, new jobs where humans and machinery work together, will be created [4]. Industry 4.0 mainly refers to advanced products and services, road safety, better working conditions and even health services, which significantly affect our lives, beyond just potential increases in production and resource efficiency

or robots that can collect large amounts of data. Our daily life and purchasing and consumption patterns are changing dramatically through a wide range of products and options such as one-touch shopping experiences. Thanks to the portable, intelligent and high-capacity communication devices now owned by every segment of the society, future customers, who will easily be able to reach markets in larger geographies, will demand more choices and more personalized products and services.

Many conferences, training programs and short-term courses are being organized to discover how to understand, reflect, direct and implement the right tools to manage I4.0 well and to contribute to digitalization-oriented developments worldwide. These courses promise to provide information about the most popular drivers of I4.0, which are artificial intelligence, drones, robots, block chain, bio-engineering and many other instruments [8, 9]. It is possible and would be very useful to design similar courses and provide them to the relevant sectors in the TRNC so that the awareness of businesses about I4.0 can be increased. With the rapid developments in digital technology and the increasing integration of production and supply processes, it is time for Industry 4.0 to come to life. For companies globally, Industry 4.0 promises technologies that enable the creation of intelligent facilities that are highly efficient and digitally integrated, rather than technologies that hinder the development of business processes. The smart factories that will be the focal point of I4.0 will benefit from information and communication technology for a further development in the supply chain and production line, which will expand both the automation and

digitization levels. Here we are talking about quite significant cost advantages and provision of higher quality goods or services, and the use machines that use self-optimization, self-configuration and even artificial intelligence to complete complex tasks. The main concern is how soon all these will happen, rather than whether they will happen or not.

The Effects of Industry4.0 on Social life

The Fourth Industrial Revolution (I4.0) is reshaping the state structure, education, health and trade systems, and is therefore, changing every aspect of our lives from the way we live, to the way we work and communicate. This change may include negative aspects as well as positive ones. The Positive Changes may be listed as Education and access to information by all the people in the world, including those in underdeveloped countries, thanks to rapid and economic access to all kinds of information, enhanced information technology devices and networks, digital services and mobile intelligent communications devices. The social media revolution, which includes Facebook, Twitter and Instagram, provides an opportunity for everyone to communicate instantly with everyone around the world. Today, more than 30% of the people in the world use social media services to communicate and follow events around the world. Online shopping and delivery services, which are improving even more with drones, have already made our lives easier and are redefining our retail experience. The ease of delivery has the power to transform communities even in remote locations, and help develop even small or rural economies. Advances in biomedical sciences in the physical sphere can lead to healthier lives and longer life spans. They can lead to innovations in neuroscience, such as connecting human intelligence to computers or improving intelligence, or experiencing a simulated world. Thanks to the Fourth Industrial Revolution technologies, developments in automotive safety can reduce road deaths, insurance costs and carbon emissions. Autonomous vehicles can reshape the physical sphere of cities, architecture and roads.

In addition to these positive gains, it is foreseen that Industry 4 will bring negative changes. The changes caused by new technologies may lead to the rise of new social values. Therefore, it is important that when transitioning into I4.0 with new technologies, the process starts and is planned correctly. For example, because artificial intelligence automates a variety of tasks, a whole new level of productivity will arise, which inevitably will lead to unemployment in many lines of work. On the other hand, as with the emergence of Internet,

the artificial intelligence revolution will transform many jobs and create new jobs that will stimulate economic growth. As I4.0 progresses, less educated and less skilled workers will become more disadvantaged. Businesses and governments should adapt to the changing nature of the business by focusing on educating people for tomorrow's jobs. Talent development, lifelong learning and the invention of new careers will be critical for the future workforce.

Recently, there has been a significant shortage of information technology experts in the world job market. By information technology experts, we refer to skilled people, who know at least a number of the modern programming languages, software developers, computer network security experts, and information system developers. In the present day, where millions of images, videos and text are constantly being uploaded on social media such as Facebook and where Big Data are being discussed, Database Management also becomes important. Software developers are expected to be competent in database management. It is foreseen that new jobs in the field of Human Resources and Development that are not yet in the market will also emerge. For example, excessive capacity brokering will emerge as a new line of work, where idle assets will be turned into money, by renting spaces or machinery from companies with the aim of increasing productivity and competitiveness. Those who will wish to do this in the future will probably need experience in logistics or supply chain management. Human-technology-integration experts will be those people, who teach people how to use and utilize a wide variety of technologies to improve the quality of their lives. These people, who will be experts in the fields of information and technology, will present a holistic approach that examines all the different business and consumer technologies used by a person, and streamlines devices and platforms to get the most out of them. Medical Mentoring will arise as a result of the inclination towards value-based-care at medical centres. These will be people, who will help patients in the field of health services, help them follow the doctors' advices about exercise, diet and medication, help them overcome obstacles that keep them from living a healthy life, check-in after doctors appointments. These experts may be considered as doctors' assistants or nurses [1]. Lastly, Event Planners, who organise events such as conferences, fairs and weddings, are increasingly in demand in the international arena. This also became popular in the TRNC at some point but then went down as most companies that got involved in it failed. There even are specific programs in this field under the Public Relations Departments at universities.

Success Story Analysis in Digitalization Process

A Country Success Story: Case of Singapore

Singapore, which is one of the most successful countries in terms of digitalization, has area of 622 km² and a population of 6 million. Therefore, it is a small economy that can serve as an example for North Cyprus, which has a population of 350,000 and an area of 3350 km². Singapore's economy is largely based on trade. It is recognized as a high-value production centre in the fields of aerospace, semiconductors, chemicals and bio medicals. For example, 10 % of all integrated circuit chips in the world are manufactured in Singapore. Five out of 10 most important drugs worldwide are produced in Singapore. With its advanced engineering and innovation capacity, Singapore is ranked fifth in the world for value-added products according to the Bloomberg Innovation Index. At the same time, it is fourth in the world after China, USA and Germany as a high-tech products exporter.

According to a study by Boston Consulting Group, Industry 4.0 can add a total output of \$36 billion to the Singapore economy, increase labour productivity by 30% and create a total of 22.000 new jobs by 2024. With its talented workforce and innovation power, Singapore is well positioned to be among the best places for companies to design and implement Industry 4.0 strategies [4]. In addition, significant income is obtained from services such as transportation, chemical products, banking and financial services, oil exploration systems, tire, food-beverage, ship repair shipyards, international construction contracting, medical and health industry, bio-technology, export (mainly in the form of acting as intermediary), insurance and communications. Including Singapore State University, which is the 68th best university in the world, Singapore has around 300 universities (including 44 large ones), all of which are well integrated into the industry, and 420 thousand university students. 18% of these students, which corresponds to roughly 75,000, are international students coming from elsewhere.

The contribution of Singapore's manufacturing sector to its GDP was around 11% in 1960. It increased to %28 in 2000 and today it is 20% [2]. During this period, Singapore's manufacturing capability has improved significantly, along with strong competencies in high-value production areas such as R&D and product design. Singapore is a leader in Global Trade and Investment, as one of the most open and trade friendly countries in the world. A strong institutional

framework increases Singapore's success in many fields. The government continues its vision of being future-oriented in all of its projects. The government has recently announced the Singapore Smart Industry Preparatory Index, which is a tool that will help industrial companies to take full advantage of the Fourth Industrial Revolution [4].

According to a new report by The World Economic Forum (WEF), Singapore is among the top 25 countries that will be able to benefit in the best possible way from the rise of advanced production and intelligent factories. The report analyses how 100 countries and economies will be able to benefit from the Fourth Industrial Revolution or Industry 4.0 and the rapid rise of new production technologies. The report found that Singapore is "among the leaders in production today" and will be among countries that will have a good position in the future of production. Singapore comes second after the United States in the rank of production drivers, which are key in helping countries globally to benefit from Industry 4.0. Singapore is one of the leading countries in the Industry 4.0 transformation. It is seen as a country that has the advantage of making a leap, force boundaries in the most effective way and turn the readiness to transform into a real transformation. The real transformation is still evolving, but leading countries are at the forefront of designing, testing and developing emerging technologies.

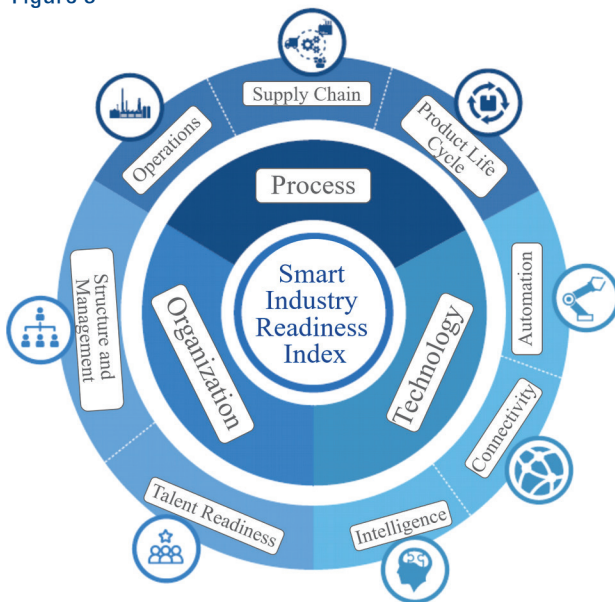
In this process, Singapore's manufacturing capabilities have evolved considerably, along with strong competencies in high-value production areas such as R&D and product design. Many countries are developing government-backed strategies to take advantage of the Fourth Industrial Revolution, but it is underlined that no country is fully prepared to use the full potential of the Fourth Industrial Revolution in production. Lim Kok Kiang, deputy director of the Singapore Economic Development Board (EKK), said the vision of the Republic of Singapore reflects efforts to establish an ecosystem to ensure the adoption of improved production among large and small firms.

Lim Kok Kiang summarizes the process as follows: "Transformation is a journey that will take many years, and there still are many things to be done. It is important that we continue to work closely with companies, businesses and trade unions to increase our competitiveness and ensure that our workforce is well equipped to support and enable the future of production. Singapore's passion is to become a global hub for production and one of the best places around the world for high-tech innovation. What make Singapore unique are the industry, and the strong cooperation between

the partners' ecosystem and the government. This enables companies to turn Industry 4.0 concepts and technologies into new values for Singapore and the markets around us.

While Industry 4.0 is globally gaining momentum, according to the 2016 Industry 4.0 global survey conducted by PwC, nearly three quarters of respondents predicted high levels of digitalization in their companies over the next five years. Nevertheless, McKinsey's 2017 digital manufacturing global expert survey highlights that the lack of a clear vision, strategy, and systematic roadmap are the biggest challenges that will delay Industry 4.0. The Singapore Smart Industry Preparatory Index (Index) has specifically been developed to address these challenges. The index, approved by industry and academic advisory committees, has been designed as a comprehensive tool for all companies, regardless of their size or the sector in which they operate. The Index covers the elements of Technology, Process and Organization, which are the three basic elements of Industry 4.0. It creates a balance between technical rigor and usability. The Index, which is summarized in Figure 3, is composed of the 3 main building blocks of Industry 4.0: Process, Technology and Organization. There are 8 focal points under the 3 building blocks [4].

Figure 3



Micro Success Stories in Digitalisation:

Cases of Netflix and Koç Holding

Leading in technological developments and benefiting from all opportunities are of the most important factors for success for the business world. Today, we are going through a period during which the change in the business world is rapidly

increasing with stunning advances in digital technologies like mobility, social networks, artificial intelligence, the Internet of Things, and cloud computing. Besides effects of technology, such as the increase in productivity and flexibility, the changing behaviour and expectations of customers using digital technologies, not only require a different approach to customers, but also lead to new growth opportunities and different business models. With the changing consumer behaviours, speed of technology and increasing digitalization, businesses in today's world are re-constructing their business models, products and services, and their ways of doing business. While they change to become the company that changes the rules of the game or that sets up new rules in this interaction, they also change the ecosystem in which they exist. The footsteps of digital change are manifested without any distinction between size and maturity, in each and every sector. We are living through a period where the general economy and competition are changing very rapidly. Keeping up with this change is no longer a choice but a necessity for businesses. Every businessperson, who wants to improve and develop his/her business, has to digitize his/her company. Rejecting digitalization, while not providing any benefits, would sooner or later cause the company to be excluded from the market.

The digital world of today enables access to information, products and services through a variety of channels, to the extent and pace we could not have imagined until recently. Companies are experiencing intense pressure to provide a continuous branding experience by offering a holistic approach to branding at many channels, vehicles and contact points that customers use. Besides, many data that could not be collected and processed before, can now be processed with analytical tools that companies can easily access. Companies are now trying to understand their own operations as well as the market and therefore, to have advantage over their competitors by analysing and understanding the big data about their own business practices and their customers. At this point, the digital strategies of companies constitute an important step towards creating companies that can make better decisions.

Business strategies in the process of digitization and successful transformations from around the world

Despite the economic uncertainties in the world, digitalization in enterprises continues to rapidly change the traditional ways of the business world. Despite the decline in many

sectors, electronic commerce is growing by double digits in mainly Asia, and the US and Europe. While institutions are becoming more integrated with each other via electronic links, digital business tools and methods are rapidly changing.

The primary problem of digitalization is all about a mentality revolution. Successful managers are closely monitoring the changes in this field and are fully aware that they have to come up with solutions in terms of competition and profitability from an innovative perspective. The Digital Strategy dimension shows the extent to which companies integrate digitalization into their organizational strategies to achieve their goals and objectives. The digitalization maturity of companies is based on several key indicators in the Digital Strategy dimension. These indicators are respectively Prioritisation, creation of a Roadmap, setting Performance goals and Return Calculation. Some of the successful companies that have implemented the digital transformation strategies and led the sector are mentioned in the following section.

A Successful Digitalisation Case from the World: Case of Netflix

Netflix was founded in 1997 in California by software developer Marc Randolph. During that period, the DVD was a very new development and the company was founded considering the demand for DVDs. At the beginning, the company only sold and rented DVDs. Customers, who wanted to watch a film, would order DVDs from Netflix and wait for it to be delivered to their home instead of having to go to the store. Initially, films were rented for cheap and the shipping cost belonged to the customer. But this system changed over time. Netflix, which started off by providing services through its Internet site, began determining the preferences of its audience and the popular categories. Then, it started offering some packages to its customers based on popular productions. In the 2000s, the company grew phenomenally. During the same period, the company made a deal with CineMatch, which enabled its audience to rate the movies they watched. This rating system proved beneficial in terms of analysing preferences. In this way, the company understood which productions the users like or disliked. New services were developed and presented according to the products that were popular.

After the attack on Twin Towers in 2001, people started spending more time at home and there was an increase in movie rental services. During this period, Netflix greatly increased its investments and distribution points in order to be able to meet consumer needs. The number of its

subscribers reached over 4 million. As of 2007, the problem of waiting for the delivery of DVDs was eliminated, as people were able to watch movies on their personal computers. This technological turning point enabled Netflix to become the success story it is today. Today, Netflix has more than 100 million subscribers all over the world. It uses algorithms that can calculate human psychology by analysing preferences and experiences, and offer personalised products. The aim of this is to increase the time that subscribers spend on the site, so that they consume more content.

Airbnb and Uber are among the most important companies that changed their business structures in the face of changing consumer patterns and preferences, and increased competition. As a result of this successful transformation, they have become sector leaders. Uber, which took into account the digital change, consumer preferences and changing consumption models, provides customers with urban transportation services in a digital environment. It has become a popular and widely used model in especially big cities all over the world. Airbnb has made a similar transformation and become successful by facilitating the arrangement of private accommodation for travellers by working two-way between customers and businesses in a digital environment. The business, which was established in 2008, had a sales turnover of \$2.6 billion in 2017.

A Successful Digitalisation Case from Turkey: Case of Koç Holding

There are enterprises in the Turkish economy that have initiated a digital transformation strategy in order to approximate themselves to the changing world, hold on to international markets and bring about internal innovations. Koç Holding is one of such success stories at corporate level. "Digital Transformation" has been identified as a priority in 2016 in order to carry through the Group's leadership role in various fields. Essential components of digital transformation were identified as; providing the customer with a buying experience designed from the very beginning till the end, responding better and faster with customized products/services, tap into the opportunities provided by digital technologies in production phases, increasing efficiency by simplifying business processes, mobilize staff participation and creativity, and bring about business models that were deemed to be technically impossible. The objective pursued was to empower the

Company managed to save 3 million TL per unit. The system will be replicated in 22 units in the upcoming term. Arçelik: The set-up of the Arctic 4.0 Washing Machine Factory in Romania has started. The factory is planned to be the first production facility with Industry 4.0 standards.

Two Successful Digitalisation Projects from North Cyprus: E-Signature and E-Visa

The most important element in digitalization is carrying over to electronic media all the processes through which businesses produce and sell their services and/or products. However, although businesses complete their digital transformation internally, enjoying targeted benefits of digitalisation will remain at low levels as the public administration has not transferred its services the digital structures. Therefore, one of the important pillars of digital transformation is the digitalisation processes of public administrations. In addition, the administration should bring about the legal and security dimensions required for digitalisation.

The introduction of the Electronic Document Management System (EBYS) and the electronic signature application in Northern Cyprus could be viewed as the important steps taken ahead in recent years by the public authority towards the digital transformation of Public Authority. Enterprises that have compatible practices with the structure offered by the public authority will be in a position to enjoy the time and cost benefits along with achieving competitive advantages. The Electronic Document Management System is a technology that includes imaging, document management and work flow processes that are used on a daily basis in work units to create, distribute, review, approve, store, edit, archive, retrieve and delete documents that are vital to comply with legal requirements.

Chamber of Electrical Engineers preliminary permit and visa application

Given the fact that significant amount of electrical equipment and materials are imported from abroad, the admission of materials and devices to the country requires to obtain a license from the Chamber of Electrical Engineers (EMO). The law mandates the Chamber with the supervision and control of the imported products and their compliance with national infrastructure and legal regulations. Work and pressure used to pile up in the preliminary permits unit of the Chamber of Electrical Engineers due to the ever-increasing numbers of imports and daily transactions. With the conviction that the

way to provide better, faster and cheaper services both to its members and importers would go through digitalisation, the Chamber of Electrical Engineers has developed a project and started its implementation in 2019. The processes illustrated in Figure 4 were established as a result of the consultations with all stakeholders. This practice provided the importers with time, cost and environment-friendly benefits.

This system allows the importer to apply for import permits at any given time from any given place without necessarily having to be present physically in the Chamber of Electrical Engineers. The application is submitted through the website of the Chamber (www.ktemo.org) by making use of the e-emo application. Once submitted, the importer's application is received as a demand under EMO's Documents, Process and Forum Manager system. The engineer working in the preliminary permit unit performs necessary checks, then again in digital environment, and identifies the products that are eligible for import. The system automatically sends the importer the amount he/she has to pay for the Eligibility (preliminary permit) license fee. If he/she wishes to do so, the importer makes the payment with his/her credit card via 3D secured online payment option. When the system receives the payment document, the system sends the Eligibility (preliminary permit) license to the preliminary permits unit by attaching the electronic signatures of two engineers, and sends it online to the importer, customs broker and Customs Directorate.

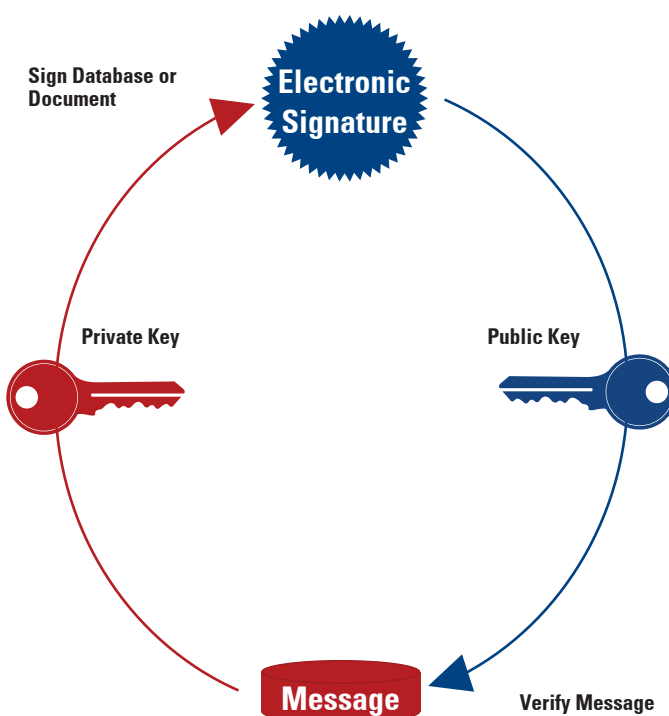
Prior to this process, in 2018, the Chamber of Electrical Engineers used to consume on a monthly basis 12,000 A4 papers, 4 printer toners and consume electricity for the printer only for issuing import licenses in signed hard copies. The Chamber had to allocate also vast amount of room for archive purposes. The Chamber also had to keep other documents separately i.e. the copy of pro forma/invoice sent by the importer during his/her application to the Chamber as well as the copies of CE certificates for relevant products. Digitalisation of this process resulted in both reduced service times and reduced costs.

Another Successful Case of Digital Transformation: Electronic Signature

Innovations emerging as a result of the progress in information and communication technologies are most often implemented primarily in the private sector. Their use in the public sector usually comes afterwards. Private sector's aspiration to increase profit margins while reducing costs could be the

main underlying reason for this situation. IT technologies remain to be one of the most used instruments towards this end. Widespread deployment of such technologies yields in lower costs, increased profit margins and more time savings. Besides, standardized service quality and business processes bring along significant advantages in terms of customer satisfaction.

There are a wide range of business processes and services that need to be followed and maintained by the public administration in accordance with legal regulations. The digitalisation of business processes through intensive use of information and communication technologies in public administration eliminates the risk of human errors and unnecessary stationary costs. While providing lower costs, better quality of service for citizens and sustainable resource management for the public administration, it provides, on the other hand, lower costs (time, labour, money), higher satisfaction levels, more effective participation and greater trust for citizens. When it comes to boost the efficiency and effectiveness levels of the State, the developments in the sphere of using information technologies also for the products and services offered by the State, push the State to change its structure significantly. Information-based change does not only encompass the business world. At the same time, organizations such as public institutions and organizations, banks and insurance companies, strategic defence units, private or public universities and voluntary organizations are also striving to be able to respond to the demands of the information-based society.



E-government is the search for new opportunities in providing public services to the citizens and to the business world. As far as the communication between the citizens and the State is concerned, the amount of savings that will be achieved by transferring processes into the electronic environment will attain huge numbers; i.e. by removing the use of red-tape creating stationery or by transferring processes such as filing, archiving, communication, searching for records, authorization and transactions that are being applied in basic public services areas such as health, education, security and justice. Such practices enable efficient and effective use of resources and thus, increase the efficiency of the State. At global level, Electronic Signature (e-signature) has become one of the most important practices in the field of e-state and electronic security. Electronic signature plays a key role in the transition to electronic life in both the public sector and private sector. Electronic Signature is a fundamental element of e-state, e-business and e-citizen concepts. The widespread use of the electronic signature means that the state provides better services to its citizens and the companies provide better services to its customers and employees. The States reveal a great desire and excitement to engage in an interaction with their citizens on the Internet by ensuring the simplification of boring and cumbersome bureaucratic procedures through e-government and e-signature applications.

Digitalization of Businesses in North Cyprus Survey Results

In this section, some data are put together in order to demonstrate the extent of digitalization in enterprises operating in North Cyprus. Data and observations in this area have been obtained in three different ways: Firstly, face-to-face interviews were held with representative Hilmi Kansu of ComTech Ltd, and representatives Lisani Deniz and Cüneyt Çerkez of Denizler Bilisim to get information about the developments in the sector and digital developments in the world. Face-to-face interviews were also held with Mr Kadri Bürüncük, the chairman of the Information Technologies Communications Authority; and Mr Ersan Dağlı, a representative of Dağlı Sigorta, who established an electronic payment and service system in his enterprise. Secondly, a survey was carried out covering 100 enterprises of different sizes in different sectors and different geographical regions. The survey was conducted by Lipa Consulting Company between 4-27 February 2019. Finally, statistics on information technology and digitalisation published by the Information Technology and Communication Authority, the State Planning Organisation and other public institutions were

used. The results of the data and observations obtained from different sources are detailed below. Since the theme of the report is 'Digitization in Enterprises' the survey questions were designed taking into account the three dimensions of digitalization in the enterprises: (hardware), software and business processes. In this context, in addition to questions related to the procurement and use of devices, software preferences and business processes, questions on the problems faced, plans and strategies and staffing situations were also included in the survey.

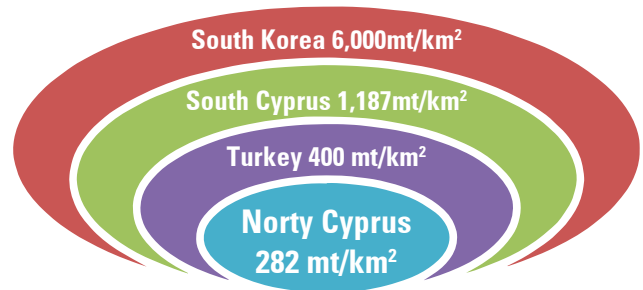
Internet Use

The initial phase of digitalization in enterprises, which is the theme of this year's Competitiveness Report, is perhaps access to Internet. For this reason, the enterprises were firstly asked how and at what speed they access the Internet. From the answers given to the question of how the enterprises connect to the Internet, it is understood that 73% of the enterprises use wireless networks (Wi-Fi), 22% use ADSL, and the remaining 5% connect to the Internet through other means. When it comes to the Internet connection speeds, which is an important factor for providing services in a digital environment, it was found that approximately 50% of the enterprises have an Internet speed of 10MB and more, 30% have an Internet speed of 5-10MB and the rest have an Internet speed of less than 5MB. In addition, it was found that the enterprises make an average annual expenditure of 3,239 TL for Internet subscriptions.

The low fibre Internet use, which is one of the variables of the Competitiveness Report, is noteworthy. According to the data provided by the Telecommunications Department, fibre

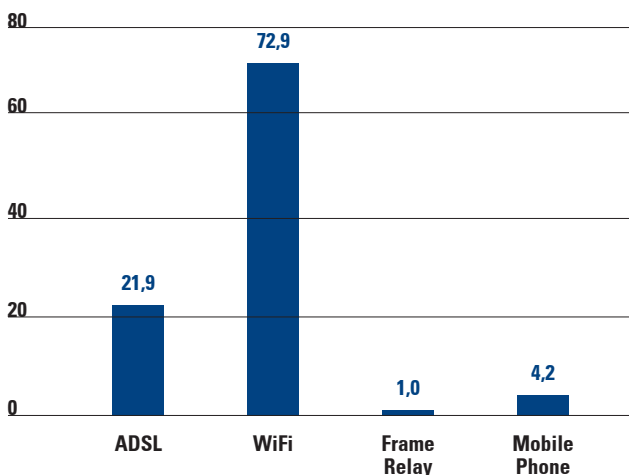
Internet use in North Cyprus is 20 in 100,000. This explains why wireless Internet connection rates are so high. The low fibre Internet use is most probably due to the inadequate fibre cable infrastructure in the country, as well as the fact that the Telecommunications Department is the sole entity with the authority to lay fibre optic cables. Lastly, fibre Internet use remains low due to high fees. For comparison, there are 6,000 meters of fibre optic cables in South Korea per kilometre, 1,187mt for South Cyprus, 400 meters in Turkey, and 280 meters in North Cyprus.

Scheme 2: Fiberoptic Lines per square Kilometer

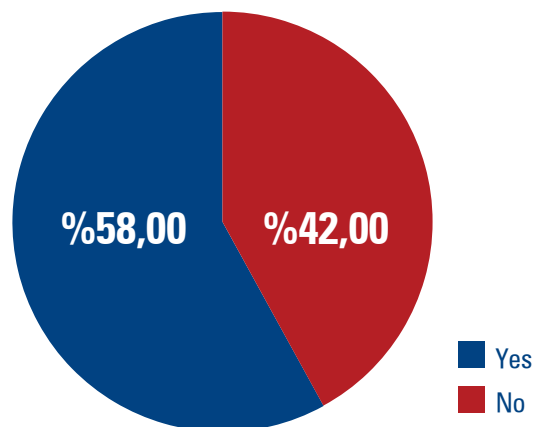


While 58% of the companies surveyed have a corporate website, the remaining 42% do not. This is a high rate of lack of corporate websites. When we look at the distribution of website availability by sectors, it can be seen that the number of companies that have a web site is higher in the commerce sector. In addition, the higher the number of employees in an enterprise, the more likely it is to have a web site. However, today with active web site use, an enterprise can deliver its services or products to the global market regardless of its size or geographical distance.

Internet access types of the enterprises



Ovnership of a Corporate Web Site

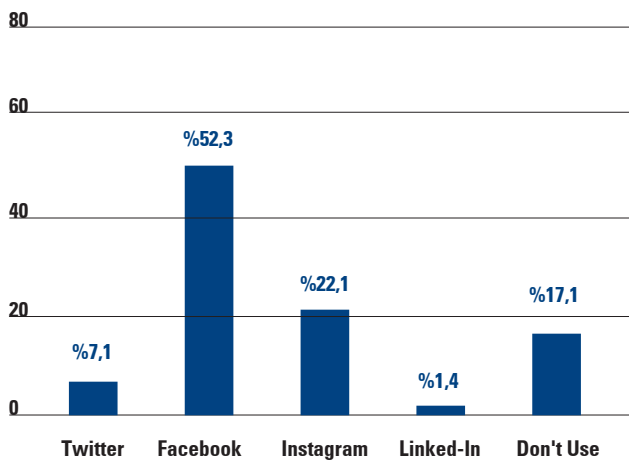


Web Site Ownership by Sector



Another question that was posed to the enterprises was the social media channels they use. According to their responses, it was found that 52% of enterprises are on Facebook, 22% are on Instagram, 7% are on Twitter, and 2% are on LinkedIn. 17% of them do not have social media accounts. Since the survey was intended only for businesses, no data was gathered regarding personal social media use. But it is widely known that individual social media use is increasing by day. For this reason, it is obvious that social media visibility of the enterprises would increase their communication with customers.

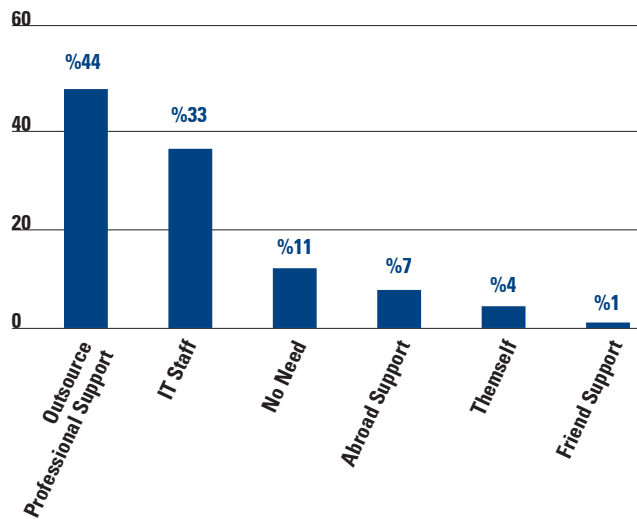
Appearance at Social Media



Human resource, which is one of the most important factors in the digitalization process, is a problematic issue in North Cyprus, as it is in many other countries. As mentioned above, new professions are expected to emerge with the digital transformation process, while some professions are expected to disappear. However, as stated before, there is a big need for software engineers, system analysts and database managers in certain sectors, and there is a serious shortage of human resource in the market in these fields. This is confirmed by the business owners interviewed and the responses given to the Competitiveness Survey. Another questions asked to enterprises in the digitization survey was from where they get their IT services. The responses demonstrate that 33%

of the enterprises have an in-house IT employee, while 67% outsource this service. The responses also show that the enterprises spend an average of 1,734TL per month for Internet maintenance services.

How do you support IT services?

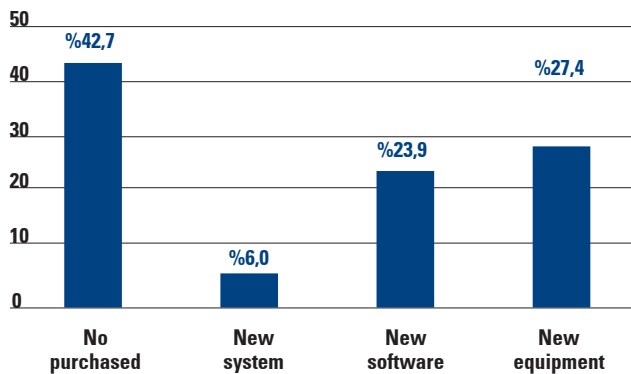


Both the public sector and the private enterprises need to have a digitalization strategy, if the companies and the country are going to prepare for the future. However, it is understood from the findings that very few of the enterprises have digitalisation strategies. Most of the responses from enterprises point to innovation and capacity development limited to the web site. In the Competitiveness Survey, enterprises were also asked about the "preparedness for the future." This question was aimed at understanding the government's digitalisation strategy. Those taking the survey were asked to rate the preparedness of the government by choosing a number from 1 to 7 (1-bad, and 7-very good). The average number was 2.38. In other words 23%. This rate points to the need for the governments here to have a more comprehensive transformation strategy on these issues. But more importantly, it shows that even if there are certain efforts, they are not brought to the attention of the public and the business world.

There is a general concern all over the world that as a result of digitization the need for labour will be reduced and that this will even lead to unemployment. However, as stated in other parts of this report, let alone losing their jobs, it will be possible for employees to benefit from the process, as long as they improve themselves professionally and adapt to the arising needs. In this context, the representatives of enterprises were also asked whether new software, system or equipment in connection with digitalization was purchased within the last year. They were also asked if anyone was hired or fired as a result of this purchase. The responses showed that 40% of the

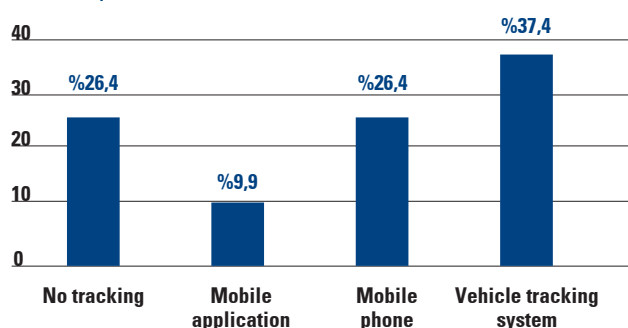
enterprises did not make such a purchase. 27% purchased a new device and 22% purchased new software. Only 2% of the enterprises fired an employee as a result of such purchases, while 28% hired new personnel.

New software, system or equipment in connection with digitalization was purchased within the last year ?



The survey also had questions about the use of vehicle tracking systems, which has become increasingly popular among enterprises. By tracking their vehicles, the enterprises aim to reduce the costs of vehicle use, control their personnel, and more importantly, to render their business processes more efficient. 37.4% of the enterprises that took the survey said they use the vehicle tracking system. 26.4% track through mobile phones and 9.9% track through mobile applications. 26.4% of the respondents (mostly micro-scale enterprises with around 1-5 employees) stated that they do not track their vehicles.

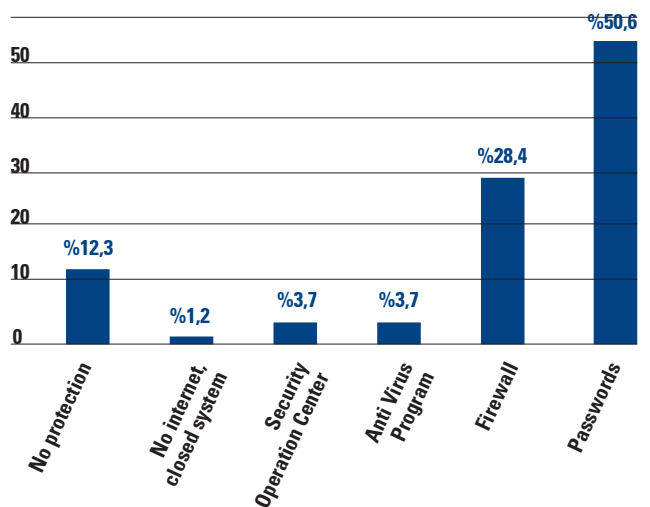
How do you track vehicles?



Along with digitalization, security concerns have increased throughout the world. As the number of digital processes increase, and as data is digitalized and stored in digital environments, serious threats have started to emerge for businesses in North Cyprus as well as in the world. Enterprises

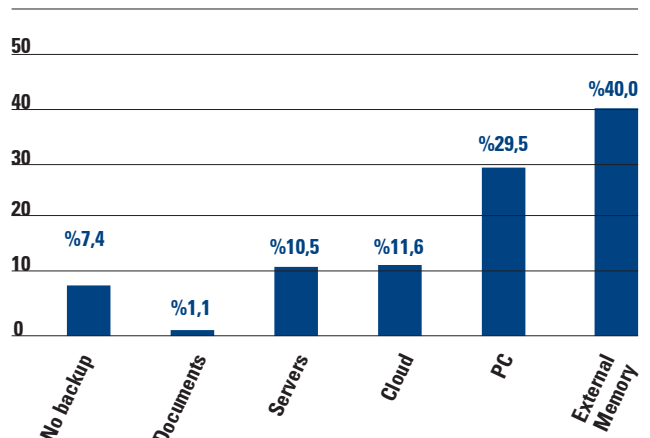
are faced with cyber attacks or virus threats that may lead to financial losses or losses of data and information. When enterprises were asked about how they protect themselves against such cyber threats and attacks, most said they use passwords (50.4%) and firewall (28%). A small number of enterprises (3.7%) said they use anti-virus programs. Here it was found that the size of an enterprise played a role in the method of protection against cyber threats and attacks. Large-scale enterprises (100 or more employees) were found to be more likely to have a security operation centre for protection.

How do you protect business against from Cyber Threats and Attacks



From the responses given to the question: 'Have you faced any cyber attacks or virus threats in the last year?' it was found that such attacks and threats are more widely seen in the services sector. Enterprises were also asked how they store (backup) their data. 40% said they use an external memory, 29.5% said they store data in the computer, and 11.6% said they use the cloud system.

How do you store (backup) of your business data?



One of the most widely used software in the enterprises is the ERP. 53% of enterprises that took the survey said they use such software. It also has been demonstrated that different modules of the software - such as stock control, sales, human rights management, finance, and production - are also used widely by enterprises. Enterprises were also asked since when they have been using these systems. It was found that companies that have these systems have been using them for over 5 years. In addition, 62% of the enterprises said their production or services increased and/or improved with the use of these systems. This shows that with digitalisation, business processes are more standardised, quality is increased, and mistakes and problems that arise due to human mistakes are decreased.

Enterprises were also asked to list the most important obstacles in front of using such software and systems. Despite a wide range of different answers, the biggest obstacle was found to be the lack of qualified staff. Financial obstacles ranked second. Among other obstacles listed were lack of adequate infrastructure, and the inability of service providers to provide enterprises with adequate information and support.

Problems Avoiding the Use of Software and System	Percentages
Lack of Experts	%38.7
Financial Problems	%19.3
Lack of Infrastructure	%16.1
Lack of Knowledge	% 4.8
Other Reasons	%21.1

The enterprises were also asked about e-commerce, which is considered as one of the most important stages of digitalisation. Only 21% of the enterprises that took the survey said they are engaged in e-commerce. Looking at the sectorial distribution of e-commerce, it can be seen that it is mostly used in the services sector - especially in banking and tourism. 57% of enterprises that said they did e-commerce also stated that they accept electronic payments. Enterprises were also asked what the biggest obstacle in front of doing e-commerce is. Most of the respondents said: "The lack of recognition of

the TRNC." High telecoms costs, company culture, lack of adequate infrastructure and lack of qualified staff were among other responses.

Conclusion and Policy Recommendations

Digital change is more than just the adaptation of new technologies, the opening of a new sales channel or the interaction on social media. The combination of smartphones and tablets, which are now part of the daily life and social media, mobile applications, cloud applications, and advanced analytical capabilities, provide consumers with unlimited access to information that they can use while performing their daily purchasing activities. At this point, digital change is far more than just making a new website or creating an e-commerce platform. Digital change is a phenomenon that involves the improvement of the experience of everyone from consumers to employees and from suppliers to customers.

The Legal Framework of Digital Transformation

The establishment of legal frameworks in the process of digitalisation enables more widespread and efficient use of technology. As such, legal framework has also significant effects on environmental or sustainability standards. As an external factor, legal framework assumes an important role in time schedules. Laws often emerge as a response to innovation. However, since all businesses do not operate at the same technological level, laws and legal requirements also determine the process of adopting digital transformation. Governments play an important role in designing enabling conditions for the formation of Digital Transformation. It is a known fact that a sound legal basis facilitates higher quality production processes and higher product quality. Besides, it is also suggested that, the relevant official parameters are particularly helpful in the process of building data security and data standards. Although there is a lot of concern about security, standards and security issues are considered to be among the most important preconditions to render digitalisation into success story.

Although digital transformation is mainly referred to the transformation of businesses, governments, government agencies, other institutions are also affected by making use of one or more of the existing or emerging technologies. In some countries, such as Japan, digital transformation goes far beyond the limited vision of "Industry 4.0" of other countries. As such, it aims to influence all aspects of life through "Community 5.0"

vision. Ensuring successful digital transformation process in TRNC would primarily require developing legislation on digital matters. As a next step, implementing agencies, namely the ones that will carry the process forward, would have to adopt the legislation. It would also be necessary to provide trainings to take on board the practitioners. The outcomes obtained would then be used to highlight the challenges caused by institutional and legal loopholes. Thus, further enhancement of the process should be ensured within a closed cycle.

Technical Infrastructure for Digital Transformation

Digital transformation experiences at global level highlight the importance of establishing required infrastructure and enacting legal instruments for digital technologies i.e. for social media, mobile technologies and embedded devices. In this context, 4G, 4.5 G installed on fibre optic main-carrier or even 5G seem to be the main backbone of digital transformation. The State promptly needs to consolidate its existing legal infrastructure in order to ensure deep-rooted developments that are also required for the supra-structure i.e. improving customer experiences in business processes, facilitating business processes or creating new business models. In addition, it is also important to provide the financing support that would assist all these processes. It should be remembered that social transformation couldn't be achieved through personal entrepreneurship, fuelled only by individual courage. The state supports significant part of R & D activities in societies leading the digital transformation domain. To illustrate it with an example, in the United States, R & D activities were fully supported by the State in the 1950s, whereas in 2018 only 50% of R & D activities were sponsored by the State. Similarly, in Germany, the State provides research support at comparable rates to research institutions engaged in research, especially in the field of fundamental sciences. On the other hand, in Singapore and South Korea, research is being carried out with Public-Private Partnership (PPP) model.

Digital Transformation infrastructure is composed of 3 main components; hard-wired connection, Internet access and content. The hard-wired connection is provided in two ways; wired and wireless connection. In pursuant of the decision made by the Council of Ministers, Telecommunications Department has so far been the provider of wired physical connection in our country. However, wireless connectivity is provided by mobile operators and by Internet service providers. Internet Access is a service provided by Internet Service Providers (ISPs).

Law No. 6/2012 gives the Information Technologies and Communication Authority (BTHK) the mandate to regulate and supervise physical connection and Internet access. The services of the content providers is regulated and controlled partly by BTHK and partly by the High Council of Broadcasting (YYK) in pursuant of Law No. 39/1997. Information Technologies and Communication Authority (BTHK) was established to ensure the regulation and supervision of the electronic communication sector by an independent administrative authority. The physical connection service is maintained by authorized companies within the scope of the authorization granted by the Information Technologies and Communication Authority (BTHK). The High Council of Broadcasting was established in 1997 as a public institution responsible for regulating and supervising the broadcasting of radios and televisions in Northern Cyprus. In accordance with the "Law on the Establishment and Broadcast of Public and Private Radios and Televisions". The Council is responsible for granting licences and broadcasting permissions to those who would like to broadcast via terrestrial, digital, satellite and IPTV platforms, and supervise their broadcast.

Digital Competencies and Occupations of Future

Given the fact that digital transformation is not a spontaneous process, there is also a need for human resources that could contribute, develop and support this process at all stages, as well as a public authority that would guide this process. The relevant capabilities and competencies of human resources will vary according to the characteristics of the process, the structure of the society and future targets. Based on the fact that nowadays each individual and each business has become part of the global economy, it is important to plan and form competencies that will possibly be required for human resources not at local level but at global level.

Some works or tasks will be taken over by applications involving artificial intelligence, as digital transformation is keen on penetrating deep in societal structures. Particularly, it could be possible to accomplish business processes in a more efficient and effective way when machines do tasks that require memory and continuous repetition. When taken into account that such processes are part of the most important driving forces of competition, they reduce the need for human work forces in some professions. Today, we live in a shrinking world where societies are intertwined. Success for both individuals and societies is associated with gaining the ability to come up with a solution by accessing and using

information instead of learning or knowing something. Net success is considered as the capacity to produce goods or services with high added value. Therefore, opting for professions that do not only attach importance to knowledge but also to skills would result in increasing opportunities for finding employment or setting up a business and becoming successful in either one. As Digital Transformation requires new applications and work flows beyond traditional business processes, many of the professions or capabilities available today will become inadequate or unnecessary. That is the reason why it would be necessary to define the Digital Transformation phenomenon in details and use that definition for the competencies that would support this process. The following have been identified as the driving forces of Digital Transformation at organizational level: process development, workplace improvement, vertical integration, management support, horizontal integration and cost reduction. As for non-organizational level: customer demands, supply chain, innovation push, market pressure and government/legal system have been identified as the driving forces [13]. Although the technologies used are not new, the Digital Transformation process has emerged as a new phenomenon.

The following have been identified as the human competencies that will be needed in the near future within the framework of the above mentioned Digital Transformation framework: computer network manager, information systems manager, information system developer, computer programmer, computer security specialist, computer software developer, large data manager, database administrator, accounting supervisor, market research analyst, pricing analyst, financial analyst, human resources and development specialist, electrical, computer, construction, machinery and industrial engineer, medical consultant, personal productivity specialist, security and repair specialist for the internet of things (IoT) [1].

In the medium-term, most of the changes you experience today will pave the way to a rapid emergence of the need for new competencies. The new professions that will probably emerge in the next decade are: augmented reality architects, alternative currency banking, new business venture capitalists (for very risky jobs), global (political, economic, social) system architects, localization (for global online communities), waste data management (especially to block redundant data copies), urban agriculture workers (production under the grocery stores), job colony managers (indigenous real and foreign virtual workers), competition

generators, 3D printing engineers (to design and maintain the next technology wave of products produced by 3D printer), 3D food printing engineers, book-interactive application converters, social training specialists – (as an extremely effective group that we rely heavily on, provides a continuous flow of information and advice to configure a truly valuable companion environment), privacy (private life) managers, wind turbine repair technologies, data hostage specialists, negotiators and damage control analysts, smart dust programmers, personality services (download a new "personality package" from the internet), smart communication developers ("smart" contact lenses that impose information on the user's field of view), nano-health professionals, new science philosopher-ethics experts (each new technology brings along non-targeted results), organ agents (specialization in the field of finding healthy organs), octogenarians (for very elderly people) service providers, upgraded tube transport engineers and removers.

It may take some time for some professions to emerge, as it may take time for some of the existing technologies to turn into production. Some of the profession groups that will be needed and emerge in the far future will be: delivery by drones (pizza or vegetable delivery, garbage removal), brain manipulators, plant and tree replacement specialists (colour-changing leaves, customized fruits), plant psychologists (to rectify the damage caused by plant and tree replacement specialists), extinction animators (to return extinct animals to life), robotic earthworm drivers, gravity regulators, time hackers, clone designers/programmers, body organ developers, memory empowerment therapists, time bank traders (to borrow time), space-based power system designers, geo-engineers (air control specialists), plant trainers (for smart plants that can re-design themselves), Nano gun specialists, lip designers, mass energy storage developers, earthquake forecasters, "heavy air" engineers (to compress air passing through the atmosphere), robot polishers, memory surgeons (to wipe bad memories), executioners for virus-developers (either death or memory surgery).

There are two tracks of education policies that can be implemented at North Cyprus during digitalization process. One is the transformation of primary and secondary education towards the requirements of digital age. Second issue deals with the higher education. Secondary school graduates can be forwarded towards the courses which can provide the required skills of the coming age. Furthermore local universities can be incentivized to open new departments for the future occupations which can attract many students from

abroad and may also influence the economy in a appositive way. Invitation of Turkish Cypriot academics and scientists to local universities may create a spillover effect and may give the opportunities to adopt the recent changes abroad.






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ANNEX I

Annex 1: Macroeconomic Indicators

	2010	2011	2012	2013	2014	2015	2016	2017
Real Growth Rate (% change)	3,6	4	0,5	1,3	4,9	4	3,6	5,4
GDP (Million TL)	5614	6508	6955	7607	8858	10226	11601	14544
GDP per capita (Current prices. US\$)	14611	15285	15123	15357	15140	13737	13897	14187
Consumer Price Index (CPI, %)	5,7	14,7	3,6	10,2	6,5	7,8	10,2	14,68
Exchange Rates (TL/₺)	2,06	2,06	2,3	2,53	2,91	3,02	3,34	4,12
Exchange Rates (TL/\$)	1,51	1,51	1,8	1,9	2,2	2,73	3,02	3,65
Total Deposits (Million, TL)	7067	8403	9284	10684	11774	13.951	14067	17480
Total Deposits / GDP (%)	126	133	132	140	133	136	121	120
Total Loans (Million, TL)	4189	5402	6288	7870	9557	10399	10352	12341
Total Loans / GDP (%)	75	85	90	103	108	102	89	85
Loan / Deposit Rate (%)	59	64	73	78	81	75	74	71
Balance of Public Budget / GDP (%)	-15,4	-14	-8,8	-7,2	-4,8	-3,7	-1,7	-0,7
Public Debt Stock / GDP (%)	139	141	139	154	149	157	165	142
Foreign Trade Balance (Surplus + / Deficit -) (Million US\$)	-1507	-1547	-1583	-1579	-1650	-1383	-1452	-1672
Foreign Trade Balance / GDP (%)	45,6	47,8	47,3	45,7	48,6	43,2	43,3	47,27
Current Account Balance (Surplus + / Deficit -) (Million US\$)	-275,8	-173,1	-125,1	-44,7	-12,6	271,6	289,9	294,4
Current Account Balance / GDP (%)	-7,4	-4,5	-3,2	-1,1	-0,3	7,2	7,6	7,4
Total Employment	93498	97103	99117	101181	103149	112811	118387	120999
Public Administration Employment	27244	29695	27141	30266	31276	32218	32236	34043
Active Insured Persons	70331	71144	74869	77334	79711	84793	92917	102944
Number of Unemployed	12619	10411	9174	8929	9320	9043	8075	7453
Minimum Wage (TL)	1300	1300	1300	1415	1675	1730	1834	2175

	State Planning Organisation
	Calculated using data from the State Planning Organisation
	TRNC Central Bank
	Calculated using data from the State Planning Organisation and TRNC Central Bank
	Ministry of Labor and Social Security

ANNEX II

Annex 2: Technical Notes and Sources for Competitiveness Report Hard Data

	Unit	Source / Method of Calculation	Amount	Implied GCR Rank	Comments / Reliability of Estimate
Homicide rate	per 100,000 population / 2017	Calculated by using data from Police Headquarters	2,56	68	2017 Number of homicide occurrences : 9
Terrorism incidence	0- 100 en iyisi	Estimated by Economists	100	1	
Social capital	Legatum Prosperity Index 0-100 (highest)		n/a	n/a	
Budget transparency	Open Budget Index 0-100 (high transparency)		n/a	n/a	
Freedom of press	World Press Freedom Index 0 - 100 (worst)	World Press Freedom Index /2017	29,88	63	
E-participation	E- participation Index 0 - 1 (en iyisi)	E-participation Index	n/a	n/a	
Incidence of Corruption	Corruption Perceptions Index 0-100 (very clean)		n/a	n/a	
Quality of land administration	Quality of land administration 0-30 (best)	"CTIDA Doing Business Report / 2017"	18,00	52	
Conflict of interest regulation	Conflict of interest regulation 0-10 (best)	CTIDA Doing Business Report / 2017	6,30	45	
Shareholder Governance	Shareholder governance 0-10 (best)	CTIDA Doing Business Report / 2017	6,00	56	
Road Connectivity Index	Road Quality Index 0 - 100 (excellent)		n/a	n/a	
Railroad Density	The World Bank Group		n/a	n/a	
Airport connectivity	Scheduled per week originating in the economy (in millions) / 2017		14,0	127	This estimate is based on all scheduled flights from Ercan Airport plus %20 off the available seat km in the Greek Cypriot community since Turkish Cypriots use those airports too
Liner Shipping Connectivity Index	Linear Shipping Connectivity Index 0 -100 (best)		n/a	n/a	
Electrification rate	percentage of population	Estimated by economists	100,00	1	
Electric power transmission and distribution losses	(electricity production - electricity consumption) / electricity production	Calculated by using data from Cyprus Turkish Electricity Agency	6,70	38	Electricity production (2017) : 1.631.041 Kwh, electricity consumption (2017): 33.138 Kwh
Exposure to unsafe drinking water			n/a	n/a	
Mobile-cellular telephone subscriptions	per 100 population / 2017	Calculated using data from Information Technologies and Communication Authority	228,53	2	Registered number of mobile-cellular telephone subscriptions (2017): 804.345, population (2017): 351.965
Mobile-broadband subscriptions	per 100 population / 2017	Calculated using data from Information Technologies and Communication Authority	98,35	30	Number of mobile-broadband subscriptions (2017) : 346.172, population (2017) 351.965
Fixed-broadband Internet subscriptions	per 100 population / 2017	Calculated using data from Information Technologies and Communication Authority	51,53	1	Number of fixed-broadband Internet subscriptions (2017) : 181.367, population (2017) 351.965
Fibre Internet subscriptions	per 100 population / 2017	Calculated using data from Information Technologies and Communication Authority	0,02	111	Number of fibre Internet subscriptions (2017) : 66, population (2017) 351.965
Internet users	internet users/ population 2017	Calculated using data from Information Technologies and Communication Authority	51,53	84	"Internet users : fixed + mobile broadband total (2017) 527.544, population (2017): 351.965"
Inflation	Annual percentage change in consumer price index / 2017	State Planning Organization	14,68	131	Inflation rate (2017): %14,68
Debt dynamics			n/a	n/a	

Annex 2: Technical Notes and Sources for Competitiveness Report Hard Data

	Unit	Source / Method of Calculation	Amount	Implied GCR Rank	Comments / Reliability of Estimate
Healthy life expectancy	at birth years / 2017	State Planning Organization	66,3	64	
Mean years of schooling	25 years and older population		n/a	n/a	
School life expectancy	enrollment rates/years of education 2017	Calculated using data from SPO	14,85	58	Primary education enrollment rate: 100%, Secondary education enrollment rate: 100 %, Highschool enrollment rate: 89%, Tertiary school enrollment rate: 82,35%
Pupil-to-teacher ratio in primary education		SPO	11,3	16	
Trade tariffs			0,90	5	Calculated based on total tariff revenue divided by total value of imports for that period. Total tariff revenue at current prices (2017):58.593.780TL Imports (2017): 6.491.000.000TL
Complexity of tariffs		International Trade Center	n/a	n/a	
Border clearance efficiency			n/a	n/a	
Service trade openness	Service Trade Restrictiveness Index 0- 100 (worst)		n/a	n/a	
Redundancy costs	weeks of salary	22/1992 Labour Act - Article 19(2)	5,00	12	22/1992 Labour Act - Article 19(2): Employees who work more than 5 years will get 5 weeks of salary amount redundancy payment
Workers' rights	ITUC Global Rights Index 1 - 7 (highest)		n/a	n/a	
Female participation in labour force	ratio to men /2017	Calculated using data from SPO	0,55	89	Female participation in labor force (2017): 35,6% Male participation in labor force (2017): 64,4 %
Labour tax rate	Sum of social insurance rate and provident fund rate	Calculated by Economists	14,00	62	Social insurance rate: 9%, provident fund rate: 5%
Domestic credit to private sector	as a percentage of GDP /2017		94,70	30	Total domestic credit to private sector: 14.437 millions TL, GDP : 14.544 millions TL
Market capitalisation	as a percentage of GDP /2017		n/a	n/a	
Insurance premium	as a percentage of GDP /2017		2,3	53	Total number of insurance premiums (2017): 330 millions TL, GDP (2017) : 14.544 millions TL
Non-performing loans	total amount of non-performing loans / total amount of credits 2017	Calculated by Economists	5,70	76	Total amount of non-performing loans (2017): 874,9 millions TL, total amount of credits (2017) : 14,431 millions TL
Credit gap			n/a	n/a	
Banks' regulatory capital ratio			n/a	n/a	
GDP as PPP	billion dollars / 2017	SPO	5,18	137	
Imports % GDP	as a percentage of GDP /2017	Calculated using data from SPO and Trade Office	47,2	63	Imports (2017): 1.558 billion dollars, GDP(2017): 14.544 billion dollars
Cost of starting a business	Expressed as a percentage of the economy's income per capita.	Calculated by using data from Official Receiver and Registrar	10,00	78	Average cost of consultancy fee: \$1000 , postage fee: \$500, GDPper capita
Time to start a business	number of procedures	CTIDA Doing Business Report / 2017	26,00	111	
Insolvency recovery rate	cents / \$		n/a	n/a	
Insolvency regulatory framework	0-16 (best)		n/a	n/a	
International co-inventions	per million population		n/a	n/a	
Scientific publications	Scopus data base	Calculated by academicians	570	17	
Patent applications	applications/million population / 2017	Calculated by using data from Official Receiver and Registrar	53,98	25	Number of patent applications (2017) : 19
R&D expenditures			n/a	n/a	
Quality of research institutions	Research Institutions Prominence Index		n/a	n/a	
Trademark applications	applications/million population / 2017	Calculated by using data from Official Receiver and Registrar	909,18	49	Number of trademark applications (2017) : 320

ANNEX III

Annex 3: How to Read the Economy Profiles

PAGE 1

Performance overview

This section details the economy’s performance on the main components of the Global Competitiveness Index 4.0 (GCI). The chart in this section presents an economy’s score on the overall GCI and on each of its 12 pillars. The economy’s rank (out of 140 economies) on each category is reported at the bottom of the chart. At the top of the chart, the three-letter code (ISO-3) of the best performer is reported (note that there are 31 best performers on the Macroeconomic stability pillar and four best performers on the Health pillar). To the right of each bar the performance of relevant benchmarks is reported: the economy’s score in the 2017 backcast edition (diamond); the average score of the economy’s income group, based on the World Bank’s classification (triangle); and the average score of the region to which the economy belongs (square). See the At a Glance section on page 18 for regional classification.



Indicator	Score	Best Performer	Best Score
1. GDP growth (2017)	3.2	USA	3.8
2. GDP per capita (US\$)	4,362.9	USA	45,274.0
3. Unemployment rate (%)	13.9	USA	3.7
4. 10-year average annual GDP growth (%)	1.0	USA	2.2
5. Environmental footprint (global hectares)	2.1	USA	10.0
6. Inclusive Development Index (score/rank)	61.5	USA	99.0

Contextual indicators

This section presents a selection of contextual indicators, as well as selected indicators of social and environmental performance, to complement the GCI. These indicators are: Population (millions, 2017 or most recent year available, source: International Monetary Fund, World Economic Outlook Database, April 2018); GDP per capita (US\$, 2017 or most recent year available, source: International Monetary Fund, World Economic Outlook Database, April 2018); 10-year average annual GDP growth (% real terms, 2017 or most recent year available, source: International Monetary Fund, World Economic Outlook Database, April 2018); Share of GDP in World total (% , 2017 or most recent year available, source: International Monetary Fund, World Economic Outlook Database, April 2018); Unemployment rate (% , 2017 or most recent year available, source: International Labour Organization, ILOSTAT database, via the World Bank’s World Development Indicators database); 5-year average annual FDI inward flow (% of GDP, 2017 or most recent year available, source: United Nations Conference on Trade and Development, FDI/MNE database); Environmental footprint network (global hectares, 2014 or most recent year available, source: Global Footprint Network, National Footprint Accounts dataset); Inclusive Development Index (score/rank, 2018 or most recent year available, source: World Economic Forum, Inclusive Development Report 2018); Global Gender Gap Index (score/rank, 2017 or most recent year available, source: World Economic Forum, The Global Gender Gap Report 2017); Income Gini coefficient (0–100, 2015 or most recent year available,

source: World Bank, Development Research Group, via the World Bank’s World Development Indicators).

PAGES 2–3

The Global Competitiveness Index in detail

These pages detail the country’s performance on each of the 98 indicators that compose the GCI 4.0. Indicators are organized by pillar. Refer to Appendix C for the detailed structure of the GCI, the definition of each indicator, and computation methodology.

For each indicator, the following information is reported:

1. Number, title and the units of measurement
2. Indicator value for the economy under review
3. Economy’s progress score on a 0 to 100 scale following normalization (see Appendix C for details)
4. Arrow indicating the direction of the change in score since the previous edition, or the “=” sign if the score has remained the same
5. Economy’s rank (out of 140)
6. Name of the best performer; that is, the economy attaining the best performance

ONLINE RESOURCES

Interactive profiles and sortable rankings with detailed meta information, as well as downloadable datasets, are available at <http://gcr.weforum.org>

