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TECHNOLOGICAL INNOVATION AND ENTREPRENEURSHP IN DEVELOPING COUNTRIES: HURDLES TO HIGHER PERFORMANCE AND GLOBALISATION

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(*): ***Abstract—***

A fact today is that there are many developing and Arab countries which are quite wealthy in terms of petro-dollars and other resources but not dynamic enough in terms of innovativeness and entrepreneurship. A consequence of that could be their real integration into the world economy being delayed because of their low levels of performance and competitiveness.

Theoretically, both technological innovation and entrepreneurship are considered as cornerstones for competitiveness and growth. In practice, however, it is not that difficult to identify lack of sound policies and effective measures in practically all Arab countries.

To illustrate the case, particular reference is made to two countries, Algeria and Saudi Arabia. Both these two countries are rich and on the way of joining the World Trade Organization. Yet, for their respective overall performance, they are still far behind even the newly industrializing countries, which have achieved amazing technological and economic progress.

The author of the present paper argues that what prevents developing countries in general from becoming quickly competitive is not really the international context, but rather the internal one within those countries. For one thing, respective governments manage their economies and societies as if change has only to do with macro-economic and political management.

***Keywords*:**

Entrepreneurship, small and medium enterprises, entrepreneurs, Technological innovation, National Innovation System, industrial policy, strategy, culture, R & D management, organization, change, performance, excellence, sustainable development, Free market economy, privatization, industrialization, trade-based development, corruption, transparency, Algeria, Saudi Arabia.

I. INTRODUCTION

Entrepreneurship coupled with different types of innovation is fundamental to fostering economic growth and social development. The observable impact of technological innovations, in particular, on business as well as work and life in the western countries, is witnessing its key role. This strongly suggests that developing countries have much to do and gain in promoting or rather given high priority to the question of entrepreneurship and technological innovation.

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Today, globalization requires that all sorts of capabilities should be relied on for a real integration, which could, however, only be achieved through higher performance levels as well as greater transparency [1].

Because of various contextual shortcomings, efforts and positive impacts and outcomes are really hindered. A key solution, therefore, is the quick and efficient removal of all sorts of hurdles or obstacles; otherwise, the rate of their economic growth and technological development will remain low and consequently not truly sustainable and durable, let alone high.

By entrepreneurship, it is meant here a creative act or manner of doing things that leads to something original or additional, basically inspired from technological innovation. By technological innovation itself, it is meant here improved or new processes and products, contributing to higher productivity and better social welfare. Thus, the relationship between entrepreneurship and technological innovation is standing, of an interdependency type and crucial for competitiveness and performance.

II. POLICY SHORTCOMINGS

*1) **Political and structural limitations**:*

At different occasions, overall performance and governance in developing including Arab countries have been debated [2]. Many various weaknesses as ell as external pressures make the broad picture generally quite misty [3]. Unfortunately, and because needed reforms are not either designed or speedily and appropriately implemented, this state of affairs seems to last for many years ahead, Basically, openness, to foreign trade and foreign direct investment, is slowed down in many countries, and organizational changes and appreciated impacts are for long to come.

An immediate consequence of all that is unavoidably the demobilization of human resources. Worse is the growing number of people of different horizons, who feel unhappy about their conditions of work and life. The frequent and sometimes violent strikes, street demonstrations as well as the continuing brain drain phenomenon are all evidence of the impact of current policies.

A. Low level of transparency:

Initiatives and some varying efforts have been made in many developing and some Arab countries to insure information diffusion as large as possible. However, because of flow discontinuity and lack of trust, transparency is on average still not really effective.

In general, decision-makers at all levels are appointed not always on the basis of competency. Accordingly, holding power and authority still depends largely on acquaintance in the government or related institutions. Also, bribing adds to that and makes things unclear.

All this witnesses insufficient transparency on how things are done or decisions are made, including appointment of leaders and managers, who could motivate and guide people and competencies to work and work efficiently. In reverse, the observable general tendency is for competent individuals refusing to hold positions, mainly because of absence of criterion or their correct application.

Information, which is the basis for any transparency, is in those countries still highly monopolized and much fluctuating, depending on political rather than economic objectives and opportunities. Macro and micro-economic decision making is also very little shared and does not mobilize enough the available competencies, let alone initiative-takers and efforts-makers individuals. Because of widespread injustice, disinterest largely prevails and makes individuals loosing their dynamics and devotion to work, let alone to invent or innovate.

Both Algeria [4] and Saudi Arabia [5] are badly ranked in terms of government efficiency, quality of regulation, Justice and level of corruption. Significantly, and as opposed to Saudi Arabia, which had not undertaken any major political reforms, Algeria had gone through very hard time towards political democracy, yet the impact on society has been very limited and biased.

Truly, combating bureaucracy and corruption in both countries is not yet of top priority to the respective governments. Indeed, simply denouncing publicly the corruption phenomenon is not at all sufficient to manage and govern effectively, nor to gain or even regain people's trust. On the other hand, maintaining power, by the same ruling individuals or groups, does not help real changes to occur, thus allowing for important and fast evolution and improvements.

These phenomenons, on their own, do really huddle the success of entrepreneurship in developing countries. Small entrepreneurs, independent inventors and innovators, who do not have personal support from highly ranked government authorities or the army, face hard times and suffer to see their projects realized for the benefit of the country and their own.

B. Low environmental sustainability index:

The relationship, between a nation's economic status and its environmental sustainability index performance, is not always standing. When so, it means that

governance is pointed out for the amount of efforts to best manage the various resources and sustain development is its large sense.

According to the latest publications, Algeria has moved back from being ranked 70th with an IES of 49.4 in 2002 to the rank of 83 in 2004 [6]. Saudi Arabia is ranked far behind, i.e., 138th with an IES of 34.2 [7]. Environmental policies are therefore largely lagging and the need for rapid improvements is far greater than those that have already been made. International aids being provided by both developed countries and international agencies, developing countries' governments have the obligation to meet their society's needs, using most efficiently as well as most honestly the available resources. In practice, corruption often prevents the aid from being felt by concerned people.

As the public sector is not able to deal with the issue on its own, the private sector would not either, unless if it is encouraged and oriented. However, when made, private sector's progress and contributions are often jeopardized by a number of various environmental factors. These include lobby power, resistance against even small changes and competition, which is usually found as unfair because of various weaknesses.

C. Policy overall inconsistency:

It happens even in developing countries that positive macro-economic aggregates are achieved, but that is not at all sufficient for micro-economic growth. In particular, real growth occurs when two major issues are voluntarily and simultaneously addressed; First is entrepreneurship and second is technological innovation. Should not they be taken care of and stimulated, productivity as an indicator of real growth will suffer.

A fact is that too often, entrepreneurship, in developing countries, is confused with small and medium enterprises. Public enterprises may be small or medium, without being competitive as private ones. Free competition requires that privatization should be allowed and applied as quickly as possible. However, if the issue is a delicate process and not an end in itself, it is still needed to help solving many structural problems. In particular, it could foster progress through enhancing individuals' or groups' technical and managerial competencies. Investments and employment would then be boosted for the benefits of society at large.

In the case of the two example countries, promoting private entrepreneurship has been clearly biased towards non productive activities, i.e., services. If this helps in reducing unemployment, it does not speed up growth. In Algeria, for instance, only 1/3 of the newly created small enterprises are engaged in production, the remaining 2/3 are in services, including transport, import-export, and other services. Worse,

general observation allows noting that productive units as well as libraries are transformed into consumption points, i.e., restaurants and take away.

In such an environment, micro-economic counter performance cannot, therefore, be explained only by lack of competition and certainly not by lack of investments; For, in both countries refereed to, their respective rates of investments are among the highest in the whole world; In Algeria, it represents on average 32% of the GDP, for the period between 1971 and 2000 [8]. In Saudi Arabia, it estimated to be around 17% for the year 2004 [9].

It is asserted that the reasons that inhibited the emergence of entrepreneurs in Saudi Arabia are pure socio-cultural factors [10]. Comparatively, in Algeria, it is the socialist orientation that had much blocked the development of the private sector for about 25 years, during the period 1965 and 1987. Indeed, the then deliberate choice for the dominance of the public sector for ideological reasons left little room for the development of the small and medium private industries. Those which maintained their existence have done so by being on the margin of the development process and generally activating in low value-added, such is beverage and textile [11].

D. Minimizing attention to cultural dimensions:

Not giving it any priority, cultural development in developing countries has, in general, been limited to artistic activities. These include cinema, theatre, folklore, music, festivals, and narratives which do not create real or industrial value-added. Institutionalization of these activities through the creation of ministries and other entities indeed reflects the importance given to them, but there is a need to manage them adequately to support economic growth and social development.

Notwithstanding, the so-called cultural industries, involving conceptualization and production of all sort of modern hard and soft pedagogical and learning items and tools, have received very little attention. Historically, book making has been practically one the major activities which resisted structural changes and competition in all developing counties.

Recent progress made, in some of the Arab countries, due to the extensive investment and use of Information and Communication Technologies (ICTs), also is characterized more by consumption than production of particularly equipments and tools. For, example, the establishment of modern IT centers or cities has little to do with the urgent need for the growth of productivity and innovation. Local conception of modern IT products and services is relatively incomparable to that of other countries outside the western sphere.

Witnessing for industrial R & D or inventive and innovative activities, the number of patents granted to residents in Algeria and Saudi Arabia is negative, and compared to other countries such as the USA, let alone Korea and particularly Japan. The following data illustrate the case for the year 2000.

Table 1:

Number of patents granted to residents in some selected countries (per million people)

Country	Year 2000
Algeria:	00
Saudi Arabia:	(..)
USA:	298
Korea, Rep.:	490
Japan:	884

Source: See ref. [26],

E. Unstable educational system:

Due to internal pressure and the impact of world-wide education systems evolution, the Algerian whole system of education has been going through various reforms. Indeed, inspiring from various foreign education systems, doors were left open for continuous changes, including shifts from one approach to another. And this is what made things unstable. For, recourse to French, British, and even American programs occurred at the time where the 'nationalistic' approach is quite strong.

Despite that the sector has been given great importance, mainly through bigger and bigger investment amounts in the successive national budgets, the outcome has not been used effectively; Indeed, perdition at different levels and brain gain have been getting worse and worse for many decades now. Besides that, unemployment of degree holders discourages people going for higher education or even study.

In fact, there is a largely widespread attitude among namely young people that doing business is a matter of individual initiative and learning by doing, rather than education and degrees. Success in it would require using different channels and means including informal ones and even unlawful means. Such a reality tends, however, to endure due to the total absence of government's specific encouragement of highly added value activities. Easy earning jobs and activities make people save efforts and avoid many administrative and bureaucratic requirements.

At the high education level, scientific research is strikingly biased towards applied one, i.e., development. Basic research is wrongly regarded as auxiliary and thus reduces its contribution to the overall performance. In the long run, this would create

a serious problem as in the case of Japan of 1970s, when it found itself in a position well behind most western countries.

Appropriate training in the fields of management of technological resources (MTR), Research and Development (R&D) and innovation has not been yet institutionalized in public educational institutions of different levels; In the private sector, only very few business or management education schools, which train operational management staff, offer relevant or specific syllabuses in the field [12].

As far as human resources are concerned, it cannot truly be said to have been in shortage [13]. This, in fact, is mainly created by the total absence of a policy, emphasizing adequate management and incentives. The brain drain phenomenon, which had indeed greatly speeded in recent years, because of darker perspectives, is not refutable evidence. For example, it is, recently, reported that more than 80000 higher education degree holders have left Algeria since 1970 [14]. This is, however, without a positive counter part, as in the case of, for instance Australia or Saudi Arabia.

In the case of the latter country, and due to its free but controlled employment policy, universities and industry attracts more and more of competencies from various foreign countries, including the Arab ones. Human Resource outsourcing is recently becoming a very important issue in Saudi Arabia, for which the nationality code had opened larger the opportunities. In this country, however, there has been rather a disequilibrium in favor of non scientific and technical graduates, which renders the need great.

III. PARTICULAR SHORTCOMINGS

A. Weak Research and Development efforts:

Despite ambitious Science and Technology policies and the urgent call of the UN since 1970s, many developing and Arab countries still spend very little on R&D. Algeria, for instance, spends a bear 0.3% on Research and Development. Saudi Arabia spends comparatively a little bit more. Similarly, in other areas, such as very poor sub-Sahara Africa, yearly R & D expenditure is worse -around 1billionUSD- representing a third or fourth of the amount spent by a single multinational corporation [15].

At micro levels, R&D expenditures are not a clear and distinct part in budgets. And, when R&D activities are undertaken, they are mostly occasional, without official support [16]. Structurally, great efforts have been made, but remain generally ineffective and inefficient [17].

Mechanisms to strengthen linkages between industries and universities still have to be greatly developed and remodeled. For positive contributions, universities need to be aggressive in their policies to serve industry in various ways, including offers of exploitation of patented innovations made by faculty or coop students' proposal solutions to particular problems. Indeed, a university ranked good in terms of patenting does not contribute much to industry and society if relevant innovations are kept in drawers or used for exhibitions. Strong linkages could well help to overcome many problems including costs of foreign assistance and interventions.

Science and Technology parks are either inexistent or not efficiently managed in most Arab countries. Contrary, in the newly industrializing countries, S&T parks are already functioning and provide industry with ideas and innovations, as sources of growth, exports and technological development.

Outstandingly, accumulated experience is largely wasted and physical capital assets are not maintained or safeguarded. Cemeteries of vehicles and equipment can be seen everywhere, near industrial enterprises. The easy way of replacing maintainable equipment with simply new ones is a largely practiced policy in industry.

A fact is that technological development is not really integrated as a criterion in the evaluation of firms' performance [18]. Quite often, the concept of technological development itself is confused with that of industrial expansion. This is true even for managers and decisions makers. While, theoretically, it is defined as a combination of four types of capabilities, spanning from engineering, investment, production and innovation [19]. In general, it is practically understood as that of the state of technological art, which refers to the advancement of applied knowledge.

B. Mismanagement of R&D personnel:

Human Resources management, in developing countries, suffers from various aspects, mainly lack of good planning and motivations. R&D personnel, in particular, are not appropriately managed. Often, they are marginalized, because of their knowledge and wrongly supposed threat to take over responsibilities and dismiss acting managers with low educational profiles.

Brain drain is more and more acute and brain gain is very little considered, despite the advantages it presents [20]. Political initiatives may be taken, as in Algeria, to find ways of using the national competencies living abroad but, practically, noting has distinctly emerged or worked properly. Particular reference could be made to the first forum of Algerian scientists and technologies, which took place in 1994, without a real outcome [21]. In fact, real opportunities exist but, appropriate actions do not follow because of lack of follow up.

C. Inadequate systems of entrepreneurship:

The emergence and contribution of entrepreneurs in a country depend on a number of factors or elements.

A first main element is a clear government's keeping distance from doing everything. Yet, in Algeria, after privatization of many enterprises, this year's (2004) program extends back its control over many sectors and activities; public spending is to be used to resolve unemployment and covers social needs [22].

A second main element is the voluntarily action providing assistance and motivation to start-ups and innovators. Significantly important is that the creation of ministries or other institutions, incapable of clearing the way before entrepreneurs, is not worth, while the means of resolving problems are out of reach.

In Algeria, obstacles in front of new small and medium enterprises are indeed real. One particular major obstacle is the guarantee financial requirement which is up to three times that at the international level, i.e., 180% against 60% respectively.

Access to loans and landscape, in particular, are hazarded by inappropriate procedures and regulations. Bureaucracy and corruption are highly spoken. Financially, the total needed amount to boost the SMEs sector exceeds 500 billion dinars. A practical solution would be to encourage more co-partnership, which is beneficial financially, technologically as well as in terms of managerial know how.

D. Weak system of innovation:

Today, there is clear recognition that governments' capacity to create jobs is very limited everywhere, and that 'the bulk of the one billion new jobs that will be needed worldwide by year 2005 will have to come from the creation and growth of new businesses, almost always starting small. More specifically, technological entrepreneurship will be the significant source of good jobs [23].

In Algeria, innovation structures have been institutionalized in 1982, but in practice, implementation by enterprises has not been immediate and adequate. Worse, due to the economic restructuring process started in 1988, many public enterprises had transformed, reduced or even abandoned the relevant innovation structures [24]. Innovation or R&D activities taking place are, hence, informal and not strategically managed.

With regard to the national information system, it is remarkable that, despite important investments and efforts, it is still far from being efficiently operational [25]. This is could be partially explained by the lack of coordination or

complementarity between the old and new institutions in charge of information provision.

Often, contradictions are observed between statistics diffused by such organisms, besides the inertia regarding the diffusion of specific information, in the fields of science and technology and innovation.

Recourse to the international shelves, for innovations felt in the public domain, is not a current practice. Patenting is not either a conscious and active action for many industrial enterprises. This is because of lack of awareness about patenting in industry, let alone in research centers and universities. For no single university, even the science and technology oriented ones, has a patenting office.

Innovation centers are established in Saudi Arabia, but not in Algeria. Effectiveness of such centers should, however, be linked to their contribution towards providing needed help and support to industry and entrepreneurs.

IV. CONCLUSION

Availability of financial and human resources is not sufficient for fostering needed rapid growth and development in developing countries. Mismanagement of such resources explains much of the failure of theses countries to maintain efforts and investments to achieve progress. In the case of oil-producing countries, in particular, lack of strategies and disruption in policy measures are the most important factors triggering the success of entrepreneurship and innovativeness.

The need of developing countries for entrepreneurs and innovators is, indeed, a real and urgent challenge. To absorb unemployment, provide opportunities for individuals to contribute effectively, and allow for durable improvements, respective governments have to apply appropriate policies and act strategically.

The two example countries referred to in this paper present various policy and organizational shortcomings. Many of these could be removed, has there been real understanding of growth tools and strategies and a serious diagnosis of structural, institutional and managerial weaknesses. Cultural change is also very important.

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