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# Human Capital and Knowledge Emergence. Induced Effects of the Global Crisis on Human capital and Innovation

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*In the global crisis context crossed by organizations and countries in the past six years we assist also at conflicting measures in which regards knowledge, innovation and human capital; for example, countries such as England and France have reduced their costs for education, while Germany and other countries (Australia, Austria, Canada and Norway) maintained the same allocations for education. What will be the effects of such measures on human capital in the near future? What are the best human resources policies in companies in the crisis context?*

*Given that the subject of the research is "knowledge and human capital", in this paper we refer to the induced effects of the crisis on human capital and innovation. We will also identify the key steps that can be taken during crisis, and not only, to stimulate human capital.*

*Keywords: M19*

*JEL Classifications: human capital, knowledge, innovation, global crisis*

## 1. PRELIMINARY ISSUES

What we call "human capital" was established in time as a concept quite complex, multidimensional totaling several "faces" in that it involves the individual with all valences and its imperfections; this remark applies theoretically and pragmatic alike (Developments and shades made by theoreticians were imposed by increasingly complex realities of

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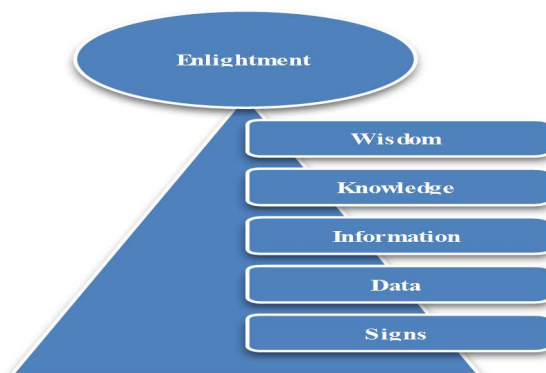
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organizational practice). In direct connection with what we call "human capital" there are notions such as knowledge, skills, competencies, qualifications, innovations, etc.; we all have a fairly accurate perception when we say "knowledge", "skills" or "innovation", but it is not really very simple to clarify the contents of the two phrases invoked.

Traditionally, knowledge has been defined in relation to the possibility of quantifying a certain amount of data, information and other items that tend to structure hierarchal in the expertise owned by a person and / or existing knowledge stock in the company. In Fig. 1.1 we present the classic pyramid regarding the classification of knowledge based on signs (representing very crude / rudimentary symbol of human knowledge that can be measured and expressed in bit), following the data, information, and what we understand today by knowledge; how does it accumulate what we mean by "wisdom" as an attribute of an expert in a company remains something unclearly clarified so far. Moreover, it is even less understood or explained, the manner in which different experts from organizations manage to bring novelty in their profession, in the sense that they imagine innovative solutions on issues related to technology, products or markets (we named this new element through the phrase "enlightment").

**Figure 1.1.**

### **REPORTS BETWEEN DATA, INFORMATION AND KNOWLEDGE**



Source: After: Apurva A., Singh M.D., Understanding Knowledge Management: a Literature Review, International Journal of Engineering Science and Technologie, IJEST, vol.3, no.2, 2011

From the perspective of our work, it is appropriate to mention a second major classification of the knowledge, namely that of making clear distinction between [4], [5], [6]:

Explicit knowledge (these are skills that are commonly encountered in books, encyclopedias, databases, technical documentations, internet etc.; they can be described, learned and transmitted easily from one person to another and they are permanently added to the stock of knowledge that defines the evolution of humanity);

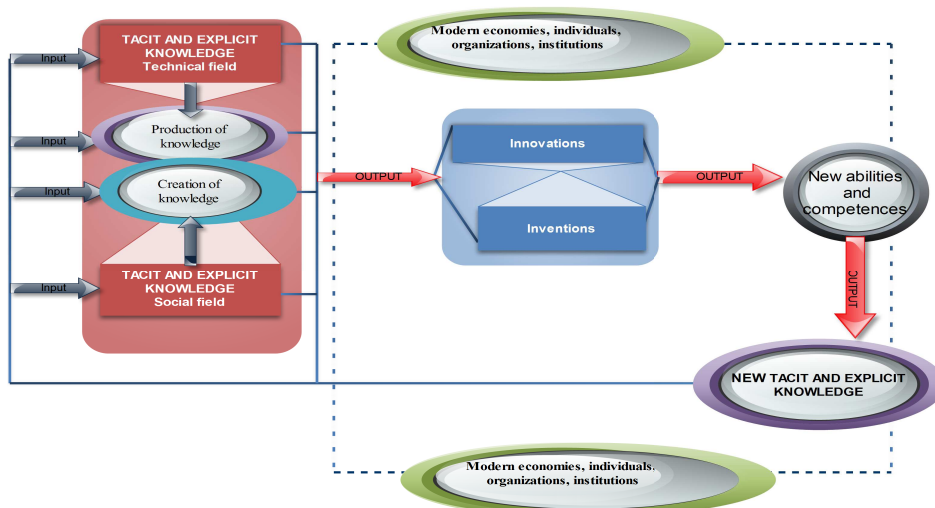
Tacit knowledge (these are skills that are included as part of the mind / thought of ordinary individuals, in organizations and in society; they are more volatile, meaning that it is difficult to say / describe how to perform to fulfill some routine activities; description, transmission and acquisition among people raise obvious difficulties).

The term tacit knowledge was first used by the philosopher Michael Polanyi that discusses "the tacit dimension of knowledge"; He argues that each of us knows more than he can say, that human language contains a certain vagueness and each has a "personal knowledge"[5]. Unlike a computer that is based on a mechanism of inference (he performed a type of mechanical reasoning), human knowledge is based on inference mechanisms that are very personal in the sense that they vary enormously from one person to another; for this reason a few people will be able to accede to the "superior knowledge"[5]. Subsequently, Polanyi's concept was extended / developed in various fields (logic of science, psychology, management, etc.). A large number of authors in the field of management and social sciences have dealt closely with distinction between explicit knowledge and tacit knowledge (Nonaka, Kono, Takeuchi, Davenport, Prusak, etc.).

It is also useful to advance other preliminary notions about issues reserved in this work (knowledge as a source of innovation and growth of skills / abilities induced on human capital); thus, through innovation we understand a new element brought or assigned on a particular aspect of human activity, from prior knowledge.

The aspects described by us briefly about innovation, knowledge creation of knowledge, production of knowledge and their implications as we see them, for modern economies are graphically designed in Fig. 1.2.

**Figure 1.2.**  
**„CONVERSION” OF KNOWLEDGE IN SKILLS,**  
**COMPETENCES, AND VICEVERSA**



Source: Own development

Therefore, we believe that innovations are necessary components for the future in the so called knowledge-based society specific to modern economies; they integrate both dimensions of the creative process and transform known / new ideas in viable products requested by individuals in order to ensure sustainable growth. No doubt, emphasize once again the essential position of explicit and tacit knowledge in the mechanism described by us in Fig. 1.2 .; the two classes of knowledge become the essential core of every step in social progress and will influence subsequently the technological, financial capital allocation or of other nature at country or organization level. Thus, we consider that particularly quality and volume of explicit and tacit knowledge are the "key" in innovation processes that lead to prosperity in the life of countries and organizations around the world (which means that the technology, capital and other traditional resources have now a subsidiary position between factors that support economic growth). We shall not insist on the mechanism described briefly in Fig. 1.2., but it is fair to point out that they are based on a simple analogy based on the model proposed by Nonaka regarding knowledge conversion

process; in that knowledge conversion model it is discussed the conversion of knowledge between the two classes and simultaneously process of distribution between individuals, groups and organizations. Similarly, in the designed mechanism we discuss about converting a stock of explicit and tacit knowledge given in output in the form of innovations with applicability in technical and social field; but it is obvious that this output obtained at a time by organizations and countries require or even "force" human capital to develop new skills and competencies, so it generates a new output absolutely specific associated. Continuing the analogy invoked, it is obvious that the new output totaling "abilities and skills of human capital" are a type of input that, in the context of competition and acute global crisis, rapidly generate another exceptional output, ie new explicit and tacit knowledge. This conversion process suggested by us is resumed later in the form of a spiral of progress both technologically and socially.

## **2. ABOUT THE ACTUAL GLOBAL CRISIS**

The current global crisis has surprised some analysts and academics, primarily through breadth and depth; her expression was largely predictable since the Great Depression of 1929-1933. For the purposes invoked, explicitly pronounces Paul Krugman, and other economists such as Robert Lucas, Joseph Stiglitz, Nouriel Roubini, etc. [3]. When the lessons of history are ignored by policy makers there is a risk that millions of people pay a significant social price; the manifestation of the current global crisis fully reflects the idea raised earlier. In fact, since mid-2008 and to date, we discuss a number of errors in macroeconomic decisions of major developed countries, from the USA and to the Member States.

The economic crisis has generated an immediate response from governments and the ability institutions to avoid a collapse of the financial and banking systems and to limit the economic impact of the credit crunch. Such policies directly aim at stabilizing the economy and initiating a fast recovery; also, policies should be designed so as to ensure a sustainable recovery and should be based on sustainable economic growth. The global crisis should not damage the economic growth factors in the long term; There are organizations and countries (China, India, Poland, etc.) achieving even some successes in the period

2007 to date; inputs should be used as a springboard to accelerate structural changes towards a strong, fair and "clean" economy. This requires an integration of growth economic factors on long-term in the short-term policy initiated by governments (governments now focus on austerity measures and limit the effects of the crisis) and implementing specific policies for periods of crisis, aimed at strengthening demand in economy.

"Economy of crisis"[7] has become a separate subject of study in academia and theorists suggest ways through which the cyclical phenomenon could be managed / controlled in the future.

In essence, there are a number of medium and long term initiatives which should be taken into account [8]:

- Stimulating innovation by promoting entrepreneurship;
- Investment in "smart" infrastructure;
- Encouragement of research - development;
- "Green" investments;
- Improving workers' skills and competencies;
- Directing economic actors to innovation and investment in innovation.

In the context of the global crisis crossed by countries and organizations in the last five years we are witnessing conflicting measures on knowledge, innovation and human capital; for example, countries such as England and France have reduced the costs of education, while Germany and other countries (Australia, Austria, Canada and Norway) have kept the same allocations for education. What will be the effects of such measures on human capital in the next period? Which are the best policies of companies to human resource in the context of crisis?

### **3. THE EFFECTS INDUCED BY THE GLOBAL CRISIS ON HUMAN CAPITAL AND INNOVATION**

Preceded by a collapse of the speculative actions in the stock market in the summer of 2000, the 2008 real estate crisis in the USA has created a "shock wave" per whole American economy; This wave then propagated very quickly, with effects already known, in most Western countries; bank failures that followed in the United States, from major banks (Lehman Brothers, Fannie Mae and Freddie Mac, Goldman Sachs, Morgan Stanley), continuing with hundreds of financial

institutions of smaller size, all requiring direct/indirect support of states have generated social panic in all countries [3].

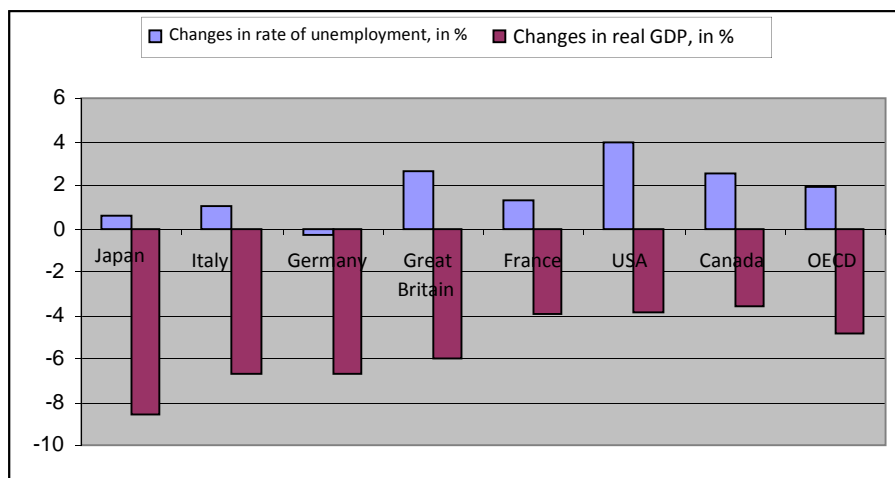
Since the subject of the research is "knowledge and human capital", we will refer only to the effects that the crisis induced on human capital and the innovation.

### 3.1. The impact of the crisis on human capital

Manifestation of the current global crisis fully reflects the considerable social price that millions of people have to pay. At first glance, the crisis-induced layoffs are increasing in many countries (chart no. 3.1.) and experience of previous recessions has shown so many times, that skilled workers are at risk of being unemployed or record a decrease in activity as the number of hours worked (in this respect it is relevant is the example of South Korea).

**Chart 3.1.**

### THE EVOLUTION OF UNEMPLOYMENT IN RELATION TO GDP GROWTH



Source: OECD, Employment Outlook, 2010, [www.oecd.org/els/employment/outlook](http://www.oecd.org/els/employment/outlook); OECD Main Economic Indicators Database.

The first steps that employers have adopted during the crisis in a number of countries have resulted in the reduction of working hours, as an alternative to layoffs. As we see from Fig. 3.3., unemployment



increased slightly in Japan and at all in Germany during the recession, even though GDP fell sharply in both countries.

However, "high-tech" industries (such as IT, aerospace or pharmaceuticals) and knowledge-based services (eg financial services) announces layoffs almost daily, so that it will have a negative effect on human capital in these industry. But perhaps qualified labor redundancies, endowed with skills and high competencies, could make a significant contribution to innovative companies that have experienced a shortage of skilled workers in the recent past and could contribute to a new wave of innovative entrepreneurship.

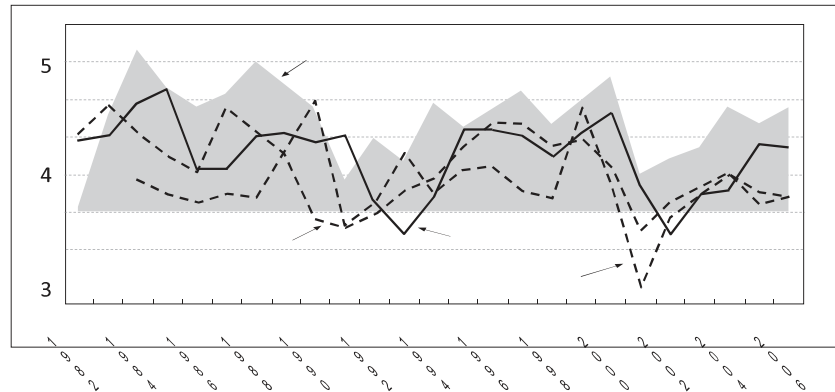
Certainly, education and training are especially important in the current crisis. In times of recession, budget constraints (in government, companies and families) tend to reduce spending on education and professional training; on the other hand, due to rising unemployment, the demand for professional training increases. Therefore, support for education and professional training in times of crisis and beyond, can help redundant workers to find new employment opportunities, which ultimately will lead to support in the process of restructuring.

### *3.2. The impact of global crisis on innovation*

There are a number of clues that illustrate how the crisis has affected innovation processes; from historical point of view, the expenditure on research and development have evolved in parallel with the GDP level, relevant being the drops in the economic downturn of the early 1990s and the early 2000s (Chart 3.2. ). Data regarding trademarks, reflecting the creation of new goods or services, with or without technological content shows that the business cycle affects widespread the innovation processes.



**CHART 3.2.**  
**IMPACT OF BUSINESS CYCLE ON INNOVATION**



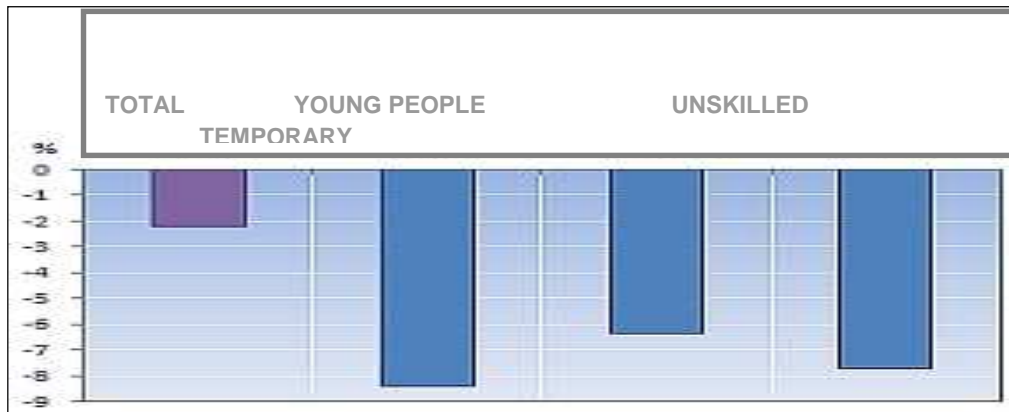
Source: OECD, MSTI and Patent database

Evidence of the actual crisis confirm these findings; reports of multinational corporations for 2008, emphasized a decline or slower growth in spending on research and development; data for 2009, 2010 and 2011 confirm this trend. A recent McKinsey study conducted on a sample of 500 large companies worldwide showed that 34% of them expected to spend less on research and development in 2009, while 21% had foreseen an increase [9].

Therefore, the research and development (R & D) is decreasing because spending on R & D is financed mainly from cash flow and in periods of crisis, in generally the work either stagnates or declines. Meanwhile, the banks, entrepreneurs and investors are more cautious; firms face difficulties in attracting external funding sources to support investment in research and development. Businesses that have as object of activity research and development are focused, on the short term, on the low-risk innovations, while projects initiated on long-term and which are based on risky innovation are no longer a viable policy option in a crisis. As a direct consequence of the decline in business in R & D we notice the decrease of the stock of knowledge of highly qualified research and even the loss of jobs for some innovators; however, statistics show that the most affected by the crisis on the labor market were young people, unskilled people and temporary workers; the overall effects on the labor market can be graphically shown (percentage of unemployed for these categories of persons is 3-4 times higher than the average):

CHART 3.3.

## CHANGES IN EMPLOYMENT



Source: OECD, Employment Outlook, 2010,  
[www.oecd.org/els/employment/outlook](http://www.oecd.org/els/employment/outlook)

Innovative small businesses are the most affected because in many cases the underlying assets are intangible (eg, an idea or a patent) and difficult to assess, making it more difficult the ability to sell or borrow them so that to remain on the market.

On the other hand, the crisis may increase the competitive advantage of R & D intensive firms, thus providing the opportunity to consolidate its leading position in the market by increasing spending on innovation and research and development. Many of today's leading companies such as Microsoft and Nokia were born or converted during economic recession as Schumpeter called "creative destruction"; There are other good examples among high-tech companies such as Samsung Electronics and Google, which strongly increased expenditure on research and development during and after the recession-deflationary period of the boost of the "dot.com" s in 2000 and of the time of 9/11 (terrorist attacks of September 11, 2001).

#### 4. HUMAN CAPITAL: SOCIO-ECONOMIC OPPORTUNITIES GENERATED BY THE GLOBAL CRISIS

##### 4.1. Intensification of investments in human capital

In fact, the current global crisis can be considered, as we will argue later, an opportunity to increase investment in human capital; support for

education and professional training can accelerate a healthy transition to new jobs. Also, a well-qualified/motivated human capital is essential for research and innovation, which requires a broad set of skills and aptitudes, skills that are developed from elementary school and continues through trainings and education of life-long learning type.

Briefly, we will review the main steps that can be taken in a crisis and not only to stimulate human capital [2]:

Investments in educational infrastructure that can support the request; There are many examples of countries that are facing problems regarding school infrastructure (buildings, equipment, IT. etc.) so that upgrading school infrastructure (ICT integration, building green schools) can facilitate the creation of innovative and effective learning environments;

Reform of education and training policies; some countries exploit the opportunity offered by the crisis, so they initiate a series of reforms, including reforms of higher education or of vocational training policy (Spain and Portugal). However, these reforms are needed in many countries, but they must be adapted to new needs / requirements imposed by a post-crisis society. Indeed, the crisis will induce a series of structural changes: the emergence of new sectors, the disappearance of older ones, the establishment of new organizations of work, all these generating the need for new skills and abilities. Therefore, as a direct consequence, the professional training should be encouraged, especially in industries undergoing restructuring, and especially where it is recommended to combine skills and competencies rather than radical changes. As proved by the history of earlier crisis, attitudes and entrepreneurial skills, risk-taking behavior, creativity etc. are and will remain the core competencies of the future economy, skills to be cultivated through education and more creative and specific professional training.

Strengthening public support for students from disadvantaged environments with low income; example of the United States and Russia are relevant in this respect, all aiming to equal access to education.

4.2. Replies pro – human capital (education and training) in global crisis  
As stated above, support for education and professional training can accelerate a healthy transition to new jobs, which is why some countries

have chosen to introduce these measures in the center of the recovery plan from the current global crisis (UK, Germany). Along with investments in child care facilities, schools, universities, policy makers in these countries focused on encouraging companies to maintain their current staff, to recruit new employees and improve their skills. Such actions focus often on measures to support SMEs (Small and medium sized enterprise) and to encourage entrepreneurship.

#### **4.2.1. Education**

Improving conditions in schools in the twenty-first century is a key element in many of the economic recovery plans. Among others, Australia, Austria, Canada, Germany and Norway have proposed to renovate and build new schools and universities (for example, Austria has allocated about 200 million euros, Germany about 8.7 billion euros, Norway about 470 million NOK and Canada about 2 billion Canadian dollars in 2009 and 2010) [8]. Spain began creating new school places for children under three. Australia will spend 14.7 billion Australian dollars on long-term investments to improve infrastructure in primary and secondary schools. New Zealand spends NZD 216.7 million (\$ 123 million) for new schools, renovation of schools and educational infrastructure of ICT. United States has allocated new funding for education: subsidizing school districts (mainly to avoid layoffs), new upgrades and repairs, a technology education program, encouraging childcare, improving higher education (student aid - especially by increasing the number of scholarships in science, new tax cuts and ease of access to colleges for some students - and improvement of the quality of teachers). Korea expanded government support to attract foreign students in order to facilitate the use of digital textbooks of e-learning type in Korean language and to promote green areas, especially "green schools" with energy efficient equipment. Hungary has launched new training programs for teachers with a value of about 70 million euros [10].

Some European countries have seen the crisis as a starting point for the implementation of reform plans in higher education (eg, Spain and Portugal have launched "University Strategy 2015").

In Russia, investments in human capital (particularly education) and stimulation of employment, predominantly college graduates in schools

and universities will become a priority. Government has developed policies to support pupils / students including measures such as: low interest rate for loans made by students, awarding scholarships by state, freezing tuition fees and, in some cases, accommodation offers without payment.

#### *4.2.2. Professional training and employment*

The European Union has proposed a program to support employment by strengthening training systems of people with low qualifications, counseling, training and retraining of skilled labor high apprenticeships - and granting of subsidies for employment and business “start-up” type.

Also, the European Union aims to create a demand on the labor market by reducing taxes for low-income persons for example by setting up controls in disadvantaged families with children in care, or through temporary subsidies for employment for a number of groups included in "vulnerable" category.

In the UK, employment through the technical support for professional training has become a key component of financial recovery policy. Through the "New Opportunities White Paper" [11] program the UK wants childcare assistance, investment in schools and bonuses awarded to teachers, creation of new places in apprenticeship schools, financial incentives for companies that hire unemployed for more than six months, other financial schemes to facilitate education and training. They also proposed tax cuts, capital expenditure amounting to 3 billion pounds and a reduction in value added.

Germany has allocated 2 billion euros in 2009 and 2010 for training (especially for those working part-time or are part of the groups “vulnerable”), and in improving the skills and competencies of human resources in the Employment Agencies [8].

Netherlands has invested nearly one billion euros for solving problems related to reintegrating human resources, reducing the number of hours worked and reducing youth unemployment.

The Austrian Government has been involved in supporting companies by creating new jobs, allocating for this purpose the amount of 80 million euros (2009 and 2010) and the financial support of actions to improve human resources worth 7 million euros [8].

Estonia focuses on measures to support training through vocational education institutions.

Canada launched its own strategy as "Canada Skills and Transition Strategy" which includes an increase in the amounts allocated to training (1.9 million Canadian dollars for 2009 and 2010), especially for people (young or old) with low qualification level.

Also, Russia has planned major initiatives to retrain human resources. The Australian Government has provided the sum of 187 million Australian dollars to create 56,000 new training places in 2008-2009.

Japan has established a fund of 3.9 billion dollars to create new jobs. This fund can be used in areas such as health or catering services for the elderly.

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