

Study of the impact of societal and environmental capital on the performance of Algerian companies

دراسة تأثير رأس المال المجتمعي والبيئي على أداء الشركات الجزائرية

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Submitted on: 2022-03-13

Revised on: 2022-06-29

Published on: 2022-07-24

Abstract:

Traditionally, producer theory has used tangible factors such as capital, labour and land for the production function. Several adaptation works have attempted to broaden the use of this concept by adding other forms to this capital often used to denote material investments and all the in-put of the productive apparatus. The objective of this article is to introduce a new type of capital which is societal and environmental capital. After several attempts at modelling, the econometric study carried out on a sample of fifty largest Algerian companies showed that the civic behaviour of firms towards society and the environment where they activate, as well as the various efforts made in this area, are not in favour of being considered as a true factor of production and hardly go beyond the framework of operating expenses.

Keywords: Intangible, relational, societal, environmental, performance.

ملخص:

تقليدياً، استخدمت نظرية المنتج عوامل ملموسة مثل رأس المال والعمالة والأرض لوظيفة الإنتاج. حاولت العديد من الأعمال توسيع استخدام هذا المفهوم من خلال إضافة أشكال أخرى إلى رأس المال هذا غالباً ما تستخدم للإشارة إلى الاستثمارات المادية وكل ما يدخل في الجهاز الإنتاجي. الهدف من هذه المقالة هو تقديم نوع جديد من رأس المال وهو رأس المال المجتمعي والبيئي. بعد عدة محاولات للنمذجة، أظهرت الدراسة الاقتصادية التي أجريت على عينة مكونة من أكبر خمسين شركة جزائرية أن السلوك المدني للشركات تجاه المجتمع والبيئة التي تنشط فيها، وكذلك الجهود المختلفة المبذولة في هذا المجال، لا يمكن اعتباره عاملاً حقيقياً للإنتاج ولا يكاد يتجاوز إطار نفقات التشغيل.

الكلمات المفتاحية: الأداء غير الملموس، العلائقي، المجتمعي، البيئي.

JEL code : C33, C51, D21

Introduction

Systemic theory has always considered the company as a living system open to an environment that includes a multitude of actors with expectations that sometimes converge with its objectives, sometimes contradictory to them and to those of the company. Corporate governance must be understood through the set of relational dynamics that unite all the stakeholders of the firm. Marie-Ange Andrieux defines stakeholders as groups of financial, economic or societal actors who impact or are impacted by the company's strategy and activities. Their role seems to be known and recognised at present, and has been widely taken up over the last ten years by the sustainable development approach, which particularly identifies human and environmental aspects (ANDRIEUX, 2010, p. 32). For example, in its Principles of Corporate Governance, the OECD writes: "Corporate governance rules should incorporate the idea that, in order to serve the interests of a company, the interests of its stakeholders and their contribution to the long-term success of the company should be taken into account" (OCDE, 1999, p. 38). In the mind of the OECD, these are mainly, in addition to investors, employees, creditors and suppliers, i.e. the so-called "primary" stakeholders, those who have a contractual relationship with the company. Other conceptions are officially emerging and are expanding the scope to include "secondary" stakeholders, those who do not have a formal contractual relationship with the company, but who are subject to (or are likely to be subject to) its activities or to have a significant influence on the course of its activities. The more prospective interest is now in the practices This issue is strongly linked to the intangible economy, in which companies structure their assets around externally dependent relational intangible assets. This issue is very much part of the intangible economy, in which companies structure their assets around externally dependent relational intangible assets. Competitiveness is based on the ability to generate a sustainable value-added relationship with stakeholders (DONALDSON & PRETON, 1995, pp. 65-91). These new types of emerging relationships cannot be understood in a static and unilateral way (MITCHELL, WOOD, & AGLE, 1997). Knowledge of the relational dynamics between companies and stakeholders implies understanding the interactions that arise from the reciprocal influence of each party on the others (ANDRIEUX, 2010).

The review of the practices used within a company to express its humane behaviour towards its employees as well as its social and environmental responsibility has stimulated in us the idea of quantifying these noble efforts and trying to measure their impact on the performance of organisations. However, whenever we try to introduce econometric tools into the field of management, especially when it comes to human values, managers categorically reject this line of thought before they even know the details. This makes us very reluctant in all stages of our study. The final objective is not to be able to quantify the societal and environmental behaviour of a company, but rather to verify the postulate relating to the selfishness of individuals which has been considered as the starting point of economic models for several decades. In other words, it has always been taken for granted that the purpose of a company is to minimise its costs and maximise its profit in order to ensure its sustainability. However, the latter has usually been taken in a purely material sense. That is, an organisation can never continue to exist if it does not generate increasing profits. This axiom is true, but in a very naive and incomplete way. For a firm would be unable to survive with non-valued employees and in the midst of a destroyed society and environment. So, our study tries to observe whether companies that care about their image in society as well as their interest in

the environment where they operate show better financial performance. This allows us to formulate our problem as follows: "What is the impact of societal and environmental capital on the performance of Algerian companies? It is obvious that good corporate citizenship will lead to costs. This is because the costs of implementing the changes in practice, meeting the requirements of standards and regulations, and the training programme are all to be financed. It is indeed a question of financing all the costs linked to the implementation of changes in practices, compliance with the requirements of standards and regulations, and training programmes. But in the long term, the gains will be significant in terms of new markets and resource savings as well as recognition by society. These results allow us to anticipate the research hypothesis as follows: "Societal and environmental capital is a significant factor of production for Algerian companies". To verify these assumptions, the impact will be measured in a material way. Indeed, and using financial accounting, we proceed to the detection of all the expenses incurred by the companies in the framework of human, societal and environmental capital investments. Our raw material will be the accounting and financial data of a sample of the 50 largest Algerian companies over a period of 4 years. The impact of societal and environmental capital on performance will be concretised through a Cobb-Douglas type function which explains production through a number of factors which are in our case: the material factor, the human factor and a third one which includes the societal and environmental component.

Our study will be organised in two main parts. We begin with a brief overview of the different concepts related to the societal and environmental capital of a company. Then we present the methodology of the empirical study carried out to measure the impact of this capital on the performance of a sample of Algerian companies.

1. Societal and environmental capital, definition of concepts and characteristics

The search for a mode of economic development that respects environmental and social balance is a trend in post-industrial economies today. It concerns all actors in society, whether they are public or private, whether they are from large or small structures. The societal vision of the governance of organisations has emerged with the reflection of companies in the sense of giving more importance to the impacts of its strategy on society and the environment in order to be able to preserve its social capital, which is mainly born of everything it spends to have a good reputation and a better brand image.

1.1 Definition and determinants of social and environmental capital

The development of environmental and societal capital is undoubtedly the one that carries with it a large part of the future value of companies. It is characterised in particular by an ethical dimension that affects all the other components of the company. It is based on the desire to reconcile economic development, environmental protection and human development. These values are found in the concepts of corporate social responsibility (CSR) and sustainable development. The notion of Corporate Social Responsibility (CSR) has been gaining momentum for several years. Originally, this was a self-regulatory approach by companies, which consisted of involving a part of civil society to counterbalance the hegemonic power of shareholders. In concrete terms, CSR approaches have effectively developed in parallel with the rise of civil society's criticism of economic globalisation and the emergence of the concept of sustainable development (CHAUVEAU & ROSE, 2003).

CSR is further defined as "the responsibility of an organisation for the impacts of its decisions and activities on society and the environment through ethical and transparent behaviour that : contributes to the sustainable development, health and well-being of society ;

- ✓ takes into account the expectations of stakeholders;
- ✓ complies with applicable laws and international standards of behaviour;
- ✓ is integrated throughout the organisation and implemented in its relationships (AFNOR, 2006).

In concrete terms, the CSR approach usually takes the form of a voluntary charter defining the company's ethical behaviour with regard to environmental and/or social issues, as well as an action plan describing all the operations carried out by the company and/or an annual sustainable development report. These declaration and action documents are sometimes accompanied by a system of indicators or reporting, the purpose of which is to specify the objectives and allow for more precise monitoring of the approach (BOUTAUD, 2010).

Corporate production and consumption patterns result in the excessive and increasing exploitation of natural resources. They affect the climate, biological diversity, natural balances and even the stability of human societies. Thus, society is characterised by increasingly intense consumption of goods and services, combined with ever shorter product lifetimes, which increases the consumption of natural resources and the production of waste and pollution. At the same time, at the global level, pressures on the environment are increasing due to the demographic growth of developing countries and the desire of an ever-increasing number of individuals to access the consumer market. In this context, the challenge is to steer production and consumption patterns towards a more sustainable economy that limits its environmental impacts while improving competitiveness, quality of life and social conditions of production. There have been many recent developments in the notion of sustainable development, which refers to notions of investment geared towards ethical choices to improve performance under healthier operating conditions. In order to maintain its brand image and reputation, the company must now include the sustainable development dimension in its strategy and action plan. In general, there are four principles on which sustainable development is based:

- ✓ balanced economic growth;
- ✓ respect for the environment;
- ✓ equity and social progress;
- ✓ achievement of societal objectives.

Having presented these two determinants, namely social responsibility and sustainable development, it is time to synthesise these concepts through a definition of the social and environmental capital of a company. This is, therefore, the counterpart of all that the company can spend to reduce its footprint on the environment and society in order to have the image of a socially responsible and environmentally sound corporate citizen.

1.2 Assessment and measurement of social and environmental capital

Companies are now seeking to identify the extra-financial factors that enable them to contribute to sustainable development without sacrificing their economic performance. The difficulty of the assessments lies in the fact that the entire value chain must be broken down, including the company's suppliers and subcontractors, from the production of raw materials to the recycling of products, and including customer satisfaction and respect (Groupe One, 2003, p. 126).

Nevertheless, tools have been developed in recent years, even if much progress remains to be made in modelling instruments to measure the social and environmental responsibility of companies and thus clearly identify the cost of generating this intangible component of its wealth, which is societal and environmental capital. Based on voluntary approaches, these tools must not make us forget that the first form of social responsibility is compliance with legal obligations in terms of taxation, labour law, staff representation, safety, etc. (WOLFF & MAULEON, 2005, p. 65).

Among the most commonly used tools for assessing social and environmental capital are The EU Eco-Management and Audit Scheme (EMAS) (ESG-UQAM, 2002, p. 25) and the Global Reporting Initiative (GRI) (Global Reporting, 2021). There are also other reporting and auditing tools for societal and environmental capital that are less widespread and less demanding than EMAS and GRI, such as ISO 9001 for quality management, ISO 14001 for the implementation of an environmental management system (ISO, 2021), ISO 8000 for child labour, forced labour, safety, trade union rights, etc. (CEPAA, 2021).

1.3 Quantification of social and environmental capital

The societal and environmental capital of the company is reflected in the practice of social responsibility. Being socially responsible means not only fully meeting applicable legal obligations, but also going beyond them and "investing" more in human capital, the environment and stakeholder relations. Corporate Social Responsibility (CSR) is about integrating social, environmental, ethical and governance objectives into a company's development strategy. The reconciliation of economic, social and environmental dimensions enables it to engage in a sustainable development approach, in particular by taking into consideration the points of view of all parties concerned (stakeholders) by the life of the company. The company builds its societal and environmental capital by adopting a certain type of behaviour that justifies its societal responsibility. These behaviours are classified into three categories, which in turn make up the company's investment in societal and environmental capital.

External social actions : These are behaviours that consist in separating social actions from economic activity, such as the creation of foundations, sponsoring and patronage actions that seek a favourable brand image, but which have no direct impact on the strategic decisions of the company or the group.

Internal social actions: The actions integrated into the strategy seek to bring the social and societal dimension into the steering of the organisation and thus influence the transformation of the management system. These actions aim, for example, to improve customer satisfaction in terms of perceived quality or to establish long-term partnership relations with suppliers; the introduction of an environmental management system, objectives aimed at improving working conditions, health and safety beyond legal obligations, staff training and skills development plans and, in general, ISO certification procedures which can be included in the strategic objectives (CEPAA, 2021).

2.Main elements of the empirical study for measuring the contribution of societal and environmental capital in the production of Algerian companies

The measurement of the contribution of societal and environmental capital in production will be carried out through the accounting and financial data of a sample of 50 largest Algerian companies over a period of 4 years. In order to achieve this objective, we

have used theories of production economics. These theories aim to represent a combination of the different factors necessary for production in the most efficient way possible in order to satisfy social demand, in quantity and quality. Our model aims not only to quantify the links between the factors of production, which are material capital, human capital, societal capital and environmental capital, but also to measure the contribution of each input (or factor of production) to the enrichment of the Algerian company (GRILICHES, 1979, pp. 92-116). In order to do this, we used the theories of production economics and, more specifically, the Cobb-Douglas function, as well as econometrics, which calculates the parameters of the function. Our study was based on the population of companies registered with the National Trade Register Centre (CNRC) and subject to corporate income tax. The sample studied is a panel cylindrical over 4 years [2010-2013] and grouping 50 large Algerian companies, i.e. 200 observations (company years). These are raw data from the balance sheets and income statements of the social accounts. The economic phenomena and concepts proposed for study are approached by accounting variables; the objective being to observe the behaviour of large Algerian companies in terms of sustainable development practices and to measure their impact on the performances displayed.

2.1 Model specification

Our study on the measurement of the impact of societal and environmental capital on the performance of Algerian companies can be included in the category of studies that focus on the relationship between intangibles and company performance. These studies distinguish four factors of production: physical capital (equipment, buildings, etc.), labour, intangible capital and a factor called "the residue". Statistical and econometric work analysing intangibles has been developing in OECD countries for some years. The most studied phenomenon is the diffusion of information and communication technologies in the economy and their contribution to growth (MAIRESSE, CETTE, & KOCOGLU, 2000). However, due to the lack of appropriate statistical data, there are few studies that integrate all intangible expenditure into a production function in order to determine the contribution of this production factor to growth, at the level of the company or the economy. One of these works is that of O'MAHONY M. and VECCHI M. These authors suggest not limiting the measurement of the effect of intangibles on production to R&D activity alone. To do this, they include a fourth factor in addition to R&D capital, extracted from the balance sheets and referred to as 'other intangible assets', which is made up of a wide variety of elements, such as goodwill, advertising expenses and other items. According to these authors, this fourth factor serves to approximate the intangible capital accumulated by advertising investments (O'MAHONY & VECCHI, 2000, pp. 199-227).

In this same line of thought, another study worth mentioning is that of Yassine LOUZZANI, through his doctoral thesis, who proposed to explain the performance of industrial companies in France by three factors of production: physical capital, labour and intangible capital measured by the sum of expenditure on R&D, training and commercial expenditure (LOUZZANI, 2004). We can also cite the doctoral thesis of Hassiba SELLOU who attempted to estimate the production function of Algerian companies by taking into account four factors: material, human, structural and relational, but who finally rejected the second and retained only the first and the fourth with a positive impact and the third with a negative impact (SELLOU, 2016).

The model we propose to measure the impact of social and environmental capital on company performance is based on four factors: material, human, relational (to encompass the societal and environmental component) and a fourth "residual" factor to allocate the contribution of other elements not taken into consideration.

The production function is of the Cobb-Douglas type:

$$P_{it} = F M_{it}^{\alpha} H_{it}^{\beta} R_{it}^{\gamma} e^{u_{it}} \quad i = 1, \dots, 50 ; t = 1, \dots, 4$$

With $u_{it} = a_{it} + \varepsilon_{it}$

We assume that $a_i \sim N(0, \sigma_a^2)$ and $\varepsilon \sim N(0, \sigma_\varepsilon^2)$.

- ✓ P_{it} denotes the variable to be explained which is the output characterised by two indices i and t representing, respectively;
- ✓ F represents the constant, in a production function it corresponds to total factor productivity;
- ✓ M_{it} is the physical capital of firm i in year t ;
- ✓ H_{it} is the human capital of firm i in year t ;
- ✓ R_{it} represents the relational (societal + environmental) capital of company i for year t ;
- ✓ a_{it} and ε_{it} represent the uncorrelated random disturbances (a_i being the individual specific effect);
- ✓ α, β, γ et λ are the elasticities of material, human and relational capital respectively.

The logarithmic form of the production function allows for linear regressions. The model we study here is therefore the following:

$$p_{it} = f + \alpha m_{it} + \beta h_{it} + \gamma r_{it} + u_{it}$$

with : $p_{it} = \log P_{it}$, $f = \log F$, $m_{it} = \log M_{it}$, $h_{it} = \log H_{it}$, and $r_{it} = \log R_{it}$

2.2 Model variables

The data used come from accounting summary documents and therefore the economic phenomena and concepts we propose to study are analysed on the basis of accounting headings. For this reason, in econometric estimations of the type we carry out in this study, large approximations at the level of the variables are often necessary, since a satisfactory measure should take into account elements rarely calculated at the level of the accounting of the companies. For this purpose, we propose to quantify the variables retained for our model on the basis of accounting and financial data as follows:

a-Production : measured by the account "Production for the year" which is a positive intermediate management balance in order to avoid attributing negative values to the logarithmic function.

b-Material capital: measured by account 21 "tangible assets".

c-Human capital : its value is obtained by adding up all the expenses incurred by the company in recruitment, remuneration, training and development and support (TREMOLIERES & DELIBALTA, 1996, pp. 521-528).

d-Relational and environmental capital : Given that the Algerian conceptual framework stipulates that expenses, income, assets and liabilities are accounted for either by nature or by function, it is not easy to draw up an exhaustive list of all the accounts that can provide the manager with reliable information on investment in societal and environmental capital. However, the Algerian accounting nomenclature devotes some accounts to gather the various expenses incurred by the company in terms of sustainable development practices on the societal and environmental level, namely :

- **623** : Public relations and social actions (sponsoring, patronage)
- **625** : travel, missions and receptions related to social actions ;
- **635** : Contributions to social organisations (donations, telethons).

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The problem with measuring the two factors, human and relational, is that most of their quantifiers are in fact expenses considered by financial accounting as costs. This means that they cannot be accumulated in the summary document representing the company's assets, the balance sheet. To solve this problem, a calculation technique well known to statisticians and economists, the chronological method, has been used in the transition from flow to stock (MARION, 1990).

Table 1: Descriptive statistics

Variables	p	m	h	se
Description	Production	Material capital	Human capital	Societal/ environmental capital
Average	152665265623	60569481674	17431936048	6085320031
Standard deviation *	863056138699	275113444996	59800555010	39619058201
Maximum*	7031522121123	2465558871043	559918602749	494082022012
Minimum*	85418575	2647055	42920401	3545500
Nbr obs	200	200	200	200

*: all values are amounts in DZD. **Sources:** carried out by us from the database collected from the CNRC

The first observation that can be made concerns the enormous values of the standard deviations, which indicate a very large dispersion of our working sample. This is mainly due to the two companies of incomparable size. These are SONATRACH and SONELGAZ.

3. Presentation and interpretation of results

We present here the results obtained with the STATA 12 software for the estimation of the elasticities of a Cobb-Douglas type production function taking into account three factors: material, human and relational (societal + environmental). Our methodology consists of first estimating the production function with these three factors according to the common effect model. Then, those of the fixed effect model. We will then carry out the test for the existence of an individual fixed effect to decide which of the two models to retain. The third step will be dedicated to the random individual effect model in case we reject the common effect model. We will then perform the Hausman test to choose the final model. Three other tests will also be performed to detect the presence of inter-individual heteroscedasticity, intra-individual heteroscedasticity and error autocorrelation in order to correct the data and improve the estimation results.

The estimation of the Cobb-Douglas production function showed the following results:

Table 2: Results of estimating the production function with a material, human and societal/environmental factor

p	Coef.	Std.Err.	t	P > t	[95% Conf. Interval]	
m	0.2127301	0.0738747	2.88	0.005	0.0667365	0.3587237
h	0.1142631	0.1135806	1.01	0.316	-0.1101987	0.3387248
se	0.6143449	0.1246101	1.32	0.189	-0.819138	0.4106036
cons	5.506266	0.922241	5.97	0.000	3.683703	7.32883
Sigma_u	0.51697424					
Sigma_e	0.22051838					
rho	0.84605956 (fraction of variance du to u-i)					
F test that all u _i =0 : F(49, 147) = 10.01				Prop > F = 0.00000		

Source : Data processed by STATA 12 software

The modelling methodology described above was carried out for three different attempts. The first included all the individuals in the sample, the second excluded the two largest Algerian companies (Sonatrach and Sonelgaz) and the last only took into account private companies. The three tests led us to retain the fixed individual effect model. After correcting for intra-individual heteroscedasticity, inter-individual heteroscedasticity and first order error autocorrelation, we find that, at a threshold of 5%, the production function of the large Algerian companies in our sample only retains the material factor with a positive influence and rejects the human, societal and environmental factors (symbolised by "se" in the STATA results table) as an explanation of performance. In other words, the efforts made by the companies in our sample to be socially and environmentally aware or they operate are not significant enough to be considered as production factors.

Conclusion

Our research aimed to measure the contribution of societal and environmental capital in the production of Algerian companies. This capital is built within an organisation by accumulating the different investments made in order to maintain and promote a talented human capital, to draw a civic profile for the company in the midst of a grateful society, and to show a concerned attitude for a healthy and clean environment.

It is true that the practices of companies in favour of their society and environment are much broader than can be quantified and valued. Nevertheless, the nomenclature of financial accounting allowed us to draw a slight outline around them to measure, in a very approximate way, their impact on performance. We also called upon the theories of production economics which provided us with a very relevant tool which is the Cobb-Douglass type function.

Through the latter, which is a combination of production factors, we tried to explain the performance of a sample of fifty largest Algerian companies over a four-year period. The inputs considered were physical capital, human capital and societal and environmental capital.

After following the methodology for estimating the parameters of the production function, and using panel data econometrics in STATA 12, our model retained only the material factor with a positive influence and rejected the human, societal and environmental factors for explaining performance. In other words, the efforts made by the companies in our sample to be socially and environmentally responsible where they operate are not significant enough to be considered as factors of production. Despite spending on charitable activities and sustainable development, large Algerian companies do not rely too much on the societal and environmental component to map out their strategies and prove their performance.

It must be noted that the results obtained from the various estimation attempts are conditioned by the quality of the data, which lacks precision. This is essentially due to the approximate way in which the variables in the model are quantified. It is also important to point out that, in terms of quantity, the size of our sample is likely to be questioned because the number 50 hardly represents the category of large Algerian companies which exceed 2000 companies. In addition, a small sample is not in favour of the accuracy of the results when estimating the elasticities of the production function. A third limitation that also reduces the credibility of our conclusions is related to the temporal scope of the study. A period of four years is not sufficient to reap the benefits of intangibles in general. A company needs more time to recoup its expenditure in this area and to feel the recognition of its company and its environment.

Furthermore, more precise measures of societal and environmental capital, by extending the sample size to a larger number of companies and a longer period, would improve our results. In addition, work on the impact of the form of ownership and the sector of activity on the relational determinants of the performance of Algerian companies could usefully complete this study.

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