United Nations
Economic Commission for Africa

Innovation, investment and skills needs, and resilience during the COVID-19 pandemic

lessons from a survey of small and medium-sized enterprises in Algeria

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Economic Commission for Africa

P.O. Box 3001

Addis Ababa, Ethiopia

Tel: +251 11 544-9900

Fax: +251 11 551-4416

E-mail: eca-info@un.org

Web: www.uneca.org

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Acknowledgments

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Preface

The world's economy has seen great changes recently, especially in terms of the challenges brought on by the coronavirus disease (COVID-19) pandemic. Algeria, like many countries, is navigating through these challenges. The present report shares the results of a detailed survey of 985 companies in Algeria during the second quarter of 2021. The main goal was to understand how the pandemic had affected jobs, sales, investment, and the various challenges faced by businesses.

One important finding is that there is a strong link between a company's focus on innovation and its ability to stay strong during tough economic times. Companies that valued innovation also had better financial results.

Interestingly, firms led by younger entrepreneurs with a university degree employed more young people and more skilled people; companies run by women employed more women and more skilled people and experienced smaller decreases in sales during the pandemic.

Furthermore, the study reveals that companies with fewer skills shortages face fewer business interruptions or situations that require reduced operations. This highlights the importance of having the right skills available. Also, those without financial-access issues experienced a smaller drop in sales, which shows the importance of having access to finance.

The report suggests a way forward in terms of reforms. It sheds light on how to create a supportive environment for innovation and digitalization, which can help businesses and the economy to grow. It proposes several reforms to improve financial support for small and medium-sized enterprises, and to encourage entrepreneurship, especially among young people and women. Those suggestions also take into account the need to adapt to climate change, with a view to helping Algeria move towards a sustainable economic path in a changing world.

The proposed reforms involve using different approaches to boost competition in the market, speed up digitalization in the economy, encourage closer ties between academic institutions and businesses, make it easier to finance innovation, and promote green innovation. In addition, the report explores how to significantly improve financing options for small and medium-sized enterprises, so as to improve the financing environment for growth and innovation.

As the global economy continues to change amid various challenges and opportunities, the report adds valuable understanding of the Algerian economic scene. The findings and suggestions therein are meant to help not just in understanding the current situation but also in sparking informed discussions for policymaking aimed at moving the Algerian economy towards greater resilience.

Zuzana Schwidrowski

Director

Executive summary

In 2020, global gross domestic product (GDP) fell by 3.1 per cent, while in Algeria it fell by 6 per cent.[1] Algeria was particularly badly affected by the pandemic-induced fall in oil prices, although it then was able to benefit from the subsequent increase in oil prices following a 6.1 per cent rebound in global GDP. In 2021, GDP in Algeria grew by 3.5 per cent.[2]

Algeria continues to benefit from high oil and gas prices, due, inter alia, to the conflict in Ukraine. At the same time, however, the country continues to suffer the repercussions of a multi-pronged crisis stemming from the lingering effects of the 2019 coronavirus disease (COVID-19) pandemic, particularly on supply chains, the conflict in Ukraine and the effects of climate change. Global inflation has also increased, rising from 4.7 per cent in 2021 to almost 9 per cent in 2022, due to higher energy and food prices. In Algeria, inflation reached 7.2 per cent in 2021 and was estimated by the International Monetary Fund (IMF) to have reached 9.2 per cent in 2022, putting considerable strain on household budgets.

Against a backdrop of high inflation and tighter monetary policies, IMF foresees global growth slowing to 2.9 per cent in 2023. In Algeria, IMF forecasts GDP growth of 3.4 per cent in 2023, supported by a sharp increase in public spending, but also forecasts that growth will slow to 2 per cent in the medium term. The growth trajectory of the Algerian economy remains heavily dependent on the hydrocarbon sector and public spending, particularly as economic diversification and structural transformation in Algeria have been slow.[3]

Weak competitiveness, limited economic diversification and the limited capacity of the Algerian economy to create jobs, particularly for qualified young people, are three major challenges identified in the 2021 recovery plan of the Government of Algeria. Diversifying the economy is even more critical in a context of multiple crises exacerbated by the acceleration and intensification of climate change. As diversification cannot be achieved without the rapid development of the private sector, it is critical to deepen understanding of the challenges faced by business enterprises. It is also important to deepen understanding of the vulnerabilities and resilient features of the economy in order to formulate and put in place appropriate public policies. This is all the more important in the context of climate change, which, as was the case in 2022, increases the likelihood that economic growth, both at the global and national levels, will be negatively affected by multiple crises.

In a 2020 report on North Africa, the Economic Commission for Africa (ECA) identified limited adaptive capacity, namely countries' weak capacity for technological absorption and development, as a factor contributing to the structural weakness of the subregion's economies. Moreover, as became clear during the COVID-19 crisis, Internet access and the digitalization of the economy can significantly bolster resilience, as can human capital development, particularly the acquisition of digital skills.

1 Bank of Algeria, Annual Report 2021 (Algiers, 2022). Available at: www.bank-of-algeria.dz/wp-content/uploads/2023/02/rapport-ba-2021fr-1.pdf.
2 Ibid.
3 United Nations, ECA, Quality of Institutions and Structural Transformation: Distortions and Resource Allocation in North Africa (Addis Ababa, 2019).

This report presents the main findings of a survey carried out by ECA in Algeria in the second quarter of 2021. The report, which involved in-person interviews with representatives of 985 business enterprises,[4] sheds light on the key factors that can strengthen the contribution of businesses to the development of the Algerian economy, including innovation, the development of workers' skills and job creation for certain sectors of the population, particularly women and skilled workers.

The survey revealed that, on average, companies pay little attention to innovation, and that the importance given by companies to innovation is closely correlated with the importance they attach to digitalization. It also appears that a focus on innovation helped bolster the resilience of companies during the COVID-19 crisis.

Notably, the survey revealed that:

- More innovative companies were more successful at sustaining their sales turnover during the crisis than less innovative companies

- Young managers with university degrees tend to employ more young people and university graduates than other managers, while companies run by women employ relatively more women and graduates

- The fewer skills shortages a company suffers, the lower the probability that that company will experience an interruption or slowdown in its business operations

- Businesses that have not found it challenging to access finance have suffered a smaller decline in turnover than those that have encountered challenges

- Businesses run by women have on average, experienced a less severe decline in turnover than other businesses

These and other findings from the survey, and an awareness of the structural weaknesses identified in the Government recovery plan, can guide public policy formulation. The report concludes by proposing three areas for reform, each of which incorporates a climate change adaptation dimension, and relevant actions. These include:

- Developing entrepreneurship policies that address the needs of specific entrepreneur categories, while ensuring that public policies are aligned and address the full spectrum of challenges encountered by certain business enterprises, including: (a) technology-focused businesses owned by young, well-educated and well-qualified entrepreneurs; (b) businesses run by women; and (c) innovative businesses or businesses with a high potential for innovation or growth. Particular attention should, moreover, be given to activities and outputs that facilitate climate change adaptation, including those facilitating de-pollution, recycling and the more efficient use of resources.

4 Business survey data on Algeria, including data generated from business surveys conducted by the World Bank remain limited.

- Stimulating innovation through the adoption of a multidimensional approach that focuses on: (a) encouraging competition in goods and services markets and removing barriers to entry; (b) promoting economic digitalization; (c) creating incentives to strengthen relations between the academic world and business enterprises; (d) financing innovation; and, (e) supporting so-called green innovation, namely innovation that reduces negative ecological impacts, including through the promotion of energy efficiency and the more rational use water and material resources, and strengthening the resilience of business enterprises to climate shocks.

- Significantly enhancing the financial resources available to small and medium-sized enterprises, including by: (a) strengthening competition and reducing the relative strength of the public banking sector; (b) improving the governance of government-owned banks, and, more generally, of public enterprises in order to improve their management and performance; (c) encouraging banks to provide financial support to small and medium-sized enterprises (IMF recommends, for example, that reforms are needed with regard to the prudential rules for banks and the personal bankruptcy framework); (d) enhancing the available data on companies; for example by establishing a central balance sheet office and a public credit register and by facilitating the establishment of company rating agencies; (e) developing the private equity and venture capital sector, which could play an important role in supporting companies with high growth potential and in financing innovation; (f) drawing up legal frameworks to support the development of financial technology companies, a promising avenue for development that will, nonetheless require Algeria to redouble its efforts to promote economic digitalization; and (g) promoting green finance, including through the creation of a green climate fund, with a view to launching a critical mass of activities and encouraging the banking system to develop green finance offerings.

1. Introduction: context and aim of the survey

This report presents the findings of a survey of 985 business enterprises that was carried out in the first half of 2021 by ECA in collaboration with the Ministerial Office for Forward Planning of Algeria. The survey included questions relating to the skills needs of businesses, innovation, investment, financing and the impact of the COVID-19 pandemic on business enterprises. The primary aim of the survey was to gather data to inform policies on economic recovery. The survey also highlighted a number of factors that had strengthened business resilience during the COVID-19 pandemic.

The pandemic had a major socioeconomic impact worldwide, causing global GDP to fall by 3.3 per cent (compared with a rise of 2.6 per cent in 2019[5]), and increasing poverty. According to the World Bank, the number of people living in extreme poverty rose by 70 million, with the extreme poverty rate rising from 8.4 per cent in 2019 to 9.3 per cent in 2020. According to the National Statistics Office, GDP in Algeria fell by 5.1 per cent in 2020, in part because of a drastic fall in oil prices[6] and in part because of the health impact of the crisis.[7]

The impact of the pandemic on the economy depended on numerous structural factors. In a 2020 report,[8] ECA proposed a pandemic vulnerability score based on scores in eight vulnerability categories, namely: spread of virus; health vulnerability; healthcare provision capacity; economic vulnerability of the population; economic structure; budgetary capacity; adaptive capacity; and governance. Table 1.1 below shows the overall score and the scores for the three categories most relevant to this report for Algeria and a number of comparable countries. The budgetary capacity score is based on six indicators relating to the fiscal space available to governments to cope with the long-term economic effects of the pandemic.

In the first half of 2020, the adoption of very strict budgetary and monetary measures curbed the slowdown in economic activity to a certain extent. In many countries, State support replaced a portion of household income and reduced the risk of corporate defaults. With their substantial borrowing capacity, rich countries were able to rapidly adopt very costly support measures for both households and businesses (the cost of which was equivalent to 11 per cent of GDP in the United States of America, for example), in response to the rapid contraction in supply and demand. Such measures were not adopted in developing countries, despite a degree of budgetary heterogeneity among countries. Table 1.1 shows that, in terms of its budgetary capacity, Algeria, with a score of 53, performed fairly well, in particular because of its very low level of external debt. The Government of Algeria adopted a number of measures to support businesses, the most important of which were to allow the deferral of payments on certain loans and the deferral of certain fiscal and parafiscal charges. However, in a joint survey conducted by the National Economic, Social and Environmental Council and the United Nations, 93 per cent of the businesses surveyed said

5 World Bank, "GDP growth (annual %)". Available at: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG.
6 Brent crude oil declined in price by 50 per cent between the end of 2019 and April 2020.
7 Decline in productivity and production as a result of infections and measures taken to contain the spread of the virus, as in most countries.
8 ECA, North Africa and the Challenges of the COVID-19 Era (Addis Ababa, 2020). Available at: https://repository.uneca.org/handle/10855/43945.

that they had not benefited from any support measures, while 56 per cent believed that the measures adopted by the Government had been ineffective.

Table 1.1: Vulnerability score, 2020

	Overall score	Budgetary capacity score	Economic structure score	Adaptive capacity score
Algeria	81	53	92	95
Chile	57	55	58	49
China	48	56	38	55
India	64	70	46	86
Indonesia	59	67	46	67
Malaysia	49	76	40	54
Nigeria	100	51	77	103
South Africa	62	85	59	59
Türkiye	64	90	64	65
Viet Nam	50	90	39	57

Source: ECA, North Africa and the Challenges of the COVID-19 Era **(Addis Ababa, 2020)**.

Note: Higher scores correlate with higher vulnerability.

The economic structure category score is based on six economic vulnerability indicators.[9] For this category, Algeria performed relatively poorly, with a score of 92, due to the limited diversification of its economy and exports. Table 1.2 indicates that, at the sectoral level, the decline in real value added was greatest in the hydrocarbons sector (-10.2 per cent), followed by the market services sector (-6.9 per cent). Value added in the agricultural sector rose by 1.3 per cent, compared with 2.7 per cent in 2019.

Table 1.2: Change in value added by sector, 2019 and 2020

	2019	2020
Agriculture, forestry and fisheries	2.7	1.3
Hydrocarbons	-4.9	-10.2
Industry	4.0	-3.3
Construction, public works and hydraulics	3.8	-3.1
Trade services	3.1	-6.9
Non-trade services	1.8	-0.2
GDP	1.0	-5.1
GDP excluding hydrocarbons	2.7	-3.9

Source: Office of National Statistics, "Quarterly national accounts: fourth quarter 2021". Available at: https://www.ons.dz/IMG/pdf/CNT4T2021.pdf.

No statistics are available on employment in 2020. However, the joint survey conducted by the National Economic, Social and Environmental Council and the United Nations in March and April 2021 revealed that redundancies since the start of the pandemic averaged 7.2 per cent,

9 Diversification of production; export diversification (products); geographical diversification of exports; technological content of exports; economic complexity index; and value added share of services.

with redundancies highest in industry (9.5 per cent) and construction (9 per cent), and lowest in services (5.6 per cent). Companies with 250 or more employees made the fewest redundancies as a proportion of their workforce (3 per cent).

The adaptive capacity score is based on nine indicators and measures the capacity of companies to withstand human and economic shocks. The indicators selected relate to economic freedom, innovation and new technologies, competitiveness and education.[10] Algeria also performs less well in this category, with a score of 95, primarily due to its indicator scores for competitiveness and innovation, and for use of digital technology. The ECA survey facilitated the collection of data on the importance given by companies to innovation and choices made with regard to innovation and investment. The survey revealed that, in general, companies pay little attention to innovation, and that the importance given by companies to innovation is closely correlated with the importance they attach to digitalization. It also appears that increased focus on innovation helped bolster the resilience of companies during the crisis.

Notably, the survey revealed that:

- More innovative companies were more successful at sustaining their turnover during the crisis than less innovative companies

- Young managers with university degrees tend to employ more young people and university graduates than other managers, while companies run by women employ relatively more women and university graduates

- The fewer skills shortages a company suffers, the lower the probability that that company will experience an interruption or slowdown in its business operations

- Businesses that have not found it challenging to access finance have suffered a smaller decline in turnover than those that have encountered challenges

- Businesses run by women have on average, experienced a less severe decline in turnover than other businesses

The remainder of the present report is structured as follows. After a description of the survey and the survey sample, the report presents its key findings with regard to skills, innovation and investment. This is followed by an analysis of the impact of the COVID-19 pandemic on businesses. A final section contains a number of policy recommendations.

10 ECA, *North Africa and the Challenges of the COVID-19 Era.*

2. Methodological approach adopted

The survey, which was carried out between April and June 2021, was based on interviews conducted by a polling company of 985 business enterprises selected on the basis of a sectoral breakdown agreed upon in discussions with the Ministerial Office for Forward Planning. The survey adopted a multichannel approach and involved computer-assisted telephone interviewing (CATI), computer-assisted web interviewing (CAWI) and computer-assisted personal interviews (CAPI). A total of 94.9 per cent of interviews were conducted face-to-face, and took place in four major regions in Algeria, namely North Centre, North East, North West and Hauts Plateaux. The survey was therefore significantly different from the survey carried out by the National Economic, Social and Environmental Council and the United Nations, which was conducted by telephone.

The sample of companies was selected from source files from the Algerian National Insurance Authority (CNAS), the National Insurance Authority for Self-employed Workers (CASNOS), Economic Studies, Financial Analysis and Trends Analysis (ECOFIE) and the National Statistics Office. The files include information on the population of companies in Algeria, by size, region, legal status (juridical or natural) and area of activity. The total population of small and medium-sized enterprises was 1,193,339 in 2019 (see annex 1).

A statistical breakdown of the sample is given in figure I. It should be noted that 17.8 per cent of the companies surveyed had a woman as their main manager.[11] The survey carried out by the National Economic, Social and Environmental Council and the United Nations, on the other hand, found that 23 per cent of managers and co-managers were women. The majority of managers had a university degree (62.8 per cent), and women managers tended to be more highly qualified than their male counterparts (70.3 per cent of female managers had a university degree, compared with 61.5 per cent of male managers). Only 3 per cent of companies had fewer than four employees, compared with 23 per cent of companies in the National Economic, Social and Environmental Council and United Nations survey sample.

It was also decided to overrepresent industrial enterprises and companies with more than 10 employees, and to exclude trading companies, so as to enhance understanding of those business enterprises targeted by certain survey questions, particularly those relating to innovation.

The following sections describe the findings of the survey on the skills needs, attitudes towards innovation and investment decisions of the companies surveyed.

11 As the sample is not representative of the country's business landscape as a whole, it cannot be used to infer national level figures. The World Bank estimates, however, that 34 per cent of businesses worldwide and 23 per cent of businesses in the Middle East and North Africa are run by women.

Figure I: Characteristics of business enterprises in the survey sample *(Percentage of business enterprises)*

Sector

Agriculture	4,3
BTPH	24,0
Hydrocarbures, énergie, mines et services liés	1,6
Industries manufacturières	37,5
Services	32,7

Size (number of employees)

2 - 3	1,2
4 - 9	14,1
10 - 49	51,2
50 - 249	25,9
250 or more	5,6
I do not know	1,8

Education level of manager

Primary	0,3
Professional training	12,2
Secondary/middle school	24,7
University	62,8

Turnover in 2019

Less than 5 million Algerian dinars (DA)	16,9
Between 5 million and 25 million DA	23,8
Between 25 and 50 million DA	12,7
Between 50 million and 100 million DA	15,2
Between 100 million and 250 million DA	14,3
Between 250 and 500 million DA	7,9

Age and sex of manager

18–24 years	0,7
25–35 years	22,4
36–55 years	54,3
56–65 years	18,5
Over 65 years	4,1
Female	17,8
Male	82,2

Age of business enterprise

0–5 years	13,2
5-10 years	28,5
10-20 years	29,8
Over 20 years	28,4

3. Key findings of the survey

The key findings of the survey are presented in this section. The section first highlights findings related to the impact of the characteristics of business enterprises outlined above on youth and women's employment, which remains a critical employment challenge in Algeria.

3.1. haracteristics of business enterprise managers and their impact on youth and women's employment

Female managers tend to employ more women and university graduates, while young managers with a university degree tend to employ more young people and university graduates.

3.1.1. Sex and education level of managers

Overall, women managers comprised 17.8 per cent of the sample. Table 3 1 shows that the proportion of women managers is highest in the services sector (24.8 per cent)[12] and manufacturing (19.2 per cent).

Table 3.1: Distribution by economic sector and sex of manager *(Percentage)*

	Agriculture	Construction, public works and hydraulics	Hydrocarbons, energy, mining and related services	Manufacturing	Services	Total
Male	92.9	91.5	93.8	80.8	75.2	82.2
Female	7.1	8.5	6.3	19.2	24.8	17.8

Table 3.2 shows that women managers are particularly prevalent in the textiles industry (21.7 per cent compared with 4 per cent for men), scientific and technical enterprises (18.9 per cent compared with 8.9 per cent for men) and the agrifood industry (12 per cent, namely on a par with men).

Table 3.2: Distribution by area of business activity and gender of manager *(Percentage)*

	Female	Male
Specialized, scientific and technical activities	18.9	8.9
Building and civil engineering	9.7	25.1
Hotels (tourism and accommodation) and catering	8.0	5.8
Food processing industries	12.0	12.5
Building materials, ceramics and glass industries	2.3	7.9
Textile, clothing, leather and footwear industries	21.7	4.0
Mechanical and electrical industries	5.7	6.8

12 It should be remembered that the survey reviewed in the present report did not include trade-focused enterprises.

	Female	Male
Pharmaceutical and chemical industries	6.3	7.8
Transport and warehousing	4.6	5.7
Total	100.0	100.0

Overall, women tend to run smaller businesses: 77.5 per cent of female managers head businesses with fewer than 50 employees, compared with 64.3 per cent of men (table 3.3). Women account for 20.1 per cent of managers of companies with fewer than 10 employees, 21 per cent of managers of companies with between 10 and 49 employees, and only 9 per cent of managers of companies with 250 or more employees (table 3.4).

Table 3.3: Distribution of managers by sex and company size (Percentage)

	Female	Male
4–9 employees	16,2	14,0
10–49 employees	61,3	50,3
50–249 employees	18,5	28,2
250 or more employees	2,9	6,3
Total	100	100

Table 3.4: Proportion of female managers by company size (Percentage)

	Female
4–9 employees	20,1
10–49 employees	21,0
50–249 employees	12,6
250 or more employees	9,1

3.1.2. Proportion of women and young people employed by business enterprises

In the sample as a whole, the proportion of women in the workforce stood at 26.8 per cent, and the proportion of young people (persons between 16 and 29 years of age) was 50 per cent. A striking fact evident in table 3.5 is that the proportion of women is much higher (55.9 per cent) in companies run by women than in those run by men (20.5 per cent).[13] However, there is no statistically significant difference between male and female managers with regard to the proportion of young people they employ. Companies run by young people employ relatively more young people than companies run by older managers.

13 This remains true when controlling for sector of activity. The R2 of a regression of the proportion of female employees by sex of manager while controlling for sector of activity is 42 per cent.

Table 3.5: Proportion of women and young people employed by business enterprises according to the educational level and age of managers *(Percentage)*

Education level of manager	Proportion of women	Proportion of young people (aged 16–29)
Professional training	31.9	48.9
Secondary/middle school	20.4	48.6
University	28.4	51.1
Age of manager		
18–24	6.4	70.7
25–35	25.3	60.5
36–55	28.2	48.2
56–65	27.2	45.0
Over 65	17.9	37.5
Sex of manager		
Female		55.9
Male		20.5

Table 3.6 shows the proportion of women and young people by company sector. The services (excluding retail) and manufacturing sectors employ the highest proportion of women, at 33.3 per cent and 31.3 per cent, respectively. As far as the proportion of young people is concerned, there are no statistically significant differences between sectors.

Table 3.6: Proportion of women and young people employed in various economic sectors *(Percentage)*

	Proportion of women	Proportion of young people (aged 16–29)
Agriculture	22.05	50.6
Construction. public works and hydraulics	12.4	54.6
Hydrocarbons. Energy, mining and related services	13.6	55.6
Manufacturing	31.3	48.3
Services	33.3	48.5

As shown in table A.4.1 in the annex to the present report, the proportion of female employees in female-led companies remains significantly higher than in male-led companies, even when other variables are taken into account, such as the company's sector or geographical location.[14]

Companies run by women employ more employees with a university education (46.6 per cent of employees) compared with companies run by men (39.3 per cent of employees).

14 The sex of the manager is statistically significant at the 1 per cent threshold when controlling for a range of variables, including economic sector, city, company size, manager's age, manager's level of education, company legal status and share ownership.

Table 3.7: Proportion of employees by level of education and sex of manager *(Percentage)*

	Proportion of employees with primary education	Proportion of employees with secondary education	Proportion of employees with university level education
Female manager	12.2	41.3	46.6
Male manager	17.1	43.7	39.3

As a proportion of their total employment, business enterprises characterized by dominant family shareholding employ fewer university graduates than other business enterprises (table 3.8).

Table 3.8: Proportion of employees with a university degree in firms with different types of ownership *(Percentage)*

	100% Fully family owned	Family and non-family ownership	Non-family owned
Proportion of employees with a university degree	36.3	36.7	46.0

It is very interesting to note that companies run by young people (aged 16 to 29) with a university degree employ more young people and more university graduates than other companies (table 3.9). There is an inverse relationship between the age of managers and the proportion of young people employed in the company.

Table 3.9: Proportion of young people and employees with a university degree in firms managed by young graduates and young non-graduates *(Percentage)*

	Manager has a university degree	Manager does not have a university degree
Proportion of young people	50.6	38.7
Proportion of university graduates	60.1	48.2

Table A.4.2 in the annex to the present report confirms these results from an econometric perspective and illustrates that managers with a university degree employ more employees with a university degree. This holds true even when controlling for other company characteristics, such as the company's economic sector or geographical location.

3.2. Skills and innovation

A number of key survey outcomes pertaining to companies' skills needs, their provision of training, and their approach to innovation are presented in this section. The group of questions relating to those areas was drawn up with a view to providing the Ministerial Office for Forward Planning with relevant data in that regard. Furthermore, the data gathered can help deepen understanding of the impact of the crisis on businesses: that matter is explored further in section 4 of the present report.

3.2.1. Skills

Teamwork (33.2 per cent), problem-solving skills (31.4 per cent), customer management (27.5 per cent), job-specific/technical skills (26.5 per cent) and technical capacity (26.4 per cent) were the skills that companies lacked most.

The companies reporting skills shortages in several areas at the same time tended to employ more employees with only a primary-level education than other companies.

Nearly half of the companies surveyed (49.1 per cent) had provided training and 46.7 per cent had recently recruited employees. Companies in the agricultural sector (38.1 per cent) and the construction, public works and hydraulics sector (42.4 per cent) indicated that they provided the least training, while companies in the hydrocarbons sector provided the most (75 per cent). In the services and industrial sectors, around half of all businesses provided training.

Only 27.8 per cent of family businesses had established relations with universities.

This section examines the structure of employment by level of education, the skills gaps encountered by companies, and the means used to address them. As mentioned above, the proportion of employees with a university degree is higher in business enterprises run by university-educated managers.

Table 3.2.1.1: Proportion of employees with different levels of education by education level of manager *(Percentage)*

Education level of manager	Primary education level	Secondary education level	University education level
Professional training	13.1	51.4	35.5
Secondary school	24.7	52.55	22.7
University	13.3	38.2	48.7

The services sector has the highest proportion of employees with a university degree (48.3 per cent), followed by the hydrocarbons sector (44.4 per cent). Agriculture and construction, public works and hydraulics are the sectors where the proportion of employees with a primary education is highest, at 20.2 per cent and 27 per cent, respectively.

Table 3.2.1.2: Proportion of employees with different levels of education by business enterprise sector *(Percentage)*

	Primary education level	Secondary education level	University education level
Agriculture	27.00	44.83	28.40
Construction. public works and hydraulics	20.17	40.26	39.60
Hydrocarbons, energy. mining and related services	14.25	47.63	44.38
Manufacturing	17.55	46.68	35.66
Services	10.54	41.20	48.28
Total	16.23	43.29	40.56

In terms of skills, teamwork (33.2 per cent), problem solving (31.4 per cent), customer management (27.5 per cent), job-specific/technical skills (26.5 per cent), and technical capacity (26.4 per cent) are the skills that companies lack most (table 3.2.1.3).

Table 3.2.1.3: Proportion of business enterprises citing a lack of specific skills *(Percentage)*

Communications skills	24.2
Customer management skills	27.5
Teamwork skills	33.2
Business management skills	20.0
Problem solving skills	31.4
Numeracy skills	20.3
Writing skills	13.3
Administrative skills	19.3
Technical skills (dexterity)	26.4
Job-specific/technical skills	26.5
General information technology (IT) skills	21.0
Professional-level IT skills	17.3

Table A.3.3 in the annex to the present report illustrates the skills that companies lack according to their sector of activity. Customer management is cited most often by companies in the services sector (32 per cent) and in the hydrocarbons sector (37.5 per cent). Teamwork is more of an issue for companies in manufacturing (38.2 per cent) and services (33.9 per cent). Problem-solving skills are lacking, in particular, in agriculture (35.7 per cent), manufacturing (32.5 per cent) and services (32.3 per cent). Information technology (IT) skills are particularly weak in the hydrocarbons, mining and related services sector (37.5 per cent).

An interesting fact is that the proportion of employees with a university degree has no impact on the propensity of a company to indicate that it lacks a skill, except in the case of writing skills and numeracy, but the latter is only statistically significant at 10 per cent (see table A.4.3 in the annex). Admittedly, it is not the proportion of employees suffering from a lack of skills that is asked about in the survey, but one might expect the number of companies indicating a lack of skills that should be acquired at university to fall as the proportion of employees who are university graduates increases. This does not appear to be the case to any significant degree, even for companies with a very high proportion of employees with a university-level education.

Furthermore, a high proportion of employees with only a primary-level education can lead to systematic skills gaps, namely a lack of competency in three specific areas[15] (see table A.4.4 in the annex for further details).

Table 3.2.1.4 below shows the average number of skills that companies lack in different economic sectors. There is some heterogeneity across all sectors. The manufacturing sector accounts for the highest proportion of companies with skills gaps in connection with more than 4 skills (35 per cent), followed by the services sector (30.7 per cent).

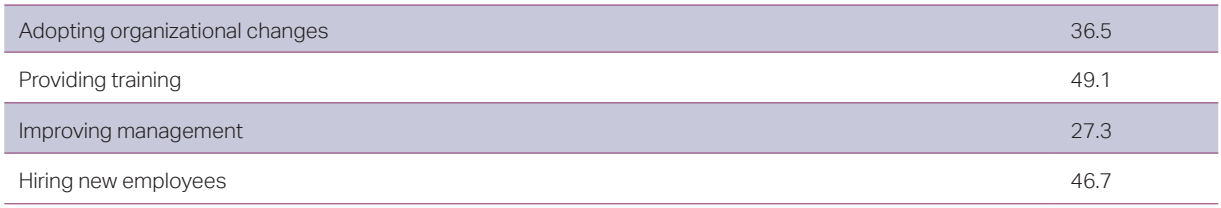
15 Social skills, cognitive skills and technical and practical skills.

Table 3.2.1.4: Proportion of business enterprises in different economic sectors lacking a certain number of skills *(Percentage)*

Number of skills lacking	0	1	2	3	More than 4
Agriculture	19.1	11.9	16.7	33.3	19.1
Construction. public works and hydraulics	12.7	21.2	24.2	20.8	21.2
Hydrocarbons, energy. mining and related services	18.8	25.0	25.0	6.3	25.0
Manufacturing	7.1	20.9	19.0	18.2	35.0
Services	11.5	18.9	17.4	21.4	30.7
Total	10.6	20	19.7	20.3	29.5

Figure II shows the solutions adopted by companies to address their skills needs. The figure shows that almost half of the business enterprises surveyed (49.1 per cent) provided training, and 46.7 per cent depended on the recruitment of new employees.

Figure II: Solutions adopted by business enterprises to address skills gaps *(Percentage)*



Differences among economic sectors are apparent, however. for example, only 38.1 per cent and 42.4 per cent of companies in the agriculture and the construction, public works and hydraulics sectors, respectively, provided training, while 75.0 per cent of companies in the hydrocarbons sector did so (see table 3.2.1.5).

Table 3.2.1.5: Solutions adopted by business enterprises in different economic sectors to address skills gaps *(Percentage)*

	Providing training	Recruiting new employees	Adopting organizational changes	Improving management
Agriculture	38.1	28.6	26.2	42.9
Construction, public works and hydraulics	42.4	38.1	24.2	51.3
Hydrocarbons, energy. mining and related services	75.0	31.3	50.0	25.0
Manufacturing	51.2	37.4	28.5	48.0
Services	51.9	35.7	27.3	43.5
Total	49.1	36.6	27.3	46.7

3.2.2. Attitudes towards innovation

Only 14.3 per cent of the companies surveyed viewed innovation as important, and only 8.8 per cent viewed it as very important.

Innovation was more likely to be perceived as important or very important by companies with 250 or more employees (most of which operate in the industrial sector) than by smaller business enterprises.

Half of the companies surveyed (49.9 per cent) stated that they sought to innovate in order to improve the quality of their products and/or services, and 38.8 per cent stated that they did so to increase productivity. Only 10.6 per cent promoted innovation in order to increase prices and differentiate themselves from their competitors. Enhancing market flexibility was cited as important by only 17.9 per cent of the companies surveyed.

The proportion of companies that attached great importance to innovation was twice as high among businesses that had established relationships with the academic world than among those that had not.

The companies surveyed did not view digitalization in the post-COVID-19 era as particularly important: 58 per cent of companies indicated that digitalization would be of low or medium importance for their business activities.

A total of 73.7 per cent of companies that placed a high value on innovation also attached great importance to information and communications technologies.

The two main constraints impeding innovation were funding (54.4 per cent of the business enterprises surveyed) and relevant expertise (54 per cent).

This section examines the approach of companies to innovation.[16] Only 14.3 per cent of the business enterprises surveyed believed innovation was important, and only 8.8 per cent viewed it as highly important (figure III). Those figures should be seen in the context of the country's ranking (120th out of 132 countries) in the 2021 edition of the Global Innovation Index, which takes into consideration seven pillars, namely institutions, human capital and research, infrastructure, market sophistication, business sophistication, creative outputs, and knowledge and technology outputs. Algeria is ranked relatively highly under the "human capital and research" pillar (74th place), but is ranked 132nd under the "market sophistication" pillar.

Figure III: Importance given by surveyed business enterprises to innovation *(Percentage)*

Low	23.9
Medium	35.0
Relatively high	18.0
High	14.3
Very high	8.8

There was a degree of heterogeneity within economic sectors. In general, innovation was perceived as important in the manufacturing sector, and the percentage of companies that attached little importance to innovation was lowest in that sector (16.8 per cent). However, fully 36.3 per cent of manufacturing enterprises considered innovation to be of only medium importance. In the hydrocarbons, energy, mining and related services sector, 62.5 per cent of companies attached

16 Innovation has been defined in a broad sense. It includes organizational changes, the adoption of new processes and the adoption of new technologies.

low or medium importance to innovation, while 18.8 per cent of business enterprises in that sector attached high importance to innovation (the highest percentage of all sectors).

Table 3.2.2.1: Importance given to innovation by economic sector *(Percentage of business enterprises)*

	Low	Medium	Relatively high	High	Very high
Agriculture	35.7	31.0	14.3	14.3	4.8
Construction, public works and hydraulics	31.8	31.8	15.3	15.3	5.9
Hydrocarbons, energy, mining and related services	37.5	25.0	12.5	6.3	18.8
Manufacturing	16.8	36.3	20.3	15.4	11.1
Services	23.9	37.0	18.0	12.7	8.4
Average	23.9	35.0	18.0	14.3	8.8

As shown in table 3.2.2.2, innovation was perceived as particularly important by companies with 250 or more employees, with 36.4 per cent of those companies according to high or very high importance, compared with, at most, 28.1 per cent of business enterprises in other size categories. This is due to the fact that some 65 per cent of business enterprises with 250 or more employees operate in the industrial sector; those business enterprises are, moreover, the enterprises least likely to experience difficulties in mobilizing financial resources to support innovation. It should also be noted that 43.2 per cent of small businesses (between four and nine employees) attached little or medium importance to innovation. Nonetheless, innovation was considered both of very high and low importance by companies with 250 or more employees, at 21.8 per cent and 23.6 per cent, respectively. It should be noted, however, that only 7 per cent of large industrial companies attached little importance to innovation (see table A.3.8 in the annex for further details).

Table 3.2.2.2: Importance given to innovation by size of business enterprise *(Percentage of business enterprises)*

	Low	Medium	Relatively high	High	Very high
4 to 9 employees	10.8	32.4	33.1	10.8	13.0
10 to 49 employees	13.9	23.6	34.3	20.6	7.5
50 to 249 employees	16.1	24.3	35.3	18.0	6.3
250 or more employees	23.6	9.1	30.9	14.6	21.8

In-house research and development and the monitoring of technological developments were the two most common methods by which companies fostered innovation; those methods were cited, respectively, by 38.8 per cent and 31.6 per cent of companies. Reviewing registered patents was the least frequently cited method (19.3 per cent).

Figure IV: Methods adopted by business enterprises to foster innovation *(Percentage of surveyed business enterprises)*

In-house research and development	38.80
Monitoring technological developments	31.60
Assistance from suppliers	26.70
Consultation of the technical documentation provided with purchased equipment	29.50
Reviewing registered patents	0.193

As illustrated in table 3.2.2.3, however, reviewing registered patents was more common among companies in the industrial sector (23.6 per cent) and in agriculture (26.2 per cent) than in other economic sectors.

Table 3.2.2.3: Methods adopted by business enterprises in various economic sectors to foster innovation *(Percentage of business enterprises)*

	Reviewing registered patents	Consultation of the technical documentation provided with purchased equipment	Assistance from suppliers	Monitoring technological developments	In-house research and development
Agriculture	26.2	33.3	40.5	23.8	31.0
Construction, public works and hydraulics	16.5	27.1	24.2	33.1	34.7
Hydrocarbons, energy. mining and related services	18.8	25.0	25.0	31.3	37.5
Manufacturing	23.6	33.6	29.0	33.1	42.8
Services	15.5	26.4	24.2	29.8	38.2

As illustrated in figure V, half of the companies surveyed (49.9 per cent) stated that they sought to innovate in order to improve the quality of their products and/or services, and 38.8 per cent stated that they did so to increase productivity. Only 10.6 per cent promoted innovation in order to increase their prices and differentiate themselves from their competitors. Enhancing market flexibility was cited as important by only 17.9 per cent of the companies surveyed.

Figure V: Innovation expectations *(Percentage of business enterprises)*

Cost reductions	34.1
Improved quality of products/services	49.9
Improved productivity	38.8
Enhanced market flexibility and responsiveness	17.9
Price increases through differentiation from competitors	10.6

As illustrated in table 3.2.2.4, there was a certain degree of homogeneity across sectors in terms of the expectations of business enterprises regarding innovation. Most companies, but especially those in the hydrocarbons and manufacturing sectors (62.5 per cent and 54.2 per cent, respectively) fostered innovation in order to improve the quality of their products and services. Companies in the agricultural and manufacturing sectors were also likely to cite improved productivity as an expectation.

Table 3.2.2.4: Expectations of business enterprises in various economic sectors with regard to innovation *(Percentage of business enterprises in each sector)*

	Cost reductions	Improved quality of products/services	Improved productivity	Enhanced market flexibility and responsiveness	Price increases through differentiation from competitors
Agriculture	40.5	47.6	45.2	16.7	2.4
Construction, public works and hydraulics	32.6	41.9	31.8	18.6	11.4
Hydrocarbons, energy, mining and related services	31.3	62.5	31.3	25.0	12.5
Manufacturing	36.6	54.2	49.9	21.1	8.9
Services	31.7	50.6	30.7	13.4	12.7

The low percentage of companies in the last two columns is reflected in the ranking assigned to Algeria in the Global Competitiveness Index: in 2019, the country was ranked 85th out of 141 countries for competitiveness in goods markets, and 120th out of 141 countries for competitiveness in services.

Table 3.2.2.5 shows the innovations introduced in the past five years. Companies in the services and in the construction, public works and hydraulics sectors have been the least innovative when it comes to developing new products or services. However, the proportion of companies that have reported the introduction of new products or services is as high in those sectors as it is in the other economic sectors.

Table 3.2.2.5: Innovations introduced in the past five years by business enterprises in various economic sectors *(Percentage of business enterprises in each sector citing the innovation in question)*

	Adoption of new approaches or techniques	Introduction of new products or services	Adoption of a new work organizational plan	Introduction of new procedures or the purchase of new material or equipment17	Development of a new product
Agriculture	59.5	59.5	54.8	73.8	54.8
Construction, public works and hydraulics	55.9	54.2	62.3	61.9	33.9
Hydrocarbons, energy, mining and related services	62.5	56.3	81.3	75.0	50.0
Manufacturing	63.1	66.4	65.0	65.9	64.2
Services	58.4	62.4	66.5	55.6	38.5

Figure VI shows that the two main constraints impeding innovation were funding (50.4 per cent of the business enterprises surveyed) and relevant expertise (54 per cent).

17 These have significantly improved production and service delivery.

Figure VI: Constraints impeding innovation *(Percentage of business enterprises citing the constraint in question)*

Financial constraints	50.4
Lack of relevant expertise	54.0
Weak intellectual property protections (particularly in industry)	18.0
Limited market size	22.0

Financing challenges appeared to be a significant constraint in agriculture (64.3 per cent of business enterprises) and industry (56.9 per cent). Only 31.3 per cent of businesses in the hydrocarbons sector reported experiencing financial constraints. Instead, businesses in that sector tended to cite a lack of relevant expertise (68.8 per cent), as did manufacturing companies (58.5 per cent).

Table 3.2.2.6: Challenges impeding innovation among businesses in various economic sectors *(Percentage of business enterprises in each sector citing the challenge in question)*

	Financial constraints	Lack of relevant expertise	Weak intellectual property protections	Limited market size
Agriculture	64.3	45.2	7.1	23.8
Construction, public works and hydraulics	54.2	49.2	16.1	19.1
Hydrocarbons, energy, mining and related services	31.3	68.8	18.8	25
Manufacturing	56.9	58.5	20.3	23.9
Services	51.6	52.8	18.0	21.7

Table 3.2.2.7 shows the proportion of business enterprise turnover allocated to innovation. The manufacturing sector allocated the largest proportion (7.5 per cent) and the agricultural sector the least (5.4 per cent). There are no statistically significant differences among other economic sectors. Geographically, the highest proportion was allocated in the North Centre region (8 per cent)

Table 3.2.2.7: Innovation expenditure as a percentage of turnover

North Centre	8,0
North West	5,3
North East	6,0
Hauts Plateaux, West	4,7
Hauts Plateaux, East	6,9
Hauts Plateaux, South	3,8

Agriculture	5,4
Construction, public works and hydraulics	6,5
Hydrocarbons, energy, mining and related services	6,3
Manufacturing	7,5
Services	6,5

Relationships with academic institutions can be an important driver of innovation. Table 3.2.2.8 shows that 44.9 per cent of the companies surveyed had established no relationship with the

academic world. Statistically, there is no difference among economic sectors. A difference is apparent between large and small companies, however. For small companies, the proportion of business enterprises with no relationship with academic institutions is significantly higher than the proportion of larger companies. Furthermore, well-established companies are more numerous than recently-established companies within their category and, proportionally, are less likely to have established relations with academic institutions.

Table 3.2.2.8: Proportion of business enterprises that have not yet established relationships with academic institutions, by economic sector and by size of business enterprise

Economic sector	
Agriculture	52.4
Construction, public works and hydraulics	47.0
Hydrocarbons, energy, mining and related services	50.0
Manufacturing	40.7
Services	46.9
Average	44.9
Size of business enterprise	
4–9 employees	48.9
10–49 employees	48.4
50–249 employees	37.6
250 or more employees	25.5
Age of business enterprise	
Less than 5 years old	55.4
Between 5 and 25 years old	45.3
Over 25 years old	33.7

Figure VII shows the reasons given by companies for their failure to establish relationships with academic institutions. The primary reason given was a lack of interest (41 per cent), suggesting that many companies do not perceive any benefit in establishing relationships. The second most cited reason was a perceived lack of expertise within the academic world in the company's area of competence (26.4 per cent).

Figure VII: Reasons given by companies for not establishing relationships with academic institutions (Percentage of business enterprises with no relationship)

Lack of available expertise in our field of activity	26.4
Lack of confidence in university skills	13.8
Lack of responsiveness from universities	20.1
Lack of information	25.2
Lack of interest	41.0

Table 3.2.2.9 shows that family-owned businesses in which 100 per cent of company capital is held by the family have proportionately fewer links with the academic world (49.8 per cent) than non-family-owned businesses (69.9 per cent). This is even more the case for relationships with universities. Indeed, only 27.8 per cent of family-owned companies maintain relations with universities, compared with 55.4 per cent of companies whose capital is held by third parties.

Table 3.2.2.9: Relations with universities and other academic institutions by business enterprise capital structure (Percentage of business enterprises)

	Relations with universities	Relations with other academic institutions
Enterprise capital held entirely by third parties	55.4	69.9
Enterprise capital held by family members and third parties	34.7	60.5
Sole proprietorship	30.7	52.3
Business capital entirely held by family members	27.8	49.8
Average	34.0	55.3

Table 3.2.2.10 shows that the proportion of companies that place a high value on innovation is twice as high among those that have established relations with academic institutions than among companies that have not. This does not presuppose a causal link; it is possible that the companies that place the greatest value on innovation simply establish more links with the academic world. In the sample, 18.4 per cent of companies that placed a high value on innovation collaborated on research projects with academic institutions, while the corresponding figure for companies that placed less importance on innovation was 8.5 per cent. Similarly, 22.4 per cent of the companies placing a high value on innovation reported that they availed themselves of academic expertise, compared with only 11.5 per cent of companies that placed less value on innovation.

Table 3.2.2.10: Innovation and relations with the academic world *(Percentage of business enterprises)*

	Importance attached to innovation		
	Low	Medium	High
Relations with the academic world			
No	32.6	53.2	14.3
Yes	16.8	52.9	30.4
Total	23.9	53.0	23.2
Relations with universities			
No	29.7	54.2	16.2
Yes	12.5	50.8	36.7
Total	24.0	53.0	23.0

Table 3.2.2.11 shows that 71.1 per cent of the companies surveyed that had established relations with academic institutions had carried out more than three innovative actions in the previous five years, while only 54.0 per cent of companies that had not established relations with the academic world had done so.

Table 3.2.2.11: Number of innovations implemented by companies that have/have not established relations with academic institutions *(Percentage of business enterprises)*

	Number of innovations		
	0	1 or 2	3 to5
Relations with academic institutions			
No	12.4	33.7	53.9
Yes	3.9	25.0	71.1

Companies that face skills needs in all three key areas of competency[18] are less likely to place a high value on innovation than companies that do not. This is also the case for companies whose managers have a secondary level of education (see table A.4.5 in the annex for further details). Companies with 250 or more employees, most of which operate in the industrial sector, tend to place a higher value on innovation than smaller companies. At sectoral level, only the transport and warehousing sector coefficient is significant and negative, indicating a lower propensity to place a high value on innovation. Companies run by managers with only a secondary education are less likely to maintain relations with academic institutions. On the other hand, managers who have graduated from a vocational training institute are more likely to establish relationships with vocational training centres. In terms of geography, companies located in Algiers and Bordj are more likely to have relationships with the professional training system, while those located in Tizi Ouzou are less likely to have established such relationships. Companies in the transport and warehousing and the agrifood sectors appear to be less interested in establishing relationships with academic institutions. This needs to be explored further, to ascertain, for example, whether this is because those companies are unable to access the specialized know-how and skills they require through their contacts with the academic world or whether other factors are involved.

The COVID-19 crisis revealed the importance of digital technology in addressing many of the challenges faced by business enterprises. Table 3.2.2.12 shows, however, that the companies surveyed did not consider digitalization in the post-COVID-19 period to be of particular importance, with 58 per cent of companies indicating that digitalization was likely to be of low or medium importance in their business activities.

Table 3.2.2.12: Importance of digitalization in the post-COVID-19 period according to business enterprises in various economic sectors *(Percentage of business enterprises)*

	Low	Medium	Relatively high	High	Very high
Agriculture	33.3	31.0	16.7	14.3	4.8
Construction, public works and hydraulics	25.0	34.3	19.1	11.4	10.2
Hydrocarbons, energy, mining and related services	50.0	25.0	18.8	0.0	6.3
Manufacturing	22.0	36.0	18.4	16.5	7.0
Services	25.8	29.5	20.2	15.5	9.0
Average	24.9	33.1	19.1	14.6	8.3

There is a strong correlation between the importance attached to innovation and that attached to digitalization. As shown in table 3.2.2.13, 73.7 per cent of companies that attach high importance to innovation also attach high importance to information and communications technologies.

18 Social skills, cognitive skills and technical and practical skills.

Table 3.2.2.13: Importance attached by business enterprises to information and communications technologies and to innovation *(Percentage of business enterprises)*

	Importance attached to innovation		
Importance attached to ICTs	Low	Medium	High
Low	52.3	18.2	11.8
Medium	27.7	43.7	14.5
High	20.0	38.1	73.7

Abbreviation: ICTs, information and communications technologies.

These limited data on innovation should be viewed in the light of international rankings on innovation. In that regard, Algeria was ranked 120th out of 132 countries in the 2021 edition of the Global Innovation Index, for example.[19] The various indicators provided in table 3.2.2.14 make clear that the country's rank is not due to a lack of human capital or research, but rather to a weak innovation environment and the limited sophistication of the country's economy, namely the sophistication of markets and companies.

Table 3.2.2.14: Global Innovation Index scores and relevant subscores, Algeria and other selected countries, 2021

	Algeria	Benin	Bolivia	Cabo Verde	Côte d'Ivoire	Egypt	India	Indonesia	Kenya	Tunisia
Global Innovation Index (overall score)	120	128	104	89	114	94	46	87	85	71
Input rank	109	113	95	96	107	102	57	87	89	78
Output rank	128	132	111	88	121	86	45	84	76	64
Institutions	104	84	131	88	79	114	62	107	80	75
Human capital and research	74	111	55	95	124	93	54	91	92	35
Infrastructure	96	118	106	66	109	92	81	68	114	89
Market sophistication	132	123	59	128	117	96	28	57	54	98
Business sophistication	124	113	75	74	91	106	52	110	77	114
University-industry research and development collaboration	93	83	125	72	89	56	65	27	49	103
Knowledge and technology outputs	125	131	112	122	110	70	29	74	65	55
Creative outputs	118	128	111	59	121	104	68	91	95	80

19 World Intellectual Property Organization, Global Innovation Index 2021. Available at: https://www.wipo.int/global_innovation_index/en/2021/.

3.3. Company financing and investment

On average, during the period 2019–2020, self-financing accounted for almost 53 per cent of business enterprise financing. Credit from private and public banks provided only 2 per cent and 4.9 per cent, respectively, of companies' financing needs.

On average, family businesses reinvest almost 8 per cent more of their profits in the business enterprise.

Some 59.4 per cent of companies have an investment horizon of less than 2 years.

In this section, the survey results pertaining to the investment behaviour of companies are presented. Figure VIII shows the share of profits reinvested on average in the five years to 2020 by sector of economic activity. Among the different economic sectors, companies in the agricultural and hydrocarbons sectors reinvested the highest share of earnings.

Figure VIII: Share of profits reinvested in business enterprises over a five-year period by economic sector *(Percentage)*

Agriculture	34.26
Construction, public works and hydraulics	24.70
Hydrocarbons, energy, mining and related services	32.69
Manufacturing	24.52
Services	23.90

Family-owned businesses tend to reinvest a higher proportion of their profits in their business enterprises (on average almost 8 per cent more, see table A.4.6 in the annex for further details). This may be due to the fact that those businesses make greater use of self-financing, as discussed below. Interestingly, companies that place a high value on innovation and research and development reinvest a larger proportion of their profits in the business enterprise than companies that do not place a high value on innovation. Companies with 250 or more employees reinvest a smaller proportion of their profits than smaller companies. This may be due to the fact that they have fewer constraints on access to external finance. Finally, companies in Algiers and Tizi Ouzou reinvest more of their profits than those in other cities in Algeria.

Table 3.3.1 shows the investment horizon of companies by sector. The first notable result is the low propensity of companies to invest beyond 10 years, across all sectors with the exception of the hydrocarbons sector. Even in manufacturing, where the investment horizon should be long, only 2.7 per cent of the companies surveyed invested for more than 10 years, while 8.1 per cent had an investment horizon of between 5 and 10 years.

Table 3.3.1: Investment horizon of business enterprises by sector *(Percentage of business enterprises in the sector)*

	Agriculture	Construction, public works and hydraulics	Hydrocarbons, energy, mining and related services	Manufacturing	Services	All sectors
Less than 1 year	11.9	15.2	12.5	18.2	19.2	17.5
1–2 years	38.1	43.6	18.7	40.9	43.5	41.9
2–5 years	33.3	30.5	37.5	30.1	27.3	29.5
5–10 years	11.9	9.7	12.5	8.1	7.8	8.6
More than 10 years	4.8	0.8	18.7	2.7	2.2	2.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3.3.2 shows the contribution of different sources of finance to business activity. It can be seen that, between 2015 and 2020, self-financing accounted on average for almost 53 per cent of business financing. Credit from private banks accounted for only 2 per cent of financing, while credit from public banks accounted for 4.9 per cent. The businesses surveyed tended to rely more on self-financing, including the mobilization of equity capital and reinvested profits, in 2020 than they had in 2019, suggesting that it had become more difficult in 2020 to access external sources of finance.

Table 3.3.2: Percentage contribution of different sources of financing to business activity, 2020, 2019 and 2015–2020 average

	2020	2019	2015–2020 average
Self-financing/company funds	54.7	51.0	52.8
Reinvested earnings	18.7	18.9	16.0
Capital increase/sale of shares	2.8	3.3	2.2
Debt issuance	0.7	0.0	0.0
Loan from a private commercial bank	3.4	2.3	2.0
Loan from a public commercial bank or other public institution	4.1	3.5	4.9
Loan from a financial institution (other than a bank)	0.8	0.6	0.9
Loans from customers or suppliers	3.8	3.3	2.4
Loans from relatives	4.2	2.2	3.3

Table 3.3.3 and table 3.3.4 show the contribution of different sources of finance by sector in 2020 and in the period 2015–2020, respectively.

Table 3.3.3: Percentage contribution of different sources of financing to business activity by economic sector, 2020

	Self-financing/ company funds	Reinvested earnings	Capital increase	Debt issuance	Loan from a private commercial bank	Loan from a public commercial bank or other public institution	Loan from a financial institution (other than a bank)	Loans from customers or suppliers	Loans from relatives
Agriculture	60.0	27.8	3.9	0.0	0.7	5.9	1.0	1.0	5.0
Construction, public works and hydraulics	55.6	27.7	4.5	0.9	2.3	8.9	1.9	3.0	3.6
Hydrocarbons, energy, mining and related services	48.8	23.1	0.8	0.9	0.0	0.0	0.0	6.4	8.5
Manufacturing	47.9	26.7	4.0	0.8	6.5	4.4	1.1	6.1	4.3
Services	52.7	25.2	3.6	0.3	3.7	4.1	0.9	4.8	6.0

Of note in 2020 was a marked increase in the proportion of self-financing in the agriculture sector (60 per cent compared with an average of 46.9 per cent between 2015 and 2020), and in the hydrocarbons sector (48.8 per cent compared with 28.9 per cent).

Table 3.3.4: Percentage contribution of different sources of financing to business activity by economic sector, 2015–2020 average

	Self-financing/ company funds	Reinvested earnings	Capital increase	Debt issuance	Loan from a private commercial bank	Loan from a public commercial bank or other public institution	Loan from a financial institution (other than a bank)	Loans from customers or suppliers	Loans from relatives
Agriculture	46.9	25.0	4.3	0.0	1.3	7.2	0.0	0.8	4.6
Construction, public works and hydraulics	56.3	16.7	7.5	0.0	1.5	4.7	2.3	2.6	5.1
Hydrocarbons, energy, mining and related services	28.9	8.9	1.3		0.0	17.9	0.0	0.0	24.2
Manufacturing	51.7	14.3	5.2	0.0	3.3	4.1	0.8	2.6	2.3
Services	53.1	17.6	5.6	0.0	1.6	5.5	0.1	3.1	2.9

Capital structure and access to external finance

Table 3.3.5 illustrates that the hydrocarbons and industrial sectors are the economic sectors with the highest proportion of family-owned or mixed ownership (family and third party) businesses. In the industrial sector, only 34.2 per cent of businesses are non-family owned. Given the characteristics of family businesses, family ownership is an important factor that should be taken into account in the development of the country's industrial policy.[20]

Table 3.3.5: Distribution of business enterprises in various economic sectors by capital structure *(Percentage of businesses in each sector)*

	Family owned/mixed ownership	Non-family ownership
Agriculture	61.9	38.1
Construction, public works and hydraulics	54.7	45.3
Hydrocarbons, energy, mining and related services	68.8	31.3
Manufacturing	65.9	34.2
Services	52.5	47.5
Average	58.7	41.3

Table 3.3.6 shows that the proportion of non-family businesses is much higher among business enterprises with 250 or more employees (65.5 per cent compared with less than 43 per cent for businesses with fewer than 250 employees). There is little variation among the other size categories.

Table 3.3.6: Distribution of business enterprises in different size categories by capital structure *(Percentage of businesses in each size category)*

	100% family-owned	Mixed ownership	Non-family ownership
4–9 employees	45.6	57.6	42.5
10–49 employees	51.1	59.3	40.7
50–249 employees	47.8	61.6	38.4
250 or more employees	23.6	34.6	65.5

As illustrated in table 3.3.7, family-owned businesses tend to rely more heavily on self-financing than other business types. For all types of business, the percentage of business enterprise financing mobilized though self-financing efforts increased between 2019 and 2020, and was particularly high for family-owned businesses or companies with mixed ownership.

Table 3.3.7: Self-financing as a percentage of total business financing by capital structure, 2019, 2020 and 2015–2020 average

	100% family-owned	Mixed ownership	Non-family ownership
2019	49.5	47.1	43.4
2020	56.5	54.3	48.4
2015–2020	59.4	56.0	46.3

20 This point will be addressed in more detail in the section of the present report on public policy recommendations.

In 2020, self-financing averaged 56.5 per cent of total business enterprise financing for companies whose capital was wholly owned by a family, and 48.4 per cent for companies that were not family-owned. It should be noted, however, that table 3.3.7 includes all companies, including those that did not indicate the share of each method of financing. Table 3.3.8 adjusts for this by including only those companies that "correctly" indicated their share of financing, and for which the sum of the percentages indicated is indeed 100 per cent. In this case, self-financing for companies whose capital is wholly owned by a family stood at 60.8 per cent of total financing in 2020, compared with 46 per cent for non-family-owned companies. Furthermore, the percentage of total business enterprise financing mobilized through bank loans was the same for all categories of business.

Table 3.3.8: Distribution of business enterprise financing by capital structure, 2020 *(Percentage)*

	100% family-owned	Mixed ownership	Non-family ownership
Self-financing/company funds	60.8	57.4	46.0
Reinvested earnings	19.7	21.4	28.9
Capital increase/sale of shares	1.8	2.6	2.7
Debt issuance	0.6	0.5	0.3
Loan from a private commercial bank	4.5	4.2	4.2
Loan from a public commercial bank or other public institution	4.4	4.2	4.6
Loan from a financial institution (other than a bank)	1.0	1.2	1.1
Loans from customers or suppliers	3.8	4.4	6.6
Loans from relatives	3.4	4.0	5.7

3.4. Impact of the COVID-19 crisis on business enterprises

The purpose of this section is to shed light on the impact of the COVID-19 crisis on companies and, in particular, to deepen understanding of the characteristics of business enterprises that can strengthen their resilience.

3.4.1. Impact of the pandemic on business operations and investment

The pandemic resulted in the temporary suspension of operations of 69 per cent of the business enterprises surveyed, while 29.3 per cent of those business enterprises operated at reduced capacity.

Companies with 250 or more employees were less likely to suspend their operations temporarily and were more likely to operate at reduced capacity.

Companies that temporarily suspended their operations were more likely to face constraints with regard to employee mobility (49.3 per cent), transport (42.9 per cent) and accessing supplies (28.1 per cent) than companies that did not suspend their operations.

Table 3.4.1 shows the proportion of businesses by operating modality in 2020. Although businesses in all economic sectors were effected in terms of their operating modalities, agricultural sector

businesses were less severely affected than businesses in other economic sectors. Businesses in the northern regions of the country were more severely affected by temporary suspensions of operations than those in other regions.

Table 3.4.1: Percentage of companies in different economic sectors that temporarily suspended their operations or operated at reduced capacity in 2020

	Operated at reduced capacity	Temporarily suspended operations	Temporarily suspended operations and operated at reduced capacity
Economic sector			
Agriculture	16.7	57.1	9.5
Construction, public works and hydraulics	33.1	71.2	14.8
Hydrocarbons, energy, mining and related services	25.0	62.5	6.3
Manufacturing	29.0	68.8	12.5
Services	28.9	69.6	12.4
Geographical region			
North Centre	25.2	73.6	8.0
North West	25.8	69.1	14.4
North East	26.6	76.2	15.4
Hauts Plateaux, West	45.5	59.1	27.3
Hauts Plateaux, East	47.9	56.4	21.5
Hauts Plateaux, South	11.1	40.7	0.0
Size of business enterprise			
4–9 employees	25.9	65.5	10.1
10–49 employees	27.6	73.4	13.7
50–249 employees	30.6	66.7	13.3
250 or more employees	43.6	52.7	14.6
Average	29.3	69.0	12.8

Although business enterprises with 250 or more employees were less likely to suspend their operations on a temporary basis than smaller companies, they were more likely to operate at reduced capacity.[21] In that regard, it should be remembered that 65 per cent of the surveyed enterprises with 250 or more employees operate in the industrial sector. Table 3.4.2 shows that companies that temporarily suspended their operations were particularly likely to face constraints with regard to employee mobility (49.3 per cent), transport (42.9 per cent) and accessing inputs (28.1 per cent).

21 This remains true even if city and business sector are controlled for.

Table 3.4.2: Reasons for the temporary suspension of business operations or for operating at reduced capacity *(Percentage of businesses citing the reason given)*

Transport problems impeding access to supplies or distribution	42.9
Supply-side challenges (failure of suppliers to deliver, unavailability of inputs)	28.1
Flow of goods challenges (reduced demand)	12.7
Restricted mobility of employees	49.3
Credit line challenges	10.8
Administrative constraints	24.9

As shown in table 3.4.3, limited employee mobility and transport-related challenges were the constraints most frequently cited by companies, regardless of their working modality. It should be noted, however, that companies that operated at reduced capacity cited employee mobility and transport-related challenges more frequently than companies that had been compelled to suspend their business operations. That can be explained by the fact that temporary work stoppages were in part due to the containment measures adopted by the authorities.

Table 3.4.3: Reasons given for operating at reduced capacity or suspending operations by working modalities of affected business enterprises *(Percentage of businesses citing the reason given)*

	Operated at reduced capacity	Temporarily suspended operations	Temporarily suspended operations and operated at reduced capacity
Transport-related challenges impeding access to supplies or distribution	53.6	49.0	51.6
Supply-side challenges (failure of suppliers to deliver, unavailability of inputs)	34.3	31.5	28.6
Flow of goods challenges (reduced demand)	14.2	14.9	13.5
Restricted mobility of employees	61.6	57.4	65.1
Credit line challenges	10.7	12.7	8.7
Administrative constraints	29.8	29.9	34.9

As regards the causes of temporary suspensions of business operations and operations at reduced capacity, table 3.4.4 indicates that agricultural businesses were particularly affected by transport-related constraints, which impeded their access to business inputs (33.3 per cent of agricultural sector businesses surveyed) and worker mobility challenges (28.6 per cent of agricultural businesses). The manufacturing industry was even more severely affected, with 48.3 of surveyed businesses in that sector experiencing transport-related challenges, 47.7 per cent experiencing employee mobility constraints and 36.0 per cent experiencing supply-side challenges. Overall, the agricultural sector was less severely affected than other economic sectors.

Table 3.4.4: Reasons given for temporary suspensions of operations and operations at reduced capacity by sector *(Percentage of businesses in each sector citing the reason given)*

	Transport-related challenges impeding access to supplies or distribution	Supply-side challenges (failure of suppliers to deliver, unavailability of inputs)	Flow of goods challenges (reduced demand)	Restricted mobility of employees	Credit line challenges	Admin-istrative constraints
Agriculture	33.3	16.7	11.9	28.6	7.1	14.3
Construction, public works and hydraulics	48.3	27.5	12.7	57.6	9.8	28.8
Hydrocarbons, energy, mining and related services	25.0	25.0	25.0	50.0	25.0	43.8
Manufacturing	48.0	36.0	14.4	47.7	11.1	14.9
Services	35.4	21.1	10.3	47.8	10.9	33.9
Average	42.9	28.1	12.7	49.3	10.8	24.9

Table 3.4.5 shows that companies in Hauts Plateaux, East were particularly badly affected by transport problems, while those in the North East tended to cite the restricted mobility of employees as particularly challenging. Those difference can be explained by the measures taken by the country's district authorities (***wilayas***) in response to the increasing or decreasing prevalence of the virus.

Table 3.4.5: Reasons given for temporary suspensions of operations and operations at reduced capacity by geographical region *(Percentage of businesses in each sector citing the reason given)*

	Transport-related challenges impeding access to supplies or distribution	Supply-side challenges (failure of suppliers to deliver, unavailability of inputs)	Flow of goods challenges (reduced demand)	Restricted mobility of employees	Credit line challenges	Administrative constraints
Hauts Plateaux, East	61.4	22.7	8.6	52.2	7.4	9.8
Hauts Plateaux, West	13.6	18.2	18.2	27.3	0.0	63.6
Hauts Plateaux, South	29.6	29.6	0.0	11.1	0.0	29.6
North Centre	39.9	32.8	12.4	51.2	14.9	22.7
North East	39.2	21.7	15.4	58.0	9.8	32.2
North West	42.3	27.8	16.0	44.3	7.7	32.0
Total	42.9	28.1	12.7	49.3	10.8	24.9

The factors disrupting business activity cited by the companies surveyed increased the likelihood that they would suspend their operations or operate at reduced capacity. Further details of the

impact of those factors are provided in table A.4.7 in the annex to the present report. Differences among cities were also apparent: companies in the city of Tizi Ouzou, for example, were more likely to suspend their operations temporarily than businesses in other cities, but were less likely to operate at reduced capacity, as were those in Annaba. The proportion of businesses that suspended their activities was higher in the hotel and catering and the construction material industries than in other economic sectors. Interestingly, it would appear that the more a company suffered from skills shortages, the greater the likelihood that it would suspend its operations or operate at reduced capacity.[22] Those figures must be interpreted with caution, however, although a relationship between the number of skills lacking in a company and that company's productivity and/or capacity to cope with constraints in the business environment would be understandable.

3.4.2. Impact on investment

On average, investment fell by 16.5 per cent in 2020 compared with 2019. It fell less in companies with 250 or more employees (-8.7 per cent).

Investment fell more sharply for companies that experienced both temporary stoppages of activity and periods of partial operation (-21.2 per cent).

As illustrated in table 3.4.6, investment fell by an average of 16.5 per cent across the economy with no statistically significant difference among economic sectors. It fell less sharply in companies with 250 or more employees, however. All regions were affected by the fall in investment, with the possible exception of Haut Plateaux, West, although the number of companies in the survey sample (22) is probably too small to infer an overall increase in investment in that region. Investment fell particularly sharply for companies that experienced both temporary stoppages of activity and periods of partial operation (-21.2 per cent).

22 In table A.4.7 in the annex, the coefficients in front of the variables reflect the number of skills lacking. The higher the number of skills lacking, the higher the coefficient.

Table 3.4.6: Variation in investment between 2019 and 2020 by economic sector, geographical region, company size and working modality in 2020 *(Percentage)*

Variation in investment by economic sector	
Agriculture	-14,6
Construction, public works and hydraulics	-18,4
Hydrocarbons, energy, mining and related services	-14,8
Manufacturing	-13,5
Services	-18,7
Average	-16,5

Variation in investment by company size	
4–9 employees	-14,0
10–49 employees	-16,7
50–249 employees	-17,0
250 or more employees	-8,7

Variation in investment by geographical region	
North Centre	-18,6
North East	-18,4
Nord West	-13,9
Hauts Plateaux, East	-17,6
Hauts Plateaux, West	5,9
Hauts Plateaux, South	-4,1

Variation in investment by working modality	
Continued normal business operations	-0,60
Temporarily suspended operations	-19,7
Operated at reduced capacity	-16,1
Experienced both temporary stoppages of activity and periods of partial operation	-21,

Changes in investment flows varied according to capital structure, with financially constrained family businesses recording an average additional fall in investment of 9.3 per cent compared with other businesses.

Table 3.4.7 sets out estimates for business investment in 2021 and shows a rebound in investment in all sectors. The rebound was estimated to be relatively weak in hydrocarbons, energy, mining and related services (a mere 0.6 per cent), and for companies with 250 or more employees, at just 2.5 per cent. Geographically, the rebound was strongest in Haut Plateaux, East, where investment is estimated to have increased by 15.2 per cent.

Table 3.4.7: Variation in investment between 2020 and 2021 by economic sector, geographical region, company size and working modality in 2020 *(Percentage)*

Estimated variation in investment by economic sector	
Agriculture	17,2
Construction, public works and hydraulics	11,5
Hydrocarbons, energy, mining and related services	0,6
Manufacturing	10,3
Services	11,8

Estimated variation in investment by company size	
4–9 employees	8,5
10–49 employees	12,3
50-249 employees	12,1
250 or more employees	2,5

Estimated variation in investment by geographical region	
North Centre	11.6
North East	11.7
Nord West	9.3
Hauts Plateaux, East	15.2
Hauts Plateaux, West	14.1
Hauts Plateaux, South	-10.1
Average	11.2

Estimated variation in investment by working modality in 2020	
Continued normal business operations	13.2
Temporarily suspended operations	4.4
Operated at reduced capacity	10.0
Experienced both temporary stoppages of activity and periods of partial operation	12.6

Finally, the rebound in investment was greatest among companies that had temporarily suspended operations. Statistically there was no difference between the rebound for those companies and for business enterprises that had experienced both temporary stoppages and periods of partial operation. That may be due to the fact that the former had experienced the greatest variation in investment in 2020.

3.5. Factors that have strengthened resilience

The fewer skills shortages a company suffered, the less likely it was that that company would be forced to suspend operations or operate at reduced capacity.

Companies that did not report access to finance challenges recorded a smaller contraction in turnover.

The most innovative companies suffered the smallest contraction in turnover during the crisis.

Companies run by women recorded, on average, a less severe decline in turnover.

Companies that invested the highest proportion of turnover in research and development recorded a smaller decline in turnover.

As a result of the health crisis, and as illustrated in table 3.5.1, turnover and employment fell in almost all economic sectors, albeit to varying degrees. The decline was most pronounced in the hydrocarbons, energy, mining and related services sector due to the combined effect of pandemic-related restrictions and falling oil prices. As was the case in many countries, the construction, public works and hydraulics sector was the second hardest hit. That sector is traditionally very sensitive to economic cycles. Although employment fell in the agricultural and the construction, public works and hydraulics sectors, it increased in the hydrocarbons, energy, mining and related services sector, although the survey only included 16 companies in that economic sector,[23] and the data obtained on employment may not be representative of the sector as a whole. On average, employment rose by 2.9 per cent in manufacturing and by 1.2 per cent in the services sector (excluding trade-focused enterprises, which were not covered in the survey).

23 Out of a total of 3,066 companies registered with the Algerian National Insurance Authority (CNAS).

Table 3.5.1: Change in business enterprise turnover and employment by sector between 2019 and 2020 *(Percentage)*

	Turnover	Employment
Agriculture, forestry and fisheries	-16.0	-6.6
Construction, public works and hydraulics	-18.9	-7.6
Hydrocarbons, energy, mining and related services	-26.4	10.9
Manufacturing	-11.7	2.9
Services	-14.2	1.2

The rather surprising explanation for the above results is that the percentage change in employment varies according to the initial headcount of a company. Indeed, as shown in table 3.5.2, employment increased only in companies with fewer than nine employees. Fifty of those companies operated in the services sector and 20 in manufacturing. If a company with eight employees hires one more employee, that is equivalent to an increase in employment of 12.5 per cent. What is more, the average size of companies with fewer than nine employees is six in the manufacturing and services sectors, so each new hire will, on average, lead to a 16.67 per cent increase in headcount.

Table 3.5.2: Change in business enterprise turnover and employment between 2019 and 2020 by company size *(Percentage)*

	Turnover	Employment
4–9 employees	-22.6	16.3
10–49 employees	-13.2	-4.1
50–249 employees	-10.4	-7.7
250 or more employees	-16.7	-6.4

Table 3.5.3 shows the percentage of companies that experienced a significant decrease in headcount between 2019 and 2020 (a decrease of more than 50 per cent), a decrease in headcount (a decrease of up to 50 per cent), an increase in headcount (an increase of up to 49 per cent), a significant increase in headcount (an increase of between 50 and 100 per cent) or a very significant increase in headcount (an increase in more than 100 per cent), together with the percentage of business enterprises whose headcount remained stable. In manufacturing, employment fell in 38.1 per cent of companies, while in the services sector, it fell in 42.8 per cent of companies and rose in only 13.7 per cent of business enterprises.

Table 3.5.3: Changes in company headcounts between 2019 and 2020 by economic sector *(Percentage of business enterprises in each category)*

	Decrease of more than 50%	Decrease of up to 50 %	Stable headcount	Increase of up to 49%	Increase of between 50% and 100%	Increase of more than 100%
Agriculture	6.3	31.3	50.0	9.4	0.0	3.1
Construction, public works and hydraulics	3.7	38.6	48.2	7.9	1.1	0.5
Hydrocarbons, energy, mining and related services	7.7	15.4	61.5	0.0	0.0	15.4
Manufacturing	3.2	34.9	42.9	11.1	5.4	2.5
Services	6.0	36.8	43.5	8.1	2.1	3.5
Average	4.4	36.0	44.8	9.1	3.0	2.6

Table 3.5.4 shows that employment was more stable in small business enterprises and fell more sharply in companies with more than 50 employees.

Table 3.5.4: Changes in company headcounts between 2019 and 2020 by company size *(Percentage of business enterprises in each category)*

	Decrease	Stable	Increase
4–9 employees	19.7	61.5	18.9
10–49 employees	42.5	44.0	13.5
50–249 employees	48.8	38.9	12.3
250 or more employees	46.2	43.6	10.3

Intuitively, it can be concluded that the number of weeks that companies suspended their operations had a significant influence on turnover. As shown in table A.4.8 in the annex to this report, business enterprises that indicated financing constraints reported a more significant fall in turnover than other companies. Companies with a high proportion of self-financing that called for improved access to finance experienced a more significant fall in sales than those with lower levels of self-financing. This probably reflects the fact that those companies were unable to access the finance they needed to withstand the crisis.

Table 3.5.5 shows that 79.4 per cent of the companies that reported financing constraints also cited facilitated access to credit as the most important measure that the public authorities should take to increase the resilience of companies against future shocks.

Table 3.5.5: Percentage of companies agreeing/disagreeing that improving access to credit is the most important measure to be taken by the public authorities

		Improving access to credit is the most important measure that should be taken by the public authorities	
		Disagree	Agree
Company experienced financial constraints	No	52.8	47.2
	Yes	20.6	79.4

The first two columns in table 3.5.6 show average changes in sales turnover, employment and investment for companies that indicated or did not indicate that (a) access to credit had been a constraint, and (b) steps should be taken to facilitate access to credit with a view to increasing company resilience to shocks. The last column combines the data in the first two columns, categorizing companies on the basis of whether or not they responded in the affirmative for both (a) and (b). It can be seen that the fall in turnover and the fall in investment were, on average, greater for companies that reported challenges in accessing credit or agreed that priority should be given to facilitating access to credit than for companies that did not respond in the affirmative for (a) or (b). There was no statistically significant difference for companies that responded in the affirmative only for (a) and companies that responded in the affirmative for both (a) and (b). However, companies indicating only that steps should be taken to strengthen access to credit tended to experience a less severe decline in turnover and investment than those companies indicating that they had found it challenging to mobilize financial resources.

Table 3.5.6: Variation in sales turnover, employment and investment for companies reporting/not reporting challenges in accessing credit and/or supporting/not supporting measures to facilitate access to credit *(Percentage)*

	Challenges in accessing credit		Support for measures to facilitate access to credit		Support for measures to facilitate access to credit and challenges in accessing credit	
	Not cited	Cited	Not cited	Cited	Not cited	Cited
Sales turnover	-12.1	-20.0	-13.9	-15.3	-12.5	-21.0
Employment	-1.3	1.9	-5.3	3.3	-1.9	4.5
Investment	-13.8	-21.9	-13.3	-18.9	-13.9	-23.5

Table 3.5.7 is similar to the previous table but only shows exclusive responses. For example, the first column only includes companies that indicated that they had faced challenges in accessing credit but did not express their support for facilitated access to credit.

Table 3.5.7: Variation in sales turnover, employment and investment for companies reporting/not reporting challenges in accessing credit only, and for companies supporting/not supporting measures to facilitate access to credit only *(Percentage)*

	(a) Reporting challenges in relation to access to credit only		(b) Supporting measures to facilitate access to credit only	
	Either not cited exclusively or not cited at all	Cited exclusively	Either not cited exclusively or not cited at all	Cited exclusively
Sales turnover	-14.6	-16.5	-16.6	-10.7
Employment	0.3	-8.2	-1.6	2.3
Investment	-16.5	-15.7	-17.2	-14.9

To understand the differences between the two tables, let us, for example, consider the variation in sales turnover. In the first table, the decline is indicated at -20 per cent and at -21 per cent (the second figure refers to companies that both cite the constraint and propose the measure). In the second table, the decline is -16.5 per cent (among companies that only cite the constraint). The fact that the drop in sales is lower in table 3.5.7, column 2, (cited exclusively) supports the idea that the financing constraint reflects real world access to financing (at least as perceived by companies). This is all the more the case as the gap is extremely wide (-21 per cent compared with -10.7 per cent). Companies that both cite financing constraints and support State efforts to facilitate access to credit are therefore it seems more financially constrained on average than other companies. As far as the impact on businesses is concerned, financially constrained family businesses did not suffer a larger decline in sales turnover than financially constrained non-family businesses.

One very interesting result of the survey is that companies that invested a relatively high proportion of turnover in research and development registered smaller declines in turnover. This may reflect the fact that more innovative companies were better able to adapt to the crisis. That notion is supported by the fact that companies indicating that they had implemented more than one innovative action within the previous five years performed better than companies indicating that had not. Finally, companies run by women tended to suffer a smaller drop in sales (of around 9.58 per cent).[24] Indeed, if care is taken to adjust for all other characteristics of business enterprises and managers, the gender of the manager remains a highly significant factor, with companies run by women on average performing better than those run by men.

Similar results are obtained if, instead of considering changes in sales turnover, the determining factors leading to a reduction in turnover of more than 50 per cent are examined (see table A.4.9 in the annex), including, in particular, constraints on access to credit (particularly significant), and the manager's gender.

In the case of employment, the difference is less pronounced than for sales turnover. The length of business interruption periods also had a significant impact on employment, but not necessarily on access to credit, the effect of which was not always statistically significant (see table A.4.10 in the annex).

24 The difference was 11.7 per cent before other company characteristics, including economic sector and business size, were adjusted for.

4. Public policy recommendations and conclusion

The recovery plan adopted by the Government emphasizes the need to reduce the Algerian economy's dependence on hydrocarbons and to create jobs, particularly for young people. It also sets out proposed reforms to address a number of key issues. The plan was drawn up in 2021, at a time when efforts to address the COVID-19 pandemic was beginning to bear fruit, but prior to the extreme climatic events of 2022 and the outbreak of armed conflict in Ukraine. The diversification of the Algerian economy will need to take place in the context of that multifaceted crisis. The post-COVID-19 world is likely to be more volatile and affected by climate, health and other shocks, with potentially cascading effects and far-reaching social and economic repercussions. This makes it all the more critical to identify sources of vulnerability and the factors undermining the competitiveness of companies with a view to strengthening the resilience of the Algerian economy.

In this section, further steps that could be taken in support of the key reform needs identified by the Government are explored, drawing on the factors identified in the recovery plan and on the survey results. In its recovery plan, the Government notes that 98 per cent of the private sector comprises small and medium-sized enterprises with fewer than 10 employees. According to the report, those companies are struggling to grow and reach a critical mass that will enable them to play a driving role in their economic sectors and increase their presence in global markets. The recovery plan points out that, between 2005 and 2017, the country's Global Competitiveness Index score remained relatively stable, fluctuating between 3.8 and 4.1, and the country was ranked 86th out of 137 countries in 2017.

The situation of many family-owned businesses in Algeria underscores the importance of adopting a systemic approach to business development and improving business competitiveness. In the survey sample, 100 per cent family-owned businesses accounted for 46 of the companies surveyed (and companies with mixed ownership accounted for 58.7 per cent). The survey shows that family-owned businesses have a number of characteristics in common that should be taken into account in the formulation of public policy.[25] These include:

- **a.** They often find it challenging to access credit[26] and are therefore more likely than other companies to rely on self-financing;
- **b.** They are less likely than other companies to place a high value on innovation;
- **c.** They have fewer links than other companies with the academic world;
- **d.** They employ proportionately fewer employees with a university degree;
- **e.** They are less likely than other businesses to be managed by a higher education graduate;

25 Those characteristics call into question the objective of orienting the Algerian economy towards the knowledge economy and promoting job creation among skilled workers.

26 This is the case in many developing countries.

f. They are less likely than other companies to place a high value on digitalization.

The characteristics of family-owned businesses highlight the multidimensional nature of the challenges that need to be resolved if the economy is to become more competitive, and help underscore the importance of aligning public policies in that area. Addressing all the issues faced by family-owned businesses is beyond the scope of this report. However, the study conducted by ECA has helped draw attention to some of the particular challenges they face as they strive to remain competitive, and how they compare in that regard with other businesses. It would be appropriate, especially given the number of family-owned business enterprises in the manufacturing sector, to focus greater attention on the particular characteristics of those businesses when formulating public policies. The fact that a company is "family-owned" is not necessarily a disadvantage in itself, provided that the capital structure is a real choice for the company, and not a constraint, for example because of limited access to credit secured on the basis of companies long-term assets. Further analysis is needed to understand the reasons why credit markets for small and medium-sized enterprises remain weak and promote reforms to promote their development.

The survey conducted by ECA provided useful input on: (a) the impact of the characteristics of managers on the employment of young people, skilled workers and women; (b) how skills gaps and the failure of companies to innovate can undermine those companies' resilience in crisis situations, and; (c) the limited interest of companies in innovation and the use of digital technologies. It is therefore recommended that action should be taken in three strategic areas, each of which incorporates a climate change adaptation dimension:

Strategic area 1: Policy development to address the needs of entrepreneurs in different sectors

With 28 small and medium-sized business enterprises per 1,000 inhabitants, the density of businesses in Algeria is lower than international average (50 per 1,000 inhabitants). Most new businesses are established in retail or basis services (45.4 per cent and 34 per cent, respectively, in 2019), while the manufacturing sector accounts for only 14.2 of registered business start-ups.[27] It is critical to stimulate entrepreneurship in the production of high value added goods and services.

Steps should therefore be taken to align public policies so that all issues facing businesses are addressed in parallel and in a coordinated manner. In the Government's 2021 recovery plan, a lead partner was identified for each proposed measure. The selection of lead partners does not necessarily lead to the convergence of public policies, however. It is therefore recommended that the following entities be created: (a) a separate ministry for small and medium-sized businesses; and (b) an entrepreneurship unit that would report either to the Ministry of Finance or to the Office of the Prime Minister. The unit would be responsible for steering and coordinating ministerial action on entrepreneurship, including actions taken by the new ministry for small and medium-sized business enterprises, the Ministerial Office for the Knowledge Economy and Startups, the Ministry of Industry and Investment Promotion, the Ministerial Office for Microenterprises and the Ministry of the Environment. The proposed entrepreneurship unit would focus on the needs of certain categories of business enterprise and entrepreneurs, particularly those involved in the manufacture and provision of high value added goods and services, and ensure the convergence

27 Government of Algeria, 2021 recovery plan.

of public policies, particularly those pertaining to the following business and entrepreneurial categories:

- Young, well-educated and well-qualified entrepreneurs, entrepreneurs leading technology-focused businesses and women entrepreneurs;
- Businesses run by women;
- Innovative businesses or businesses with high potential for innovation or growth.

The unit would be responsible for steering the implementation of relevant strategies and actions in support of small and medium-sized enterprises and certain entrepreneur categories and would coordinate its actions with the new ministry for small and medium-sized enterprises. It would, moreover, work closely with all relevant institutions to support implementation of key reforms.

Targeting those categories, and especially young well-educated entrepreneurs, may facilitate efforts to address youth unemployment, and particularly unemployment among young higher education graduates and women. The survey conducted by ECA determined that those business and entrepreneurial categories provide employment to proportionally more higher education graduates and women. It should be remembered, moreover, that the unemployment rate for graduates is much higher than for people with lower levels of education.

Lastly, public policies should be enacted to strengthen support for small and medium-sized enterprises, taking account of the need to adapt to climate change, in particular by raising awareness among those enterprises of the risks and opportunities associated with climate change and of the need to adapt their activities and practices to bolster resilience against future shocks. The public authorities should, moreover, encourage businesses to adopt sustainable and environmentally-friendly practices.

Strategic area 2: Supporting innovation[28]

The survey showed that only a small fraction of companies innovate in order to distinguish themselves from other companies in the market place, and drew attention to the lack of competition in goods and services. Although the COVID-19 crisis was a catalyst for digitalization in many countries, the majority of companies surveyed did not view the adoption of digital technologies as particularly important in the post-COVID-19 period. In line with those findings, a 2020 report by ECA concluded the Algerian economy had significant scope for development through the adoption of digital technologies.[29] The survey also revealed strong correlation between an interest in digital technology and the importance attached to innovation. It also shows that when it comes to supporting innovation, companies often faced challenges in securing the necessary funding and expertise. Furthermore, the survey helped draw attention to the need to strengthen links between universities and businesses, particularly in the area of research. The following actions are therefore proposed:

28 In all its aspects.
29 ECA, North Africa and the challenges of the Covid-19 era (Addis Ababa, 2020).

Fostering competition in goods and services markets and remove barriers to entry; this is a critical aspect of any reforms aiming to promote competitiveness, innovation and entrepreneurship;

Promoting digitalization by strengthening the country's digital infrastructure and creating a more incentive-based environment in order to accelerate the adoption of electronic payment mechanisms, online banking platforms, e-government portals and other digital services;

Creating incentives to strengthen relations between academic institutions and businesses, including with regard to: (a) drawing up teaching programmes; (b) deciding course content; (c) conducting research projects; and (d) engaging with students, particularly those studying for doctorate degrees. Such steps could help address the gaps in relevant expertise experienced by many businesses;

Making it easier to finance innovation, inter alia, by mobilizing public support for tax incentives and for research and development, and by facilitating the mobilization of venture capital;

Supporting so-called green innovation, namely innovation that, inter alia, promotes energy efficiency, the more rational use of water and material resources, and research and development to improve the sustainability and resilience of small and medium-sized enterprises and promote climate change adaptation.

Strategic area 3: Significantly enhancing the financial resources available to small and medium-sized business enterprises

Ensuring the provision of adequate financial support to businesses, and particularly to small and medium-sized enterprises, remains a significant challenge in Algeria. As indicated in the Government's 2021 recovery plan, the lack of a strong banking and financial system is one of the reasons why the business landscape is populated overwhelmingly by very small business enterprises with fewer than 10 employees that are unable to grow to critical size. That reality is, moreover, reflected in the country's relatively low ratio of private sector credit to GDP (25.8 in 2019) compared to the average ratio in lower middle-income countries (43.8 in 2019). The development of the financial sector should be a major focus of reforms in Algeria.

The lack of banking sector support for small and medium-sized business enterprises stems from a number of factors, including: (a) the characteristics of those business enterprises, which, inter alia, often fail to provide adequate financial transparency or establish clear boundaries between company accounts and those of shareholders; (b) a lack of competition within the banking sector,[30] in which public banks play an outsized role, (c) banking practices and regulations that are unfavourable to small and medium-sized enterprises, including high collateral requirements; (d) a legal framework on property rights that is unfavourable to banks;[31] (e) limited information on companies, particularly on their credit history, and (f) poorly developed financial markets[32] and limited mobilization of private equity and venture capital. Furthermore, IMF indicates that the lack

30 In Algeria, banks are criticized for being reluctant to take risks and for being more willing to provide credit to consumers than to small and medium-sized enterprises.

31 World Bank, Doing Business 2018.

32 Only one small and medium-sized enterprise is listed on the Algiers stock exchange.

of credit provided to the private sector in recent years is attributable to a crowding-out effect, due to the propensity of public banks to finance public enterprises and to a lack of competition within the banking sector. The following actions are therefore proposed:

- Significantly enhancing competition and reduce the relative weight of the public banking sector (which accounts for over 90 per cent of bank balance sheets);

- Improving the governance of public banks and, more generally, of public enterprises, in order to improve their management and results;

- Stimulating the provision of credit to small and medium sized enterprises by banks. In that regard, it should be recalled that IMF has called for action to be taken on the prudential rules for banks;

- Improving the available data on companies, for example by establishing a central balance sheet office and a public credit register and by facilitating the establishment of company rating agencies;

- Developing the private equity and venture capital sector, which could play an important role in supporting companies with high growth potential and in financing innovation;

- Drawing up legal frameworks to support the development of financial technology companies, a promising avenue for development that will, nonetheless require Algeria to redouble its efforts to promote economic digitalization.

Promoting climate change adaptation will require the development of green finance. To that end, a green climate fund could be established to support so-called green innovation, namely innovation that reduces the negative ecological impact of business activities. One of the objectives of the fund would be to establish a critical mass of companies and thus create a favourable context for the development of private-sector green financing, including through the banking system.

The survey conducted by ECA helped draw attention to certain characteristics of small and medium-sized business enterprises in the manufacturing and services sectors that should be taken into account in the development of public policies. With a view to accelerating the diversification of the Algerian economy and promoting innovation and knowledge-based economic growth, further research is needed to explore ways to support certain business enterprises, including companies with high development potential, those with a strong appetite for innovation, and those with the greatest potential impact on job creation for certain sectors of the population, including women and young skilled workers. The survey also underscored that many family-run businesses in the manufacturing sector are poorly positioned to enhance the competitiveness of the Algerian economy. Here too, the results of the study should be examined in greater depth in order to gather more information for the purposes of drawing up effective public policies in that area.

Annex

1. Comparison of the survey conducted by the Economic Commission for Africa with the survey conducted jointly by the National Economic, Social and Environmental Council and the United Nations

Table A.1.1 compares the samples used in the two surveys. The far south of Algeria was not covered in the ECA survey, and the two samples are significantly different in terms of sectoral distribution and company size.

Table A.1.1: Comparison of the samples used in the two surveys

	National Economic, Social and Environmental Council and United Nations		ECA	
	Businesses	Proportion	Businesses	Proportion
Economic sector				
Agriculture	203	14	39	4
Fisheries	50	3	0	0
Industry	300	20	417	42
Construction	70	5	220	22
Trade	506	34	0	0
Services	371	25	309	31
Company size (No. of employees)				
1-4	350	23	31	3
5-9	437	29	106	11
10-19	290	19	245	25
20-49	201	13	222	23
50-99	82	5	124	13
100-249	70	5	93	9
>=250	70	5	41	4
Region				
Far South	139	9	0	0
Hauts Plateaux	347	23	212	22
North Centre	534	36	436	44
North East	234	16	143	15
North West	247	16	194	20

2. Distribution of business enterprises according to the source files

Table A.2.1: Distribution of business enterprises according to the source files

Type of small and medium-sized enterprise	No. of enterprises	%
Very small businesses (fewer than 10 employees)	1 157 539	97
Small businesses (between 10 and 49 employees)	31 027	2,6
Medium-sized businesses (Between 50 and 249 employees)	4 773	0,4
Total	1 193 339	100

Source: Algerian National Insurance Authority (CNAS), National Insurance Authority for Self-employed Workers (CASNOS), Economic Studies, Financial Analysis and Trends Analysis (ECOFIE).

Table A.2.2: Distribution of business enterprises by sector according to files compiled by the Algerian National Insurance Authority

Economic sector	Privately-owned small and medium-sized enterprises (CNAS)	Publicly-owned small and medium sized enterprises (ECOFIE)	Total	%
Agriculture	7 387	94	7 481	1.11
Hydrocarbons, energy, mining and related services	3 064	2	3 066	0.46
Construction, public works and hydraulics	190 155	15	190 170	28.32
Manufacturing	103 621	72	103 693	15.44
Services	367 040	60	367 100	54.67
Total	671 267	243	671 510	100

Source: Algerian National Insurance Authority (CNAS).

Table A.2.3: Distribution of business enterprises by sector and size according to files compiled by Economic Studies, Financial Analysis and Trends Analysis

Economic sector	1–9 employees		10–49 employees		50–249 employees		Total no of business enterprises	%
	No. of enterprises	Employees	No. of enterprises	Employees	Number of business enterprises	Employees		
Industry	2	11	12	312	58	7 203	72	29.63
Services	1	5	9	272	50	7 030	60	24.69
Agriculture	21	94	57	1 432	16	1 930	94	38.68
Construction, public works and hydraulics	0	0	1	29	14	2 435	15	6.17
Mining and quarries	0	0	0	0	2	332	2	0.82
Total	24	110	79	2 045	140	18 930	243	100

Source: Economic Studies, Financial Analysis and Trends Analysis (ECOFIE).

Table A.2.4: Distribution of business enterprises by sector

Sector of economic activity	No.	%
Agriculture	7 387	0.62
Hydrocarbons, energy, mining and related services	3 064	0.26
Construction, public works and hydraulics	19 0155	15.94
Manufacturing	103 621	8.69
Services, including liberal professions	614 315	51.49
Artisanal activities	274 554	23.01
Total	1 193 096	100.00

Source: Algerian National Insurance Authority (CNAS), National Insurance Authority for Self-employed Workers (CASNOS).

Table A.2.5: Distribution of business enterprises by region

Region	No. of small and medium-sized enterprises, 2019	%
North	830 438	69.59
Hauts Plateaux	262 340	21.98
South	100 561	8.43
Total	1 193 339	100.00

Source: Algerian National Insurance Authority (CNAS), National Insurance Authority for Self-employed Workers (CASNOS), Economic Studies, Financial Analysis and Trends Analysis (ECOFIE).

3. Descriptive statistics used in the ECA survey sample

Figure A.I: Sectoral distribution of business enterprises

Financial and insurance activities	2.2
Real estate activities	1.6
Specialized, scientific and technical activities	10.7
Agriculture, forestry and fishing	4.0
Construction and civil engineering	22.3
Hotels (tourism/accommodation) and catering	6.2
Food industries	12.4
Building materials, ceramics and glass industries	6.9
Textiles, clothing, leather and footwear industries	7.1
Extractive industries (oil, natural gas, mining, etc.)	1.8
Mechanical and electrical industries	6.6
Pharmaceutical and chemical industries	7.5
Car and motorbike repair	2.9
Information and communications technologies	2.2
Transport and warehousing	5.5

Table A.3.1: Proportion of women and young people employed by area of economic activity *(Percentage)*

	Proportion of women	Proportion of young people (16–29 years old)
Financial and insurance activities	45.36	47.09
Real estate activities	9.50	56.63
Specialized, scientific and technical activities	47.74	39.86
Agriculture, forestry and fishing	16.64	52.69
Construction and civil engineering	12.75	55.04
Hotels (tourism/accommodation) and catering	30.43	50.85
Food industries	36.83	51.45
Building materials, ceramics and glass industries	11.25	49.82
Textiles, clothing, leather and footwear industries	65.14	40.47
Extractive industries (oil, natural gas, mining, etc.)	15.78	49.00
Mechanical and electrical industries	12.82	52.69
Pharmaceutical and chemical industries	30.47	49.09
Car and motorbike repair	9.79	45.76
Information and communications technologies	26.05	58.05
Transport and warehousing	15.81	53.98
Total	26.78	50.10

Table A.3.2: Distribution of employees by level of education and area of economic activity *(Percentage)*

	Primary education level	Secondary education level	University education level
Financial and insurance activities	0.27	21.00	78.73
Real estate activities	21.31	39.31	39.38
Specialized, scientific and technical activities	8.55	32.82	58.53
Agriculture, forestry and fishing	23.56	47.28	29.41
Construction and civil engineering	18.95	41.68	39.40
Hotels (tourism/accommodation) and catering	15.49	47.05	37.54
Food industries	19.07	51.25	29.81
Building materials, ceramics and glass industries	22.07	47.31	30.44
Textiles, clothing, leather and footwear industries	22.07	51.04	26.24
Extractive industries (oil, natural gas, mining, etc.)	13.39	41.22	50.94
Mechanical and electrical industries	13.98	44.83	41.18
Pharmaceutical and chemical industries	18.51	33.80	47.69
Car and motorbike repair	8.72	56.28	35.00
Information and communications technologies	3.14	19.05	78.45
Transport and warehousing	9.22	54.91	35.78
Total	16.23	43.29	40.56

Table A.3.3: Human skills that companies lack by economic sector *(Percentage of companies)*

	Agriculture	Construction, public works and hydraulics	Hydrocarbons, energy, mining and related services	Manufac-turing	Services	Total	Chi2
Communica-tions skills	31.0	20.8	18.8	24.7	25.5	24.2	0.533
Customer management skills	16.7	22.0	37.5	27.9	32.0	27.5	0.039
Teamwork skills	23.8	27.5	12.5	38.2	33.9	33.2	0.015
Business management skills	16.7	17.4	25.0	20.1	22.1	20.0	0.662
Problem solving skills	35.7	28.4	18.8	32.5	32.3	31.4	0.578
Numeracy skills	21.4	16.1	18.8	22.8	20.5	20.3	0.403
Writing skills	11.9	9.3	18.8	14.1	15.2	13.3	0.293
Administrative skills	16.7	17.4	12.5	20.1	20.5	19.3	0.799
Technical skills (dexterity)	21.4	22.5	31.3	30.9	24.5	26.4	0.134
Job-specific/ technical skills	16.7	24.2	18.8	28.5	27.6	26.5	0.381
General information technology (IT) skills	9.5	20.3	37.5	23.3	19.3	20.9	0.099
Professional-level IT skills	23.8	14.0	18.8	18.7	17.1	17.3	0.462

Table A.3.4: Human skills lacking by area of economic activity (*Percentage of companies in each area)*

	Communication skills	Customer management skills	Teamwork skills	Business management skills	Problem solving skills	Numeracy skills	Writing skills	Administrative skills	Technical skills (dexterity)	Job specific/ technical skills	General IT skills	Professional-level IT skills
Financial and insurance activities	36.36	18.18	22.73	27.27	22.73	13.64	13.64	31.82	36.36	31.82	22.73	4.55
Real estate activities	37.50	37.50	43.75	31.25	31.25	31.25	37.50	43.75	12.50	31.25	12.50	12.50
Specialized, scientific and technical activities	21.90	28.57	29.52	17.14	30.48	14.29	9.52	13.33	23.81	26.67	23.81	18.10
Agriculture, forestry and fishing	28.21	17.95	23.08	20.51	30.77	20.51	12.82	15.38	20.51	17.95	15.38	28.21
Construction and civil engineering	21.36	24.55	24.55	17.73	29.55	15.91	10.00	17.27	20.91	25.91	20.91	13.18
Hotels (tourism/ accommodation) and catering	37.70	40.98	42.62	31.15	36.07	22.95	16.39	24.59	31.15	26.23	16.39	22.95
Food industries	27.87	36.07	40.98	25.41	32.79	27.87	14.75	26.23	29.51	28.69	27.87	14.75
Building materials, ceramics and glass industries	33.82	23.53	42.65	25.00	48.53	20.59	14.71	22.06	36.76	27.94	19.12	20.59
Textiles, clothing, leather and footwear industries	20.00	24.29	47.14	8.57	25.71	21.43	17.14	15.71	35.71	28.57	15.71	15.71
Extractive industries (oil, natural gas, mining, etc.)	5.56	38.89	11.11	33.33	11.11	27.78	11.11	16.67	38.89	11.11	16.67	22.22
Mechanical and electrical industries	16.92	23.08	29.23	18.46	29.23	21.54	12.31	20.00	29.23	24.62	24.62	20.00

	Communication skills	Customer management skills	Teamwork skills	Business management skills	Problem solving skills	Numeracy skills	Writing skills	Administrative skills	Technical skills (dexterity)	Job specific/ technical skills	General IT skills	Professional-level IT skills
Pharmaceutical and chemical industries	18.92	29.73	35.14	16.22	22.97	22.97	13.51	16.22	22.97	31.08	22.97	18.92
Car and motorbike repair	13.79	17.24	27.59	3.45	44.83	13.79	13.79	6.90	20.69	27.59	0.00	17.24
Information and communications technologies	40.91	27.27	31.82	18.18	54.55	18.18	4.55	22.73	31.82	22.73	18.18	18.18
Transport and warehousing	18.52	24.07	38.89	24.07	25.93	24.07	18.52	18.52	18.52	24.07	25.93	20.37
Total	24.16	27.51	33.20	20.00	31.37	20.30	13.30	19.29	26.40	26.50	20.91	17.26
Chi2	0.012	0.152	0.004	0.032	0.02	0.472	0.305	0.099	0.127	0.967	0.251	0.577

Table A.3.5: Number of skills lacking by area of economic activity *(Percentage of companies lacking the cited number of skills)*

	0	1	2	3	4	5 or more
Financial and insurance activities	0.0	12.5	37.5	25.0	0.0	25.0
Real estate activities	13.6	27.3	13.6	13.6	9.1	22.7
Specialized, scientific and technical activities	12.4	31.4	18.1	13.3	7.6	17.1
Agriculture, forestry and fishing	18.0	12.8	15.4	33.3	15.4	5.1
Construction and civil engineering	13.2	19.6	25.9	19.6	10.5	11.4
Hotels (tourism/accommodation) and catering	8.2	14.8	9.8	26.2	9.8	31.2
Food industries	7.4	10.7	19.7	23.0	15.6	23.8
Building materials, ceramics and glass industries	2.9	17.7	14.7	27.9	17.7	19.1
Textiles, clothing, leather and footwear industries	4.3	22.9	25.7	17.1	17.1	12.9
Extractive industries (oil, natural gas, mining, etc.)	11.1	27.8	27.8	5.6	5.6	22.2
Mechanical and electrical industries	12.3	30.8	10.8	16.9	10.8	18.5
Pharmaceutical and chemical industries	12.2	23.0	14.9	18.9	16.2	14.9
Car and motorbike repair	27.6	13.8	20.7	10.3	17.2	10.3
Information and communications technologies	13.6	9.1	18.2	31.8	4.6	22.7
Transport and warehousing	5.6	18.5	22.2	22.2	20.4	11.1
Total	10.6	20.0	19.7	20.3	12.7	16.8

Table A.3.6: Solutions adopted by business enterprises to address skills gaps *(Percentage of companies in each area of economic activity)*

	Providing training	Recruiting new employees	Adopting organizational changes	Improving management
Financial and insurance activities	43.75	50.00	37.50	50.00
Real estate activities	63.64	36.36	36.36	40.91
Specialized, scientific and technical activities	55.24	35.24	24.76	44.76
Agriculture, forestry and fishing	38.46	35.90	28.21	41.03
Construction and civil engineering	45	36.36	23.64	53.18
Hotels (tourism/accommodation) and catering	49.18	36.07	27.87	39.34
Food industries	48.36	34.43	31.97	48.36
Building materials, ceramics and glass industries	48.53	36.76	30.88	48.53
Textiles, clothing, leather and footwear industries	44.29	38.57	20.00	45.71
Extractive industries (oil, natural gas, mining, etc.)	55.56	33.33	50.00	44.44
Mechanical and electrical industries	50.77	29.23	26.15	43.08
Pharmaceutical and chemical industries	62.16	48.65	32.43	45.95

	Providing training	Recruiting new employees	Adopting organizational changes	Improving management
Car and motorbike repair	65.52	27.59	13.79	24.14
Information and communications technologies	54.55	45.45	31.82	40.91
Transport and warehousing	33.33	33.33	25.93	53.70

Table A.3.7: Importance given to innovation by business enterprises in different geographical regions *(Percentage of business enterprises)*

	Low	Medium	High
Centre	23.0	52.3	24.7
East	16.9	57.1	26.0
West	33.1	48.9	17.9
South	44.4	44.4	11.1

Table A.3.8: Importance given to innovation in the manufacturing sector by size of business enterprise *(Percentage of business enterprises)*

	Low	Medium	Relatively high	High	Very high
4–9 employees	25.0	35.7	14.3	7.1	17.9
10–49 employees	15.9	36.3	23.6	14.3	9.9
50–249 employees	18.6	36.3	17.7	19.4	8.1
250 or more employees	7.4	25.9	22.2	18.5	25.9
Total	16.9	35.6	20.7	15.8	11.1

Table A.3.9: Percentage of sales turnover spent on research and development by area of economic activity

Financial and insurance activities	5.9
Real estate activities	8.5
Specialized, scientific and technical activities	5.7
Agriculture, forestry and fishing	6.8
Construction and civil engineering	6.4
Hotels (tourism/accommodation) and catering	5.4
Food industries	7.0
Building materials, ceramics and glass industries	7.2
Textiles, clothing, leather and footwear industries	7.6
Extractive industries (oil, natural gas, mining, etc.)	6.8
Mechanical and electrical industries	7.9
Pharmaceutical and chemical industries	8.1
Car and motorbike repair	8.4
Information and communications technologies	9.7
Transport and warehousing	5.0

Table A.3.10: Challenges encountered by business enterprises by geographical region *(Percentage of business enterprises)*

	Transport-related challenges impeding access to supplies or distribution	Supply-side challenges (failure of suppliers to deliver, unavailability of inputs)	Flow of goods challenges (reduced demand)	Restricted mobility of employees	Credit line challenges	Administrative constraints
Hauts Plateaux, East	61.4	22.7	8.6	52.2	7.4	9.8
Hauts Plateaux, West	13.6	18.2	18.2	27.3	0.0	63.6
Hauts Plateaux, South	29.6	29.6	0.0	11.1	0.0	29.6
North Centre	39.9	32.8	12.4	51.2	14.9	22.7
North East	39.2	21.7	15.4	58.0	9.8	32.2
North West	42.3	27.8	16.0	44.3	7.7	32.0
Total	42.9	28.1	12.7	49.3	10.8	24.9

Table A.3.11: Percentage contribution of different sources of financing in family-owned/mixed ownership and non-family-owned businesses, 2020, 2019 and 2015–2020 average

	Self-financing		Supplier credit		Loans from public banks		Loans from private commercial banks		Loans from relatives	
	Family-owned or mixed ownership	Non family-owned	Family-owned or mixed ownership	Non family-owned	Family-owned or mixed ownership	Non family-owned	Family-owned or mixed ownership	Non family-owned	Family-owned or mixed ownership	Non family-owned
2019	47.10	43.40	3.20	3.90	3.60	4.00	2.70	1.60	1.90	3.20
2020	54.30	48.40	4.20	5.90	5.10	5.30	4.40	4.40	4.50	5.40
2015–2020	56.00	46.30	2.60	2.60	4.20	6.70	2.30	2.10	3.00	4.50

Table A.3.12, which compares family-owned and mixed-capital business enterprises, shows that self-financing as a percentage of total financing is particularly high for family-owned companies.

Table A.3.12: Percentage contribution of different sources of financing in family-owned and mixed-ownership businesses, 2020, 2019 and 2015–2020 average

	Self-financing		Supplier credit		Loans from public banks		Loans from private commercial banks		Loans from relatives	
	100% family owned	Mixed owner-ship	100% family owned	Mixed own-ership	100% family owned	Mixed owner-ship	100% family owned	Mixed ownership	100% family owned	Mixed ownership
2019	49.5	37.8	2.9	5.0	3.7	2.9	2.7	2.3	1.6	3.8
2020	56.5	46.8	3.8	5.5	5.3	4.4	4.6	3.5	4.2	5.7
2015–2020	59.4	37.8	1.9	6.3	3.1	9.4	1.9	4.3	1.7	9.6

4. Econometric regression tables

Table A.4.1: Proportion of women

	(1)		(2)		(3)		(4)	
Importance given to innovation: low							0	(.)
Importance given to innovation: medium							0.691	(0.37)
Importance given to innovation: high							2.419	(1.05)
100% third party-owned							0	(.)
Family members and third party-owned							-2.420	(-0.96)
One-person business with limited liability (EURL)							1.13	(0.45)
100% family owned							-2.084	(-0.97)
Female manager			27.43***	(11.84)	26.73***	(11.17)	25.36***	(10.76)
Professional training					0	(.)	0	(.)
Secondary/middle					-6.334**	(-2.28)	-6.522**	(-2.30)
University					-1.928	(-0.79)	-1.750	(-0.71)
10–49 employees							0	(.)
2 or 3 employees							1.788	(0.24)
250 or more employees							3.833	(1.29)
4 to 9 employees							1.261	(0.53)
50–249 employees							3.361*	(1.92)
Age of business: less than 5 years							0	(.)
Age of business: between 5 and 10 years							-2.240	(-0.85)
Age of business: between 10 and 20 years							-1.895	(-0.69)
Age of business: more than 20 years							-6.825**	(-2.41)

	(1)		(2)		(3)		(4)	
Age of manager: more than 65 years							0	(.)
Age of manager: between 18 and 24 years							-16.96**	(-2.84)
Age of manager: between 25 and 35 years							0.674	(0.16)
Age of manager: between 36 and 55 years							4.968	(1.31)
Age of manager: between 56 and 65 years							9.712**	(2.39)
City: Algiers	3.267	(1.36)	3.554*	(1.65)	3.594*	(1.66)	5.428**	(2.32)
City: Annaba	5.693	(1.41)	4.275	(1.23)	4.237	(1.21)	7.639**	(2.11)
City: Bejaia	-3.067	(-0.80)	-0.523	(-0.14)	0.0341	(0.01)	3.121	(0.80)
City: Bordj	-2.164	(-0.47)	1.109	(0.26)	0.237	(0.06)	0.984	(0.23)
City: Constantine	9.629**	(2.66)	9.090**	(2.72)	8.276**	(2.48)	7.887**	(2.36)
City: Oran	4.414	(1.41)	3.094	(1.03)	2.128	(0.71)	3.514	(1.16)
City: Setif	-4.824	(-1.85)	-10.41**	(-4.16)	-9.522***	(-3.73)	-4.511	(-1.65)
City: Tizi Ouzou	0.0211	(0.01)	-4.226	(-1.55)	-3.376	(-1.23)	1.835	(0.59)
City: Tlemcen	-6.857	(-1.92)	-5.750**	(-2.17)	-5.894**	(-2.21)	-5.298**	(-1.98)
Agriculture, forestry and fishing	-5.363	(-1.22)	-3.465	(-0.86)	-3.014	(-0.75)	-3.347	(-0.76)
Specialized, scientific and technical activities	24.82***	(5.92)	20.08***	(5.40)	20.12***	(5.42)	19.64***	(5.25)
Construction and civil engineering	-9.167***	(-3.75)	-6.695**	(-2.97)	-6.541**	(-2.96)	-6.250**	(-2.59)
Hotels and catering	9.452**	(2.48)	7.027**	(1.98)	7.566**	(2.16)	10.71**	(2.88)
Food industries	15.04***	(4.33)	14.60***	(4.48)	15.57***	(4.82)	16.29***	(4.98)
Building material industries	-10.20***	(-3.40)	-7.358**	(-2.67)	-6.226**	(-2.29)	-5.347*	(-1.91)
Textile industries	43.72***	(9.70)	32.73***	(8.34)	33.65***	(8.46)	34.54***	(8.86)
Mechanical and electrical industries	-8.372**	(-2.99)	-8.841**	(-3.08)	-8.582**	(-3.06)	-8.104**	(-2.76)
Pharmaceutical and chemical industries	8.260**	(2.28)	8.691**	(2.69)	8.716**	(2.74)	10.74***	(3.21)
Transport and warehousing	-5.070	(-1.38)	-4.482	(-1.25)	-4.194	(-1.20)	-3.753	(-1.11)
Public limited liability company (SA)							5.878**	(1.98)
Company with limited liability (SARL)							-2.069	(-1.24)
Other company structure							0	(.)
Chief executive officer (CEO)							6.014**	(2.49)
Deputy managing director							-2.798	(-0.63)
Chief operating officer							0.145	(0.05)
Human resources director							-7.689**	(-2.60)

	(1)		(2)		(3)		(4)	
Manager							-3.396*	(-1.66)
Chairman and chief operating officer							3.051	(0.84)
Constant	20.40***	(7.38)	17.04***	(6.92)	19.59***	(6.16)	15.46**	(2.47)
Observations	985		985		982		962	
R2	0.317		0.427		0.431		0.472	

Note: OLS, clustered standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.001, determination coefficient: R2 adjusted.

Table A.4.2: Proportion of employees with university or primary-level education

	University level				Primary level			
	(1)		(2)		(3)		(4)	
100% third party-owned	0	(.)	0	(.)	0	(.)	0	(.)
Family members and third party-owned	-13.19***	(-4.39)	-11.34***	(-3.84)	-10.15***	(-3.47)	0.539	(0.26)
One-person business with limited liability (EURL)	-14.99***	(-4.50)	-12.93***	(-3.98)	-12.04***	(-3.73)	5.558**	(2.52)
100% family-owned	-14.51***	(-5.69)	-12.88***	(-5.13)	-10.30***	(-4.09)	2.504	(1.40)
Female manager	6.237**	(2.58)	4.978**	(2.03)	6.945**	(2.81)	-3.731**	(-2.30)
Professional training	0	(.)	0	(.)	0	(.)	0	(.)
Secondary/ middle	-11.41***	(-3.92)	-11.11***	(-3.65)	-8.723**	(-2.98)	9.847***	(4.02)
University	12.76***	(4.58)	13.21***	(4.73)	12.36***	(4.51)	0.328	(0.17)
10–49 employees	0	(.)	0	(.)	0	(.)	0	(.)
2 or 3 employees	11.59	(1.27)	9.268	(1.04)	6.837	(0.86)	-6.878*	(-1.89)
250 or more employees	-4.253	(-1.12)	-3.714	(-1.02)	-3.157	(-0.87)	5.852**	(2.15)
4–9 employees	8.988**	(2.91)	7.425**	(2.38)	5.060*	(1.68)	-6.660***	(-3.65)
50–249 employees	0.638	(0.31)	1.727	(0.82)	0.591	(0.29)	1.713	(0.98)
Age of business: less than 5 years	0	(.)	0	(.)	0	(.)	0	(.)
Age of business: between 5 and 10 years	-3.729	(-1.17)	-2.931	(-0.94)	-4.597	(-1.56)	0.505	(0.27)
Age of business: between 10 and 20 years	-2.082	(-0.63)	-0.144	(-0.04)	-2.671	(-0.87)	0.56	(0.27)

	University level				Primary level			
Age of business: more than 20 years	-4.223	(-1.24)	-2.451	(-0.73)	-5.256	(-1.64)	2.149	(0.94)
Age of manager: more than 65 years	0	(.)	0	(.)	0	(.)	0	(.)
Age of manager: between 18 and 24 years	-29.30***	(-4.01)	-31.36***	(-4.05)	-29.55***	(-3.65)	-4.878	(-0.81)
Age of manager: between 25 and 35 years	-4.531	(-0.94)	-2.008	(-0.43)	-2.350	(-0.49)	-12.21**	(-2.78)
Age of manager: between 36 and 55 years	-4.383	(-0.96)	-2.748	(-0.64)	-3.198	(-0.72)	-12.70**	(-3.02)
Age of manager: between 56 and 65 years	-2.301	(-0.48)	-0.719	(-0.16)	-1.921	(-0.41)	-7.658*	(-1.72)
North Centre			0	(.)				
North West			-7.099**	(-2.87)				
North East			5.161*	(1.75)				
Hauts Plateaux, West			-1.832	(-0.33)				
Hauts Plateaux, East			-1.787	(-0.70)				
Hauts Plateaux, South			-13.27**	(-2.75)				
City: Algiers					5.793**	(2.27)	-8.781***	(-4.59)
City: Annaba					1.998	(0.49)	-8.936**	(-2.93)
City: Bejaia					9.996**	(2.15)	-13.60***	(-5.09)
City: Bordj					-1.522	(-0.28)	2.62	(0.66)
City: Constantine					14.98***	(3.62)	-9.526***	(-3.36)
City: Oran					1.857	(0.58)	-3.744	(-1.54)
City: Setif					3.614	(1.03)	-0.387	(-0.15)
City: Tizi Ouzou					0.754	(0.22)	-0.735	(-0.21)
City: Tlemcen					-3.146	(-0.67)	0.071	(0.02)
Agriculture			-9.341**	(-2.18)				
Manufacturing			-2.442	(-1.20)				
Services			7.757***	(3.23)				
Agriculture, forestry and fishing					-27.35***	(-5.43)	14.24***	(3.70)
Specialized, scientific and technical activities					-1.792	(-0.41)	0.448	(0.20)
Construction and civil engineering					-16.69***	(-4.95)	7.519***	(3.69)

	University level				Primary level			
Hotels and catering					-16.40***	(-3.87)	5.233*	(1.80)
Food industries					-21.94***	(-6.30)	5.197**	(2.02)
Building material industries					-19.84***	(-4.87)	5.694*	(1.68)
Textile industries					-28.21***	(-6.65)	11.92***	(3.68)
Mechanical and electrical industries					-14.16***	(-3.45)	2.657	(1.01)
Pharmaceutical and chemical industries					-9.724**	(-2.29)	4.634	(1.57)
Transport and warehousing					-19.38***	(-4.10)	-0.797	(-0.32)
Public limited liability company (SA)	1.918	(0.56)	3.428	(1.00)	2.207	(0.63)	0.75	(0.30)
Company with limited liability (SARL)	0.938	(0.40)	1.829	(0.78)	3.572	(1.54)	-1.376	(-0.74)
One-person business with limited liability (EURL)	2.452	(0.80)	2.852	(0.98)	4.756	(1.60)	-4.706**	(-2.17)
Other company structure	0	(.)	0	(.)	0	(.)	0	(.)
Chief executive officer (CEO)	-6.223**	(-2.05)	-5.335*	(-1.77)	-5.472*	(-1.87)	0.42	(0.20)
Deputy managing director	-9.382	(-1.19)	-10.65	(-1.41)	-9.169	(-1.32)	-5.637	(-1.47)
Chief operating officer	-2.646	(-0.74)	-1.634	(-0.46)	-2.611	(-0.74)	-1.789	(-0.65)
Human resources director	-5.924	(-1.58)	-4.833	(-1.29)	-2.942	(-0.81)	0.792	(0.29)
Manager	-4.970*	(-1.90)	-4.411*	(-1.71)	-4.620*	(-1.83)	2.388	(1.26)
Chairman and chief operating officer	-12.88***	(-3.79)	-8.991**	(-2.68)	-10.65***	(-3.21)	2.834	(1.07)
Constant	55.67***	(8.28)	49.60***	(7.17)	60.83**	(8.18)	22.16***	(3.83)
Observations	962		962		962		962	
R2	0.209		0.253		0.311		0.200	

Note: OLS, clustered standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.001.

Table A.4.3: Impact of the proportion of employees with a university-level education on written and numeracy skills

	Writing skills		Numeracy skills	
University education (proportion)	-0.00864*	(-2.23)	-0.00574	(-1.81)
City: Algiers	-0.0929	(-0.32)	1.011***	(3.75)
City: Annaba	0.177	(0.43)	0.27	(0.66)
City: Bejaia	-1.083	(-1.95)	-0.219	(-0.45)
City: Bordj	-2.092	(-1.92)	-1.468	(-1.35)
City: Constantine	-0.353	(-0.82)	-1.555*	(-2.03)
City: Oran	-0.531	(-1.43)	0.700*	(2.10)
City: Setif	-1.582**	(-2.82)	1.012**	(3.09)
City: Tizi Ouzou	-0.175	(-0.47)	1.316***	(3.96)
City: Tlemcen	-0.101	(-0.20)	1.085**	(2.67)
Agriculture, forestry and fishing	-0.331	(-0.57)	-0.00879	(-0.02)
Specialized, scientific and technical activities	-0.582	(-1.27)	0.00798	(0.02)
Construction and civil engineering	-0.517	(-1.35)	-0.230	(-0.72)
Hotels and catering	-0.107	(-0.23)	0.089	(0.22)
Food industries	-0.178	(-0.43)	0.381	(1.12)
Building material industries	-0.239	(-0.52)	-0.131	(-0.31)
Textile industries	-0.114	(-0.24)	-0.139	(-0.34)
Mechanical and electrical industries	-0.241	(-0.48)	0.228	(0.57)
Pharmaceutical and chemical industries	-0.0921	(-0.20)	0.199	(0.52)
Transport and warehousing	0.0381	(0.08)	0.0862	(0.20)
100% family-owned	-0.403	(-1.86)	0.0393	(0.20)
Age of business: less than 5 years	0	(.)	0	(.)
Age of business: between 5 and 10 years	-0.512	(-1.65)	0.0707	(0.25)
Age of business: between 10 and 20 years	-0.699*	(-2.20)	-0.220	(-0.75)
Age of business: more than 20 years	-0.509	(-1.60)	-0.178	(-0.60)
Other company structure	0	(.)	0	(.)
Chief executive officer (CEO)	0.673*	(2.04)	0.273	(0.92)
Deputy managing director	-0.501	(-0.44)	0.659	(0.87)
Chief operating officer	0.451	(1.19)	0.0176	(0.05)
Human resources director	0.527	(1.25)	0.0211	(0.05)
Manager	0.25	(0.84)	0.183	(0.74)
Chairman and chief operating officer	-0.794	(-1.44)	0.833*	(2.36)
Public limited liability company (SA)	-0.184	(-0.43)	-0.261	(-0.68)
Company with limited liability (SARL)	-0.0957	(-0.36)	-0.0109	(-0.05)
One-person business with limited liability (EURL)	-0.0863	(-0.30)	0.303	(1.19)
Constant	-0.538	(-0.99)	-1.967***	(-3.92)
Observations	985		985	
Pseudo R^2	0.068		0.082	

Notes: (a) Logistic regression, clustered standard errors in brackets, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; (b) "Writing skills" is a binary variable that takes the value of 1 if the skill is cited by the company. The same applies to "numeracy skills".

In table A.4.4 below, the figures in the first two columns (a) reflects an indicator that is assigned a value of 1 if the company reported that at least two skills were lacking in each of the three competency areas[33] and a value of 0 if otherwise. The figures in the last two columns (b) reflect an indicator that is assigned a value of 1 if the company reported that at least two skills were lacking in the first two (non-technical) areas, and more than three were lacking in the technical area (technical and practical skills). Education level is shown to be significant, whereas the proportion of young employees in a company does not appear to have a significant impact. The coefficient for the proportion of employees with only a primary-level education is significant and positive, at 5 per cent or greater, in both columns.

Table A.4.4: Core competency gaps by level of education and business enterprise characteristics

	Core competency gaps (a)		Core competency gaps (b)	
Primary level (proportion)	0.0274***	(3.39)	0.0293**	(2.64)
Secondary level (proportion)	0.00311	(0.33)	-0.0150	(-1.23)
Young people (secondary level)	0.831*	(1.81)	1.259**	(2.24)
Proportion of young people	0.00431	(0.66)	-0.00107	(-0.13)
100% third party-owned	0	(.)	0	(.)
Family and third party-owned	0.544	(1.09)	0.568	(1.00)
One-person business with limited liability (EURL)	0.358	(0.76)	0.48	(0.78)
100% family-owned	-0.438	(-1.00)	-0.681	(-1.33)
Female manager	0.349	(0.79)	0.109	(0.21)
Professional training	0	(.)	0	(.)
Secondary/middle	-0.133	(-0.26)	0.518	(0.77)
University	0.0751	(0.17)	0.384	(0.65)
Age of manager: more than 65 years	0	(.)	0	(.)
Age of manager: between 18 and 24 years	1.96	(1.36)	1.693	(1.30)
Age of manager: between 25 and 35 years	-0.176	(-0.22)	0.243	(0.28)
Age of manager: between 36 and 55 years	-0.0374	(-0.05)	0.613	(0.78)
Age of manager: between 56 and 65 years	-0.297	(-0.38)	-0.0474	(-0.05)
City: Algiers	1.071**	(2.64)	1.209**	(2.26)
City: Annaba	0.0581	(0.08)	0.23	(0.24)
City: Bejaia	0.118	(0.15)	1.158	(1.42)
City: Bordj	0	(.)	0	(.)
City: Constantine	0.242	(0.34)	-0.503	(-0.43)
City: Oran	-0.576	(-0.82)	-0.0460	(-0.05)
City: Setif	-1.193	(-1.20)	-1.133	(-0.85)
City: Tizi Ouzou	-0.571	(-0.70)	-1.394	(-1.04)
City: Tlemcen	1.050*	(1.75)	0.951	(1.07)
Agriculture, forestry and fishing	-0.530	(-0.57)	-0.832	(-0.65)
Specialized, scientific and technical activities	0.0422	(0.07)	0.568	(0.81)
Construction and civil engineering	-0.736	(-1.29)	-1.123	(-1.58)
Hotels and catering	0.346	(0.54)	-0.199	(-0.25)
Food industries	0.124	(0.23)	0.362	(0.56)
Building material industries	-0.133	(-0.21)	-0.00343	(-0.00)

33 Social skills, cognitive skills and technical and practical skills.

	Core competency gaps (a)		Core competency gaps (b)	
Textile industries	-1.071	(-1.47)	-1.118	(-1.22)
Mechanical and electrical industries	0.483	(0.83)	0.269	(0.39)
Pharmaceutical and chemical industries	0.0768	(0.12)	0.157	(0.22)
Transport and warehousing	0.226	(0.33)	0	(.)
Public limited liability company (SA)	-0.0458	(-0.09)	0.0288	(0.04)
Company with limited liability (SARL)	-0.167	(-0.49)	0.341	(0.80)
One-person business with limited liability (EURL)	0	(.)	0	(.)
Other company structure	1.289**	(2.12)	1.222*	(1.70)
Chief executive officer (CEO)	2.307**	(2.46)	0	(.)
Deputy managing director	1	(1.44)	0.831	(0.95)
Chief operating officer	1.600**	(2.42)	1.481*	(1.72)
Human resources director	1.298**	(2.35)	1.208*	(1.73)
Manager	0.834	(1.15)	0.587	(0.62)
Constant	-5.070***	(-4.42)	-5.657***	(-4.13)
Observations	950		884	
Pseudo R2	0.149		0.168	

Note: Logistic regression, clustered standard errors in brackets, * p < 0.10, ** p < 0.05, *** p < 0.001.

In table A.4.5 below, the variable in the first column reflects an indicator assigned a value of 1 if the company indicated that it had a relationship with more than one academic institution (among various options) and a value of 0 if otherwise. The variable in column 3 reflects an indicator assigned a value of 1 if the company attached high importance to innovation and a value of 0 if otherwise.

Table A.4.5: Relationship with the education system and the importance attached to innovation

	More than one relationship with academic institutions		Importance attached to innovation	
Core competencies			-0.643***	(-3.38)
100% third party-owned	0	(.)	0	(.)
Family and third party-owned	0.0144	(0.05)	-0.502*	(-1.65)
One-person business with limited liability (EURL)	-0.217	(-0.72)	-0.367	(-1.17)
100% family-owned	-0.140	(-0.58)	-0.340	(-1.40)
Female manager	0.381*	(1.76)	-0.0124	(-0.05)
Professional training	0	(.)	0	(.)
Secondary/middle	-0.945***	(-3.49)	-0.867**	(-2.46)
University	-0.498**	(-2.12)	0.252	(0.98)
10–49 employees	0	(.)	0	(.)
2 or 3 employees	0.836	(1.16)	0.339	(0.40)
250 or more employees	0.36	(0.96)	0.970**	(2.79)
4–9 employees	0.165	(0.69)	0.121	(0.46)
50–249 employees	0.284	(1.47)	-0.00565	(-0.03)
Age of business: less than 5 years	0	(.)	0	(.)

	More than one relationship with academic institutions		Importance attached to innovation	
Age of business: between 5 and 10 years	0.0759	(0.31)	-0.00999	(-0.04)
Age of business: between 10 and 20 years	0.413	(1.61)	-0.164	(-0.57)
Age of business: more than 20 years	0.581**	(2.17)	-0.807**	(-2.53)
Age of manager: more than 65 years	0	(.)	0	(.)
Age of manager: between 18 and 24 years	0.357	(0.46)	-1.338	(-1.14)
Age of manager: between 25 and 35 years	-0.109	(-0.26)	-1.318**	(-2.99)
Age of manager: between 36 and 55 years	0.227	(0.59)	-1.091**	(-2.77)
Age of manager: between 56 and 65 years	0.513	(1.26)	-1.083**	(-2.60)
City: Algiers	1.111***	(4.37)	0.28	(1.06)
City: Annaba	0.151	(0.47)	0.101	(0.28)
City: Bejaia	-0.610*	(-1.76)	-0.594	(-1.26)
City: Bordj	1.086**	(2.11)	0.958**	(2.27)
City: Constantine	-0.175	(-0.58)	-0.376	(-1.05)
City: Oran	-0.428	(-1.52)	-0.0528	(-0.16)
City: Setif	-0.396	(-1.32)	0.286	(0.85)
City: Tizi Ouzou	-1.307***	(-3.99)	-2.016**	(-3.15)
City: Tlemcen	0.327	(0.90)	-2.516**	(-2.42)
Agriculture, forestry and fishing	-0.257	(-0.60)	-0.190	(-0.42)
Specialized, scientific and technical activities	-0.115	(-0.34)	0.104	(0.31)
Construction and civil engineering	-0.334	(-1.16)	-0.424	(-1.32)
Hotels and catering	-0.241	(-0.62)	-0.669	(-1.39)
Food industries	-0.715**	(-2.23)	-0.0419	(-0.12)
Building material industries	-0.399	(-1.02)	-0.321	(-0.69)
Textile industries	-0.474	(-1.22)	0.102	(0.23)
Mechanical and electrical industries	-0.272	(-0.72)	-0.176	(-0.43)
Pharmaceutical and chemical industries	0.196	(0.50)	0.207	(0.53)
Transport and warehousing	-1.226***	(-3.19)	-1.252**	(-2.47)
Public limited liability company (SA)	0.0549	(0.16)	0.0596	(0.17)
Company with limited liability (SARL)	-0.0977	(-0.47)	0.113	(0.47)
One-person business with limited liability (EURL)	-0.0662	(-0.26)	0.114	(0.39)
Other company structure	0	(.)		
Chief executive officer (CEO)	0.0409	(0.17)		
Deputy managing director	0.0658	(0.10)		
Chief operating officer	-0.168	(-0.61)		
Human resources director	0.762**	(2.06)		

	More than one relationship with academic institutions		Importance attached to innovation	
Manager	0.016	(0.08)		
Chairman and chief operating officer	0.0213	(0.06)		
Constant	0,529	(0,80)	0,745	(1,14)
Observations	962		962	
Pseudo R2	0.155		0.148	

Note: Logistic regression, clustered standard errors in brackets, * p < 0.10, ** p < 0.05, *** p < 0.001.

Table A.4.6 shows the outcome of an econometric regression of the share of revenue reinvested for a number of variables. The variables shown in the table include sector, company size, the importance attached to innovation and research and development efforts.

Table A.4.6: Share of revenue reinvested in the business enterprise

	Average proportion of revenue reinvested in the past 5 years	
100% third party-owned	0	(.)
Family and third party-owned	5.745	(1.46)
One-person business with limited liability (EURL)	6.43	(1.61)
100% family-owned	8.359**	(2.45)
Importance given to innovation: high	0	(.)
Importance given to innovation: low	-7.186**	(-1.98)
Importance given to innovation: medium	-9.998**	(-2.88)
Importance given to innovation: relatively high	-7.476**	(-1.99)
Importance given to innovation: very high	2.575	(0.48)
Self-financing as a percentage of total business investment: medium	-2.049	(-0.63)
Female manager	-4.008	(-1.49)
Professional training	0	(.)
Secondary/middle	0.84	(0.27)
University	-0.419	(-0.17)
10–49 employees	0	(.)
2 or 3 employees	3.68	(0.33)
250 or more employees	-10.54**	(-2.69)
4–9 employees	-1.763	(-0.61)
50–249 employees	2.556	(0.94)
City: Algiers	11.25**	(2.79)
City: Annaba	0.466	(0.11)
City: Bejaia	-0.614	(-0.12)
City: Bordj	-2.638	(-0.40)
City: Constantine	5.571	(1.00)
City: Oran	-3.612	(-1.11)
City: Setif	7.634*	(1.82)
City: Tizi Ouzou	10.20**	(2.66)
City: Tlemcen	1.226	(0.28)

	Average proportion of revenue reinvested in the past 5 years	
Agriculture, forestry and fishing	9.170*	(1.69)
Specialized, scientific and technical activities	1.433	(0.30)
Construction and civil engineering	2.504	(0.66)
Hotels and catering	0.746	(0.16)
Food industries	-0.238	(-0.06)
Building material industries	5.47	(1.12)
Textile industries	-1.505	(-0.34)
Mechanical and electrical industries	1.421	(0.29)
Pharmaceutical and chemical industries	-5.793	(-1.07)
Transport and warehousing	3.084	(0.69)
Portion of turnover reinvested in research and development	0.304*	(1.85)
Public limited liability company (SA)	-0.267	(-0.05)
Company with limited liability (SARL)	1.724	(0.61)
One-person business with limited liability (EURL)	-3.536	(-1.05)
Other company structure	0	(.)
Chief executive officer (CEO)	2.489	(0.81)
Deputy managing director	-4.754	(-0.58)
Chief operating officer	-3.855	(-1.24)
Human resources director	-2.966	(-0.68)
Manager	5.747*	(1.92)
Chairman and chief operating officer	-0.0141	(-0.00)
Constant	20.42***	(3.33)
Observations	487	
R2	0.208	

Note: OLS, clustered standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.001.

In table A.4.7, the variables reflect three indicators: the first indicator is assigned a value of 1 if the company only experienced stoppages in its business operations and 0 if otherwise; the second indicator is assigned a value of 1 if the company only experienced periods of partial operation and 0 if otherwise; and the third indicator is assigned a value of 1 if the company experienced both stoppages and periods of partial operation and 0 if otherwise.

Table A.4.7: Operating modality of business enterprises by cause of business activity reduction

	Temporary suspension of operations only		Operation at reduced capacity only		Temporary suspension of operations and operation at reduced capacity	
Restricted mobility of employees	0.529***	(3.28)	0.723***	(3.26)	0.828***	(3.65)
Transport-related challenges impeding access to supplies or distribution	0.725***	(4.16)	0.727**	(3.06)	0.355	(1.48)
Supply-side challenges	0.494**	(2.62)	0.878***	(3.74)	0.429*	(1.66)
Administrative constraints	0.936***	(4.62)	0.549**	(2.07)	0.469*	(1.93)
Flow of goods challenges	0.881***	(3.33)	0.593*	(1.92)	0.252	(0.73)
Credit line challenges	-0.318*	(-1.74)	0.515**	(2.19)		
No lack of skills	0	(.)	0	(.)	0	(.)
1 skill lacking	0.231	(0.77)	-0.526	(-1.51)	1.026*	(1.80)
2 skills lacking	0.0718	(0.24)	-0.861**	(-2.39)	1.528**	(2.62)
3 skills lacking	0.46	(1.47)	-0.938**	(-2.46)	1.113*	(1.86)
4 skills lacking	0.635*	(1.87)	-1.231**	(-2.88)	0.687	(1.01)
5 or more skills lacking	0.525*	(1.65)	-2.390***	(-5.07)	1.496**	(2.48)
No innovative actions taken	0	(.)	0	(.)	0	(.)
1 innovative action taken	-0.266	(-0.70)	0.774	(1.34)	-0.144	(-0.21)
2 innovative actions taken	-0.618*	(-1.78)	0.796	(1.50)	0.52	(0.90)
3 innovative actions taken	-0.706**	(-2.05)	0.811	(1.52)	0.612	(1.08)
4 innovative actions taken	-0.782**	(-2.19)	1.295**	(2.38)	0.454	(0.77)
5 innovative actions taken	-0.645*	(-1.81)	0.712	(1.28)	0.587	(1.04)
Facilitate access to credit			0.0181	(0.08)		
Obstacle: financing measures					0.0569	(0.19)
Female manager	0.542**	(2.38)	-0.203	(-0.61)	-0.227	(-0.73)
Professional training	0	(.)	0	(.)	0	(.)
Secondary/middle school-level	-0.0792	(-0.28)	0.3	(0.69)	-0.482	(-1.26)
University-level	-0.00556	(-0.02)	0.436	(1.19)	-0.443	(-1.38)
10–49 employees	0	(.)	0	(.)	0	(.)
2 or 3 employees	-0.0852	(-0.14)	1.14	(1.18)	-1.115	(-0.74)
250 or more employees	-0.812*	(-1.95)	0.579	(1.46)	0.0942	(0.18)
4–9 employees	-0.0845	(-0.35)	0.162	(0.50)	-0.169	(-0.50)
50–249 employees	-0.0537	(-0.28)	-0.0300	(-0.11)	0.187	(0.69)
City: Algiers	0.565**	(2.25)	0.549*	(1.70)	-0.582	(-1.58)
City: Annaba	1.339***	(3.56)	-0.676	(-1.31)	-0.637	(-1.28)
City: Bejaia	0.784**	(2.21)	-0.718	(-1.43)	1.111**	(2.25)
City: Bordj	-0.817	(-1.50)	1.001**	(2.13)	0	(.)
City: Constantine	0.113	(0.34)	-0.611	(-1.24)	0.178	(0.41)
City: Oran	-0.00955	(-0.03)	-0.178	(-0.41)	0.0125	(0.03)
City: Setif	-0.233	(-0.73)	-0.592	(-1.36)	1.138**	(3.06)

	Temporary suspension of operations only	Operation at reduced capacity only	Temporary suspension of operations and operation at reduced capacity			
City: Tizi Ouzou	2.279***	(5.83)	-1.807**	(-3.05)	-2.794**	(-2.57)
City: Tlemcen	1.204**	(3.01)	-0.667	(-1.08)	-2.183*	(-1.91)
Agriculture, forestry and fishing	-0.240	(-0.52)	-0.534	(-0.90)	1.218*	(1.67)
Specialized, scientific and technical activities	0.172	(0.54)	-0.577	(-1.23)	1.150**	(2.16)
Construction and civil engineering	0.144	(0.50)	-0.727**	(-2.01)	0.822*	(1.67)
Hotels and catering	0.901**	(1.99)	-0.979	(-1.56)	0.699	(1.09)
Food industries	-0.163	(-0.50)	-0.858**	(-1.97)	0.829	(1.53)
Building material industries	1.147**	(3.11)	-1.174**	(-2.17)	-0.830	(-0.95)
Textile industries	-0.531	(-1.37)	-0.421	(-0.78)	1.746**	(2.91)
Mechanical and electrical industries	0.588	(1.52)	-0.933**	(-2.03)	0.951	(1.58)
Pharmaceutical and chemical industries	-0.504	(-1.34)	-0.205	(-0.43)	0.816	(1.38)
Transport and warehousing	-0.306	(-0.77)	-0.864	(-1.56)	1.543**	(2.73)
Other company structure	0	(.)	0	(.)	0	(.)
Public limited liability company (SA)	-0.263	(-0.81)	0.334	(0.73)	0.301	(0.57)
Company with limited liability (SARL)	-0.211	(-0.97)	0.594*	(1.93)	0.0772	(0.27)
One-person business with limited liability (EURL)	-0.268	(-1.16)	0.595*	(1.82)	0.099	(0.32)
Chief executive officer (CEO)	0.373	(1.45)	0.00671	(0.02)	-0.361	(-1.04)
Deputy managing director	-1.029	(-1.36)	1.297*	(1.85)	0.273	(0.40)
Chief operating officer	-0.399	(-1.29)	0.658*	(1.66)	-0.506	(-1.21)
Human resources director	-0.147	(-0.43)	0.584	(1.47)	-0.861	(-1.62)
Manager	0.457**	(2.06)	-0.239	(-0.73)	-0.309	(-1.08)
Chairman and chief operating officer	1.117***	(3.52)	-0.963	(-1.60)	-3.130**	(-2.75)
Constant	-1.002*	(-1.76)	-3.167***	(-4.17)	-4.481***	(-4.51)
Observations	962		962		930	
Pseudo R2	0.187		0.210		0.199	

Note: Logistic regression, clustered standard errors in brackets, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.

In table A.4.8 below, the dependent variable is the percentage change in sales turnover between 2019 and 2020.

Table A.4.8: Impact on sales turnover

	(1)	(2)	(3)			
Number of weeks of suspended business operations	-0.560***	(-4.09)	-0.422**	(-3.14)	-0.409**	(-3.05)
Obstacle: access to sources of credit only	3.606	(0.71)	4.403	(0.87)	2.008	(0.39)
Facilitate access to credit	0.813	(0.30)	1.301	(0.49)		
Obstacle: financing measures					-6.676**	(-2.24)
No innovative actions taken	0	(.)	0	(.)	0	(.)
1 innovative action taken	15.77**	(2.41)	14.07**	(2.20)	14.65**	(2.27)
2 innovative actions taken	14.68**	(2.63)	12.03**	(2.06)	12.58**	(2.13)
3 innovative actions taken	14.40**	(2.61)	13.95**	(2.43)	15.03**	(2.57)
4 innovative actions taken	13.78**	(2.36)	12.84**	(2.07)	13.75**	(2.19)
5 innovative actions taken	18.95**	(3.24)	14.56**	(2.32)	14.68**	(2.37)
100% third party-owned	0	(.)	0	(.)	0	(.)
Family and third party-owned	-2.076	(-0.44)	1.468	(0.31)	1.219	(0.26)
One-person business with limited liability (EURL)	-0.707	(-0.16)	2.436	(0.56)	2.413	(0.56)
100% family-owned	-4.136	(-1.11)	3.805	(0.99)	3.65	(0.95)
Portion of turnover reinvested in research and development	0.326	(1.57)	0.497**	(2.63)	0.528**	(2.78)
Investment horizon: 1 or 2 years	0	(.)	0	(.)	0	(.)
Investment horizon: 2–10 years	1.697	(0.64)	-5.638**	(-2.02)	-5.679**	(-2.05)
Investment horizon: less than 1 year	12.20**	(2.95)	6.512	(1.64)	6.394	(1.61)
Investment horizon: more than 10 years	8.517	(1.04)	8.23	(0.94)	8.222	(0.93)
Female manager	9.107**	(2.81)	9.986**	(2.95)	9.557**	(2.80)
Professional training	0	(.)	0	(.)	0	(.)
Secondary/middle school-level	11.39**	(2.56)	9.766**	(2.37)	9.093**	(2.21)
University-level	3.112	(0.85)	1.994	(0.59)	2.065	(0.60)
10–49 employees	0	(.)	0	(.)	0	(.)
2 or 3 employees	-18.44*	(-1.88)	-6.392	(-0.68)	-6.178	(-0.63)
250 or more employees	1.926	(0.33)	2.166	(0.41)	2.039	(0.38)
4–9 employees	-15.46***	(-3.93)	'-14.06***	(-3.59)	'-13.84***	(-3.54)
50–249 employees	4.111	(1.27)	7.658**	(2.45)	7.503**	(2.42)
Age of business: less than 5 years	0	(.)	0	(.)	0	(.)
Age of business: between 5 and 10 years	1.955	(0.47)	2.043	(0.51)	2.676	(0.67)
Age of business: between 10 and 20 years	-4.602	(-1.02)	-5.991	(-1.36)	-5.584	(-1.27)
Age of business: more than 20 years	-0.738	(-0.16)	-4.067	(-0.92)	-3.895	(-0.89)
Age of manager: more than 65 years	0	(.)	0	(.)	0	(.)
Age of manager: between 18 and 24 years	-10.79	(-0.57)	-2.469	(-0.13)	-0.875	(-0.05)
Age of manager: between 25 and 35 years	12.55*	(1.75)	15.24**	(2.31)	15.27**	(2.32)
Age of manager: between 36 and 55 years	3.273	(0.49)	4.49	(0.74)	4.44	(0.74)
Age of manager: between 56 and 65 years	1.148	(0.17)	2.296	(0.36)	2.652	(0.42)
North Centre	0	(.)				
North West	-2.137	(-0.59)				
North East	1.074	(0.27)				
Hauts Plateaux, West	-16.00*	(-1.73)				

	(1)	(2)	(3)			
Hauts Plateaux, East	5.213	(1.21)				
Hauts Plateaux, South	5.795	(0.56)				
City: Algiers			11.45**	(2.87)	10.59**	(2.67)
City: Annaba			7.786	(1.38)	7.163	(1.28)
City: Bejaia			-16.69**	(-2.62)	-15.90**	(-2.48)
City: Bordj			-6.279	(-0.63)	-4.466	(-0.45)
City: Constantine			-8.588*	(-1.73)	-8.935*	(-1.83)
City: Oran			-7.731	(-1.46)	-8.068	(-1.55)
City: Setif			12.50**	(2.11)	13.46**	(2.34)
City: Tizi Ouzou			-28.08***	(-5.61)	-26.05***	(-5.12)
City: Tlemcen			7.809	(1.37)	9.222	(1.62)
Agriculture	3.934	(0.47)				
Manufacturing	3.393	(1.09)				
Services	7.371**	(2.09)				
Agriculture, forestry and fishing			5.796	(0.66)	6.711	(0.76)
Specialized, scientific and technical activities			5.83	(0.98)	5.727	(0.96)
Construction and civil engineering			-3.345	(-0.64)	-3.178	(-0.60)
Hotels and catering			-0.112	(-0.01)	0.171	(0.02)
Food industries			-1.597	(-0.30)	-1.140	(-0.21)
Building material industries			-3.089	(-0.53)	-2.627	(-0.45)
Textile industries			-3.344	(-0.57)	-2.724	(-0.46)
Mechanical and electrical industries			-9.425	(-1.56)	-9.289	(-1.54)
Pharmaceutical and chemical industries			-5.878	(-0.91)	-5.339	(-0.82)
Transport and warehousing			0.597	(0.09)	0.257	(0.04)
Public limited liability company (SA)	-5.613	(-1.28)	-9.942**	(-2.27)	-9.809**	(-2.24)
Company with limited liability (SARL)	1.939	(0.63)	1.521	(0.52)	2.208	(0.74)
Other forms of company	0	(.)	0	(.)	0	(.)
Chief executive officer (CEO)	-11.86**	(-2.99)	-13.78***	(-3.68)	-13.48***	(-3.59)
Deputy managing director	-13.11	(-0.99)	-15.41	(-1.14)	-14.64	(-1.10)
Chief operating officer	-9.476*	(-1.93)	-7.874*	(-1.69)	-7.728	(-1.65)
Human resources director	-8.410	(-1.59)	-9.434*	(-1.75)	-8.591	(-1.63)
Manager	-6.505*	(-1.94)	-7.571**	(-2.33)	-7.815**	(-2.39)
Chairman and chief operating officer	11.23**	(2.01)	6.553	(1.28)	8.418	(1.64)
Constant	-35.04**	(-3.14)	-29.86**	(-2.45)	-29.50**	(-2.45)
Observations	821		82		821	
R^2	0.190		0.270		0.277	

Note: OLS, clustered standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.001.

In table A.4.9 below, the dependent variable is an indicator that is assigned a value of 1 if the fall in the company's sales turnover is greater than 50 per cent and 0 if otherwise.

Table A.4.9: Business enterprises that experienced a fall in sales turnover of 50 per cent or more

	(1)	(2)	(3)				
Number of weeks of suspended business operations	0,0390***	(4,77)	0,0305**	(3,38)	0,0305**	(2,98)	
Access to sources of credit	0,552**	(2,55)	0,391*	(1,71)	0,541**	(2,16)	
Facilitate access to finance	0,422**	(1,99)	0,279	(1,21)	-0,128	(-0,41)	
Self-financing in 2020					0,895**	(2,33)	
1 innovative action taken	-1,159**	(-2,64)	-0,971**	(-2,14)	-0,984**	(-2,04)	
2 innovative actions taken	-1,336***	(-3,43)	-1,137**	(-2,84)	-1,142**	(-2,55)	
3 innovative actions taken	-1,352***	(-3,62)	-1,332***	(-3,52)	-1,286**	(-2,98)	
4 innovative actions taken		-1,412***	(-3,55)	-1,292**	(-3,14)	-1,269**	(-2,71)
5 innovative actions taken		-1,342***	(-3,45)	-1,105**	(-2,55)	-1,056**	(-2,15)
100% third party-owned		0	(.)	0	(.)	0	(.)
Family members and third party-owned		-0,0671	(-0,19)	-0,283	(-0,72)	-0,0692	(-0,17)
One-person business with limited liability (EURL)		0,0494	(0,16)	0,0162	(0,05)	-0,136	(-0,38)
100% family owned		-0,0758	(-0,28)	-0,422	(-1,35)	-0,307	(-0,91)
Portion of turnover reinvested in research and development		-0,0138	(-0,92)	-0,0242	(-1,57)	-0,0177	(-1,07)
Investment horizon: 1 or 2 years		0	(.)	0	(.)	0	(.)
Investment horizon: 2–10 years		0,112	(0,54)	0,524**	(2,20)	0,599**	(2,31)
Investment horizon: less than 1 year		-0,229	(-0,78)	0,148	(0,49)	0,253	(0,79)
Investment horizon: more than 10 years		-0,802	(-1,11)	-0,839	(-1,05)	-1,671	(-1,53)
Female manager		-0,755**	(-2,60)	-1,033***	(-3,25)	-1,113**	(-3,04)
Professional training		0	(.)	0	(.)	0	(.)
Secondary/middle school-level		-0,169	(-0,48)	-0,0418	(-0,12)	-0,221	(-0,55)
University-level		-0,170	(-0,56)	-0,0738	(-0,24)	-0,168	(-0,49)
Age of business: less than 5 years		0	(.)	0	(.)	0	(.)
Age of business: between 5 and 10 years		-0,0814	(-0,24)	-0,0227	(-0,06)	-0,117	(-0,29)
Age of business: between 10 and 20 years		0,204	(0,60)	0,296	(0,81)	0,264	(0,65)
Age of business: more than 20 years		0,0741	(0,21)	0,195	(0,50)	0,0974	(0,22)
Age of manager: more than 65 years		0	(.)	0	(.)	0	(.)
Age of manager: between 18 and 24 years		1,517	(1,58)	1,575	(1,28)	1,452	(1,06)
Age of manager: between 25 and 35 years		-0,534	(-1,10)	-0,571	(-1,10)	-0,618	(-1,19)
Age of manager: between 36 and 55 years		-0,0212	(-0,05)	0,0513	(0,11)	0,12	(0,26)
Age of manager: between 56 and 65 years		-0,395	(-0,86)	-0,151	(-0,31)	-0,158	(-0,31)
10–49 employees		0	(.)	0	(.)	0	(.)
2 or 3 employees		0,918	(1,30)	0,623	(1,01)	0,704	(1,07)
250 or more employees		-0,375	(-0,89)	-0,218	(-0,47)	-0,205	(-0,41)
4–9 employees		0,836**	(3,04)	0,920**	(2,97)	1,012**	(2,96)
50–249 employees		-0,178	(-0,68)	-0,250	(-0,93)	-0,534*	(-1,77)
North Centre		0	(.)				
North West		0,0504	(0,18)				
North East		0,176	(0,58)				

(1)	(2)	(3)				
Hauts Plateaux, West	1,185**	(2,06)				
Hauts Plateaux, East	0,337	(1,17)				
Hauts Plateaux, South	-1,553*	(-1,66)				
City: Algiers			-0,317	(-0,92)	-0,00472	(-0,01)
City: Annaba			0,404	(0,88)	0,377	(0,76)
City: Bejaia			0,817*	(1,78)	1,922***	(3,54)
City: Bordj			1,246**	(2,35)	1,496**	(2,59)
City: Constantine			0,747*	(1,82)	0,609	(1,21)
City: Oran			1,065**	(2,89)	1,143**	(2,83)
City: Setif			0,494	(1,08)	0,723	(1,53)
City: Tizi Ouzou			2,034***	(4,54)	1,643**	(2,90)
City: Tlemcen			-0,463	(-0,71)	0,00336	(0,01)
Agriculture	-0,121	(-0,25)				
Manufacturing	-0,602**	(-2,45)				
Services	-0,372	(-1,45)				
Agriculture, forestry and fishing			0,421	(0,72)	0,118	(0,16)
Specialized, scientific and technical activities			0,0833	(0,18)	0,213	(0,43)
Construction and civil engineering			0,272	(0,73)	0,299	(0,71)
Hotels and catering			0,68	(1,32)	0,636	(1,09)
Food industries			-0,714	(-1,38)	-0,627	(-1,09)
Building material industries			-0,207	(-0,43)	-0,222	(-0,44)
Textile industries			0,232	(0,44)	-0,184	(-0,29)
Mechanical and electrical industries			0,358	(0,78)	0,493	(0,96)
Pharmaceutical and chemical industries			0,0152	(0,03)	0,431	(0,77)
Transport and warehousing			0,0781	(0,16)	0,146	(0,28)
Public limited liability company (SA)	0,54	(1,24)	0,922**	(2,08)	1,014**	(2,12)
Company with limited liability (SARL)	-0,0872	(-0,38)	0,0405	(0,17)	-0,0688	(-0,25)
Other company structure	0	(.)	0	(.)	0	(.)
Chief executive officer (CEO)	1,682***	'(4,75)	1,950***	(5,30)	2,255***	(4,95)
Deputy managing director	2,583***	'(4,09)	3,015***	4,27)	3,705***	(4,42)
Chief operating officer	1,364***	(3,31)	1,202**	(2,83)	1,542***	(3,09)
Human resources director	1,245**	(2,94)	1,346**	(2,97)	1,969**	(3,72)
Manager	1,250***	(3,75)	1,317***	(3,76)	1,658***	(3,84)
Chairman and chief operating officer	-0,209	(-0,33)	0,0824	(0,13)	0,376	(0,54)
Constant	-1,371*	(-1,66)	-2,501**	(-2,68)	-2,994***	(-2,96)
Observations	821		821		719	
Pseudo R^2	0,175		0,220		0,25	

Note: Logistic regression, clustered standard errors in brackets, * p < 0.10, ** p < 0.05, *** p < 0.001.

Table A.4.10: Changes in employment

	(1)	(2)	(3)				
Number of weeks of suspended business operations	-0.00795***	(-4.80)	-0.00768***	(-4.27)	-0.00686***	(-3.98)	
Access to sources of credit only	-0.0706	(-1.64)	-0.101**	(-2.17)	-0.105*	(-1.74)	
Facilitate access to credit	0.0247	(0.47)	0.0303	(0.57)			
Obstacle: financing measures					0.0198	(0.27)	
No innovative actions taken	0	(.)	0	(.)	0	(.)	
1 innovative action taken	-0.107	(-0.92)	-0.0721	(-0.58)	-0.0676	(-0.51)	
2 innovative actions taken	-0.164	(-1.50)	-0.140	(-1.23)	-0.124	(-1.02)	
3 innovative actions taken	-0.0381	(-0.34)	-0.0303	(-0.26)	-0.0287		(-0.23)
4 innovative actions taken	-0.0592	(-0.52)	-0.0419	(-0.35)	0.00149		(0.01)
5 innovative actions taken	-0.106	(-0.87)	-0.0840	(-0.67)	-0.0530		(-0.41)
100% third party-owned	0	(.)	0	(.)	0		(.)
Family and third party-owned	0.111	(1.52)	0.121*	(1.68)	0.128*		(1.82)
One-person business with limited liability (EURL)	-0.0396	(-0.68)	-0.0420	(-0.75)	-0.0333		(-0.59)
100% family-owned	-0.00747	(-0.17)	-0.0245	(-0.58)	-0.0247		(-0.60)
Portion of turnover reinvested in research and development	0.00536**	(2.39)	0.00452**	(2.01)	0.0031		(1.40)
Investment horizon: 1 or 2 years	0	(.)	0	(.)	0		(.)
Investment horizon: 2–10 years	0.0345	(0.95)	0.0282	(0.77)	0.0273		(0.78)
Investment horizon: less than 1 year	-0.0612	(-1.22)	-0.0453	(-0.90)	-0.0223		(-0.49)
Investment horizon: more than 10 years	0.109	(1.06)	0.0693	(0.67)	0.114		(1.22)
Female manager	-0.00765	(-0.15)	-0.0108	(-0.21)	-0.0266		(-0.52)
Professional training	0	(.)	0	(.)	0		(.)
Secondary/middle school-level	-0.0299	(-0.30)	-0.0559	(-0.56)	-0.0677		(-0.63)
University-level	-0.130	(-1.52)	-0.123	(-1.47)	-0.114		(-1.41)
10–49 employees	0	(.)	0	(.)	0		(.)
2 or 3 employees	1.156**	(3.23)	1.172**	(3.32)	1.267***		(3.63)
250 or more employees	-0.00780	(-0.13)	-0.0273	(-0.44)	-0.0335		(-0.54)
4–9 employees	0.265**	(2.59)	0.258**	(2.65)	0.283**		(2.59)
50–249 employees	-0.0765**	(-2.26)	-0.0920**	(-2.67)	-0.0969**		(-2.65)
Age of business: less than 5 years	0	(.)	0	(.)	0		(.)
Age of business: between 5 and 10 years	0.0898	(1.35)	0.0742	(1.09)	0.0622		(0.94)
Age of business: between 10 and 20 years	-0.00275	(-0.05)	-0.00499	(-0.09)	-0.0187		(-0.33)
Age of business: more than 20 years	0.0518	(0.81)	0.0327	(0.49)	0.0171		(0.25)
Age of manager: more than 65 years	0	(.)	0	(.)	0		(.)
Age of manager: between 18 and 24 years	-0.105	(-0.49)	-0.0715	(-0.35)	-0.0921		(-0.43)
Age of manager: between 25 and 35 years	-0.108	(-0.63)	-0.0850	(-0.50)	-0.104		(-0.67)

	(1)	(2)	(3)			
Age of manager: between 36 and 55 years	-0.105	(-0.65)	-0.109	(-0.69)	-0.121	(-0.81)
Age of manager: between 56 and 65 years	-0.105	(-0.63)	-0.0940	(-0.58)	-0.0987	(-0.65)
North Centre			0	(.)		
North West			-0.136**	(-2.72)		
North East			-0.152**	(-2.29)		
Hauts Plateaux, West			-0.0851	(-1.12)		
Hauts Plateaux, East			-0.180***	(-4.11)		
Hauts Plateaux, South			-0.132*	(-1.68)		
Agriculture			-0.0560	(-0.55)		
Manufacturing			0.0747*	(1.82)		
Services			-0.00110	(-0.02)		
City: Algiers					0.171***	(3.78)
City: Annaba					-0.0167	(-0.24)
City: Bejaia					-0.00957	(-0.13)
City: Bordj					-0.164**	(-2.58)
City: Constantine					-0.00514	(-0.08)
City: Oran					0.0351	(0.52)
City: Setif					-0.0154	(-0.34)
City: Tizi Ouzou					0.228*	(1.90)
City: Tlemcen					0.0525	(0.94)
Agriculture, forestry and fishing					0.128	(1.11)
Specialized, scientific and technical activities					0.0063	(0.13)
Construction and civil engineering					0.128*	(1.75)
Hotels and catering					0.0536	(0.83)
Food industries					0.177**	(2.09)
Building material industries					0.140*	(1.89)
Textile industries					0.162**	(2.02)
Mechanical and electrical industries					0.141**	(2.54)
Pharmaceutical and chemical industries					0.231**	(2.83)
Transport and warehousing					0.094	(1.11)
Public limited liability company (SA)	0.0598	(0.59)	0.0152	(0.15)	0.0131	(0.14)
Company with limited liability (SARL)	-0.0173	(-0.39)	-0.0384	(-0.86)	-0.0623	(-1.44)
Other company structure	0	(.)	0	(.)	0	(.)
Chief executive officer (CEO)	0.00459	(0.09)	0.0191	(0.35)	0.0414	(0.66)
Deputy managing director	0.0114	(0.15)	0.0207	(0.28)	0.0498	(0.51)
Chief operating officer	-0.0354	(-0.64)	-0.0470	(-0.85)	-0.0391	(-0.71)
Human resources director	0.0753	(0.89)	0.0866	(1.00)	0.0894	(0.98)
Manager	0.0706	(1.07)	0.0807	(1.21)	0.0776	(1.15)

	(1)	(2)	(3)			
Chairman and chief operating officer	0.219**	(2.34)	0.217**	(2.36)	0.212**	(2.00)
Constant	0.198	(1.11)	0.269	(1.53)	0.0438	(0.26)
Observations	711		711		711	
R^2	0.172		0.200		0.221	

Note: OLS, clustered standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.001.

In table A.4.11 below, columns (1) and (2) indicate the number of months that were expected to pass before sales turnover returned to normal, while column (3) indicates the number of months that were expected to pass before employment returned to normal.

Table A.4.11: Time expected for sales turnover and employment to return to normal

	Turnover	Employ-ment					
	(1)	(2)	(3)				
Self-financing/ company funds	2.674**	(2.18)	3.684***	(3.24)	2.044**	(2.25)	
Number of weeks of suspended business operations	0.00708	(0.16)					
Access to sources of credit	0.00721	(0.01)	0.778	(0.89)	1.091	(1.57)	
Facilitate access to finance	-0.200	(-0.22)	-0.706	(-0.83)	0.204	(0.32)	
Importance given to innovation: high	0	(.)	0	(.)	0	(.)	
Importance given to innovation: low	-2.978**	(-1.97)	-1.656	(-1.24)	-1.927*	(-1.69)	
Importance given to innovation: medium		-2.918**	(-1.98)	-2.190*	(-1.73)	-1.676	(-1.58)
Importance given to innovation: relatively high		-0.138	(-0.09)	-0.512	(-0.38)	-1.107	(-0.93)
Importance given to innovation: very high		-1.977	(-1.07)	-0.736	(-0.46)	-2.437	(-1.55)
100% third party-owned		0	(.)	0	(.)	0	(.)
Family and third party-owned		1.728	(0.93)	1.538	(0.91)	-0.828	(-0.66)
One-person business with limited liability (EURL)		2.891*	(1.77)	3.005**	(2.02)	-0.553	(-0.46)
100% family-owned		3.168**	(2.26)	2.883**	(2.28)	0.545	(0.55)
Portion of turnover reinvested in research and development		0.0352	(0.54)	0.0271	(0.48)	0.0918**	(2.03)
Investment horizon: 1 or 2 years		0	(.)	0	(.)	0	(.)
Investment horizon: 2–10 years		3.398***	(3.61)	2.849**	(3.15)	1.11	(1.38)
Investment horizon: less than 1 year		-2.905**	(-2.71)	-3.146**	(-3.10)	-2.545**	(-3.50)
Investment horizon: more than 10 years		-0.444	(-0.18)	-2.258	(-0.95)	-1.995	(-1.06)
Female manager		-0.282	(-0.27)	0.644	(0.62)	0.313	(0.43)

Turnover	Employ-ment					
Professional training	0	(.)	0	(.)	0	(.)
Secondary/middle school-level	-0.671	(-0.46)	-0.342	(-0.27)	-0.158	(-0.16)
University-level	0.329	(0.28)	0.595	(0.59)	-0.521	(-0.59)
Age of business: less than 5 years	0	(.)	0	(.)	0	(.)
Age of business: between 5 and 10 years	-0.897	(-0.66)	-0.111	(-0.09)	-0.00310	(-0.00)
Age of business: between 10 and 20 years	0.691	(0.45)	1.527	(1.13)	0.858	(0.89)
Age of business: more than 20 years	0.393	(0.25)	1.277	(0.83)	0.0152	(0.01)
Age of manager: more than 65 years	0	(.)	0	(.)	0	(.)
Age of manager: between 18 and 24 years	-2.257	(-0.58)	-3.343	(-0.88)	-1.949	(-0.63)
Age of manager: between 25 and 35 years	-1.390	(-0.72)	-2.770	(-1.64)	-3.295**	(-2.12)
Age of manager: between 36 and 55 years	-1.369	(-0.77)	-2.385	(-1.52)	-3.047**	(-1.99)
Age of manager: between 56 and 65 years	-1.169	(-0.59)	-2.577	(-1.52)	-3.262**	(-2.05)
10–49 employees	0	(.)	0	(.)	0	(.)
2 or 3 employees	4.164	(1.39)	5.131*	(1.72)	-0.0932	(-0.08)
250 or more employees	-2.349	(-1.11)	-1.049	(-0.48)	1.504	(0.82)
4–9 employees	0.427	(0.37)	0.243	(0.24)	-0.323	(-0.36)
50–249 employees	-1.659	(-1.62)	-1.857**	(-1.97)	-0.883	(-1.21)
City: Algiers	-3.044**	(-2.36)	-3.239**	(-2.74)	-1.506	(-1.37)
City: Annaba	-8.800***	(-5.21)	-8.452***	(-5.41)	-5.205***	(-3.68)
City: Bejaia	-4.107**	(-2.10)	-4.579**	(-2.49)	-3.772**	(-2.67)
City: Bordj	4.859	(1.52)	4.608*	(1.87)	2.851	(1.21)
City: Constantine	-2.008	(-0.92)	-1.744	(-0.87)	0.154	(0.09)
City: Oran	-0.980	(-0.65)	-1.357	(-1.03)	-0.365	(-0.33)
City: Setif	9.095***	(4.49)	9.288***	(4.74)	2.146	(1.47)
City: Tizi Ouzou	-6.238***	(-4.23)	-6.637***	(-4.73)	-2.896**	(-2.38)
City: Tlemcen	-2.102	(-1.19)	0.545	(0.25)	-2.776**	(-2.26)
Agriculture. forestry and fishing	0.451	(0.17)	-1.264	(-0.57)	-0.293	(-0.16)
Specialized. scientific and technical activities	-2.263	(-1.14)	-1.849	(-1.08)	-0.921	(-0.69)
Construction and civil engineering	2.141	(1.27)	1.271	(0.85)	0.188	(0.16)
Hotels and catering	-1.046	(-0.54)	-0.618	(-0.38)	-0.888	(-0.65)
Food industries	-2.876*	(-1.71)	-2.286	(-1.58)	-0.986	(-0.83)
Building material industries	2.495	(1.21)	2.868	(1.52)	0.393	(0.29)
Textile industries	-4.287**	(-2.32)	-3.812	(-1.89)	-2.784**	(-2.28)
Mechanical and electrical industries	0.104	(0.05)	0.314	(0.16)	0.298	(0.18)
Pharmaceutical and chemical industries	0.675	(0.33)	1.765	(0.87)	-0.329	(-0.24)
Transport and warehousing	2.191	(0.95)	2.812	(1.33)	-0.439	(-0.32)

	Turnover	Employ-ment				
Public limited liability company (SA)	-3.462*	(-1.69)	-4.168**	(-2.98)	-1.568	(-1.40)
Company with limited liability (SARL)	0.195	(0.18)	-0.205	(-0.21)	-1.018	(-1.36)
Other company structure	0	(.)	0	(.)	0	(.)
Chief executive officer (CEO)	0.677	(0.49)	0.313	(0.25)	0.559	(0.63)
Deputy managing director	2.5	(0.76)	2.119	(0.65)	1.893	(0.74)
Chief operating officer	-0.791	(-0.55)	-1.356	(-1.03)	-0.396	(-0.46)
Human resources director	2.966	(1.56)	1.046	(0.53)	0.818	(0.41)
Manager	-0.817	(-0.74)	-1.356	(-1.28)	0.951	(1.25)
Chairman and chief operating officer	2.704	(1.27)	2.905*	(1.68)	3.599**	(2.76)
Temporary suspension of operations 1			-0.495	(-0.39)	0.378	(0.43)
Temporary suspension of operations and operation at reduced capacity			4.221**	(2.02)	2.152	(1.39)
Operation at reduced capacity l 1			-0.0658	(-0.04)	0.652	(0.60)
Constant	9.937**	(2.65)	9.682**	(2.81)	9.118***	(3.28)
Observations	414		487	487		
R^2	0.374		0.378	0.235		

Note: OLS, clustered standard errors in parentheses. * p < 0.10. ** p < 0.05. *** p < 0.001.

5. Time needed for a return to normal

Table A.5.1 shows that the time taken for employment to return to normal was shorter than it was for sales turnover. This was also observed in the other North African countries in which the survey was conducted. The time taken for sales to return to normal was longer in the construction, public works and hydraulics sector (11.2 months), compared with the average of 9.7 months. The time taken was also shorter than average in the hydrocarbons, energy, mining and related services sector. There were, however, no statistically significant differences among sectors in terms of a recovery in employment.

Table A.5.1: Average time taken for sales turnover and employment to return to normal by economic sector *(Months)*

	Turnover	Employment
Agriculture	9.3	6.4
Construction, public works and hydraulics	11.2	7.3
Hydrocarbons, energy, mining and related services	6.9	5.9
Manufacturing	9.2	6.5
Services	9.5	6.3
Average	9.7	6.6

The northern regions took the shortest time to return to normal, while Hauts Plateaux, East was the region that took the longest (14.4 months).

Table A.5.2: Average time taken for sales turnover and employment to return to normal by geographical region *(Months)*

	Turnover	Employment
North Centre	8.2	6.2
North West	9.1	6.3
North East	8.4	5.8
Hauts Plateaux, West	15.8	7.0
Hauts Plateaux, East	14.4	8.3
Hauts Plateaux, South	13.4	8.7
Average	9.7	6.6

Companies that both operated at reduced capacity and temporarily suspended their operations had an average return-to-normal time in terms of sales turnover of four months. Companies with an investment horizon of less than a year took less time on average to return to their average sales turnover (three months). In terms of differences among economic sectors, the textile sector stands out in that it achieved a rapid return to normal employment levels (almost three months less than average). Finally, companies that made greater use of self-financing reported that it had taken them more time to return to normal than it had for other companies. This may mean that the financing capacity of business enterprises with high levels of self-financing had been particularly badly affected by the losses they had incurred in 2020.

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