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High End Labour: The Foundation of 21st Century Industrial Strategy

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Introduction

This paper presents the basics of a strategy for re-industrialization and economic rebalancing that starts from the highest available technology at the world level. The strategy rests on four principles:

- (1) the country needs to acquire and develop its own advanced technological capacity and not have to rely importing it;
- (2) the country needs a system of national innovation to employ this advanced technology to reindustrialise. Advanced sectors will then find a market for their products, and the technical basis will be laid for re-industrialization using advanced methods.
- (3) the country should seek to become a supplier of high-end products and high-end content, capable of competing in world-class markets;
- (4) the supply of finance, including state finance where necessary, must be managed so that innovation and industry develop in a balanced way, to reduce uncertainty caused by unnecessary dependencies on world markets, and to allow enterprises to make the long-term plans demanded by changes in fundamental technology.

These principles are widely accepted in the Business Literature; they have been highly successful in China, the 'Four Tigers', and the 'Scandinavian Model', and are discreetly applied in America and Europe to a greater degree than is generally accepted. They were the founding principles of Japanese industrialisation, and that country's economic malaise dates from the point when, seeing financial liberalization as the cure for a non-existing disease, the country moved away from them. They are unpalatable to liberal economic orthodoxy, but in practice, they are widely recognised. They should therefore be relatively uncontroversial.

However to implement such a strategy, a prior question has to be answered, namely 'what is in fact the most advanced technology of the age?' It would obviously be idiotic to build a modern factory driven by steam, because this out-of-date technology would be wasteful, cost-ineffective and uncompetitive. But the principle of using up-to-date technology at least for industrial infrastructure is completely general. A modern rail system demands a High-speed Rail spine, a modern power system requires Smart Grid and a mix of generation methods, and the replacement for steam-based production systems is neither coal or electricity, but completely new systems that have developed in recent decades using robotics, flexible manufacturing, distributed component production, grid decoupling, and so on. Therefore, in order to form a viable strategy, it is important to evaluate which key emerging technologies we can expect to underpin industrial strategy and render it coherent.

What is tomorrow's advanced technology?

For nearly ten years, I have worked with researchers in Australia, the United Kingdom, North America, China and many parts of Europe, to study high-end production, the emerging market for high-end goods, and the way they are transforming industry. The statistical evidence is very strong:

the key feature of these new technologies is their dependence on high-end labour: scientific, technical, creative and advanced management labour.

Industries based on high-end labour are emerging everywhere in a new and characteristic relation to modern productive techniques which allow them to operate on a mass scale. At the heart of these techniques is a revolution in the productivity of services – relations between humans. With Information and Communication Technology (ICT) at their core, such new techniques are coming to the fore not just in the specialised areas for which they are well-known, but are increasingly transforming all branches of production and consumption.

In this sense they are a characteristic technology of the age; they are to the 21st Century what steam was to the Victorian age, Electricity and Steel to the early 20th Century, and oil and motor transport to the postwar era.

Their growth has reached a tipping-point; the mass market for the consumer products of high-end labour is as significant as the market for cotton goods which drove the industrial revolution, for travel and haulage which drove the second industrial revolution, or for motor transport and household gadgets which drove the expansion of working-class consumption throughout most of the twentieth century.

However it is also transforming the structure of production, through such developments as robotics, flexible production, the revolution in urban structures and places, smart grids and energy diversification, biosciences, and much more. It has thus unleashed a primary transformative technology, which is still in its early stages of development, but can no more be ignored than steam power or the motor car. This is what makes possible an integrated industrial strategy which, at one and the same time, aims to compete at world level for a new mass consumer market in creative goods, and reindustrialise on a new and higher technological basis.

Let us consider only one of many indicators of this transformation. Today, according to the United Nations telecommunications agency, there are 6.98 billion active cellphone connections in the world, very slightly less than its population. The first commercial cellphone appeared in 1983 – just over twenty years ago. The cellphone itself is just one manifestation of the much wider phenomenon of the web, which is in turn only the culmination of a revolution in service productivity which began with the telephone, worked its way through film, broadcasting, the computer, communications networks and digitization to produce a world as different from even the late Twentieth Century as the age of the motor car was from the Victorian Age.

To understand how this changes the structure of production – and lays the basis for a strategy for re-industrialisation – we must first ask what is happening to consumption.

Samsung is today the world leader because Korea asked this question. Korea realised that it was insufficient to have an electronics , or produce good phones; instead, it had to grasp what consumers were using the cellphones for – in a way, just as Henry Ford transformed car production by understanding what travel was about. Samsung outsells Apple, according to IDC (<http://www.idc.com/prodserv/smartphone-os-market-share.jsp>) by a factor of four to one.

The Korean strategy focussed on the content which the users of the Android phone would use – applications, games, music, data – the list is huge, and growing. They ensured that the supply of these consumer products – which is what they are - would be great enough to persuade users to purchase their phones, in order to get hands on this content.

That is what sold the phone. The strategy is a universal one. Today's mass markets are in the sphere of designed products, that is to say, products which allow the consumer to exercise choice. The fastest initial growth was in cultural products like music, films, print, and artistic products – but now it is extending to every product in which design is involved, from skyscrapers to cars, from clothing to furniture.

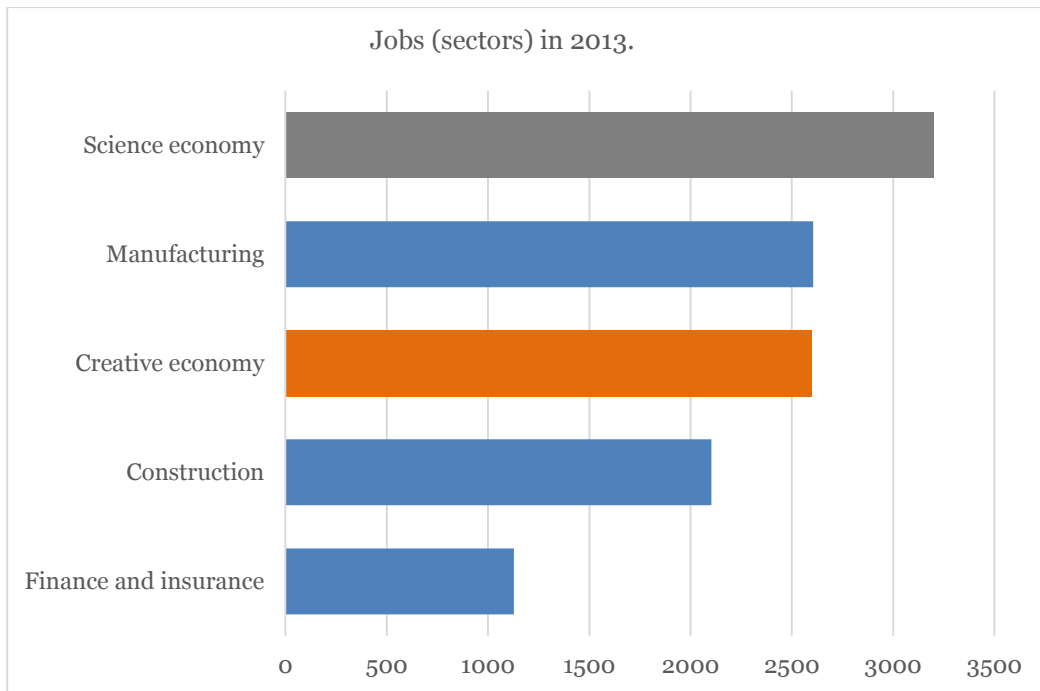
The key to a successful re-industrialization of even basic industry is to make use of the new productive capabilities that design-based industries have brought into being. The key resource these industries use is high-end labour.

To this end a rational industrial strategy must maximise the production and use of that resource. It must provide for the complementary technologies that this labour requires, deploy it in a transformational manner to re-industrialise, and use it to obtain a world-class position in the markets of the emerging multi-polar world.

High-end labour: the evidence

Where is the proof to be found? In the field of creativity, there is much inventive use of statistics. My sources however are official. They were produced by research teams in three countries who worked for eight years. They have been adopted as the basis for the official statistics of the UK Department of Culture, Media and Sport (DCMS), which are respected worldwide. The Ministry overhauled them in 2014; I was part of their research team, though of course I am not solely responsible for the results and, moreover, the conclusions I draw from them are mine alone. Nevertheless, the results have undergone intensive scrutiny and, I would say, they are the best that exist.

Figure 1: UK Industrial sectors in 2013

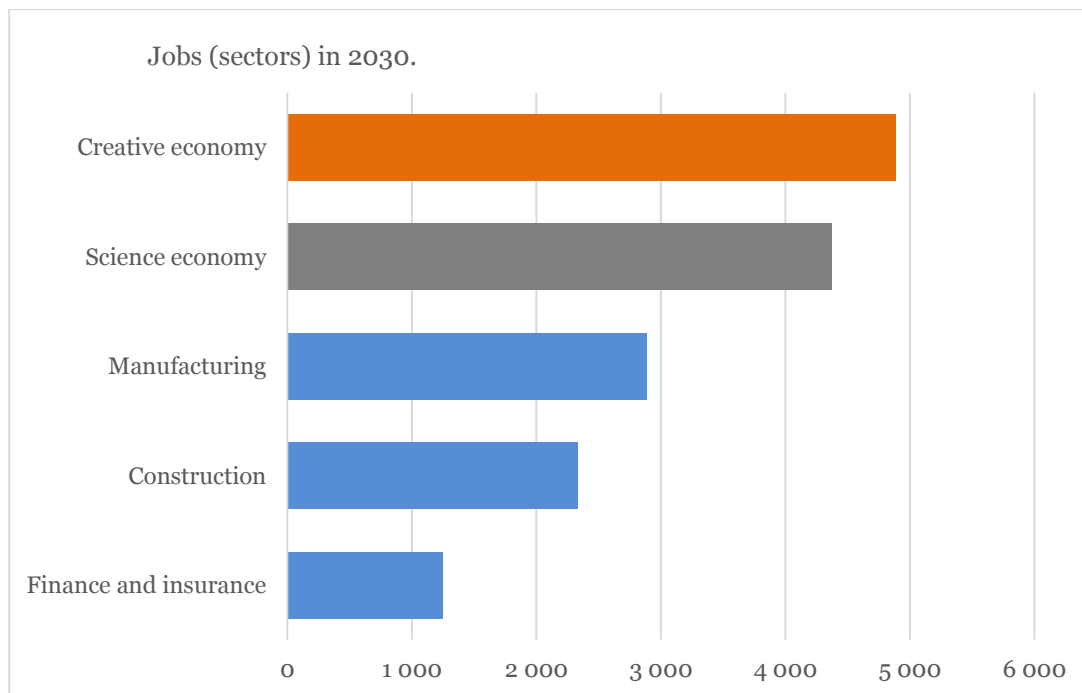


Sources: authors calculations, plus DCMS January 2015 statistical estimates (<https://www.gov.uk/government/statistics/creative-industries-economic-estimates-january-2015>), and Bakhshi, Freeman and Higgs (2014) ‘The geography of the UK’s high-tech and creative economies’ (<http://www.nesta.org.uk/publications/geography-uks-creative-and-high-tech-economies>).

I focus on the two major sectors defined by Bakhshi et al (2014), being the High-tech Economy and the Creative Economy. Figure 1 shows the relative size of these in the UK in 2013 compared with traditional sectors such as manufacture and finance. It can be seen that already, although there is some overlap, high-tech is the largest economically-meaningful sector in the UK, and that the Creative Economy, accounting for nearly 1,700,000 jobs – is almost as big as manufacturing.

This is not all. The growth rate of these sectors greatly exceeds that of the remainder of the economy, so that as figure 2 shows, at current rates of growth by 2030 they will employ more people between them than manufacture, finance and construction put together. Moreover by this time the creative economy will be bigger than the science-based, high-tech economy.

Figure 2: projected industrial sectors in UK in 2030 at current growth rates



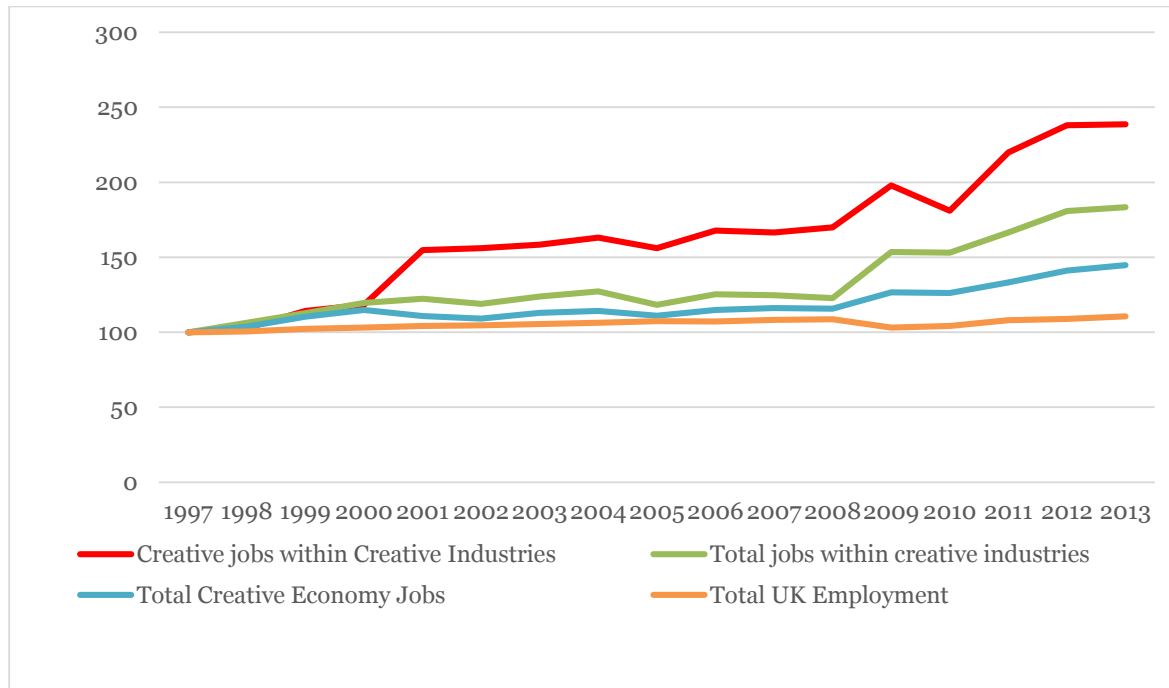
Sources: as for figure 1

Figure 3 shows where this growth is coming from. The data cover 16 years, which means this trend is not a cyclic flash in the pan. The bottom line shows job growth in the UK Economy as a whole. UK Jobs grew by 10.6 per cent in 16 years, which is below demographic growth. The next line shows the creative economy as a whole.

The creative economy has two components. The first comprises nine creative industries. They produce what are sometimes called high-end products, but do not include what's sometimes thought of as high-end, namely 'scientific' products like pharmaceuticals or aerospace.

The most important characteristic of these industries is that they make products with aesthetic content. At the consumer end these are the visual and performing arts together with heritage and exhibition; the digital industries including cutting-edge products such as gaming; and the communication industries – film, video, recording, broadcasting, and publishing. They are powered by Business-to-Business industries: architecture, fashion, advertising and software production. A growing number of industries cross boundaries and cater for both consumer and business clients, notably web design and video production. Interestingly both robotics and bio-science also cross these boundaries.

Figure 3: Creative employment in the UK, indexed to 1997=100



To define the creative economy – in its widest sense – researchers add a further component called ‘embedded’ creative labour. This consists of creative work conducted outside the creative industries. This, for example, includes car designers but excludes mechanics. Embedded labour shows where creative labour is demanded, but has yet to give rise to specific industries based upon it. The entire trend of the modern economy consists of building such industries out of what were previously thought of as mass production. The car and furniture industries are classic examples. Once, Henry Ford said ‘you can have it any colour you like, as long as it’s black’. The modern car manufacturer says ‘you can have any colour you like, as long as you buy our car.’

The DCMS definition of the creative economy excludes the car and furniture industries in their entirety, including only the creative workers inside them. That’s because, in these industries, function still dominates over design. Cars or furniture have growing aesthetic content but are defined by what they do rather than how they look – you can sit in them, they take you from A to B, and so on. Correspondingly, mechanical operatives predominate over designers in their production. At the end of the day, the modern car is made by process engineers, mechanics and operatives, not by designers. In contrast, films are produced by directors, producers, actors, make-up artists and all the people listed on the screen in the credits while the audience walks out of the cinema. The camera people, vital though they are, come last; this is because they do not define the product.

This definition is narrow, to avoid exaggeration. Yet, even on this narrow definition, the creative economy grew by 44 per cent in sixteen years, around 2.5 per cent a year. It actually it went up in 2008 when most other things were falling.

The next number to note, in the data displayed in figure 3, is employment in the creative industries themselves. These grew by 83 per cent – nearly four per cent a year. That’s big. It’s approaching growth levels the UK economy hasn’t seen since the fifties and sixties.

Finally, the top line shows creative labour in the creative industries. This has grown by 138 per cent, which is approaching six percent per year. This is gold rush territory. Thus, it is the growth in this specific type of labour itself which is making this new, spectacular growth possible.

Creative labour and scientific labour

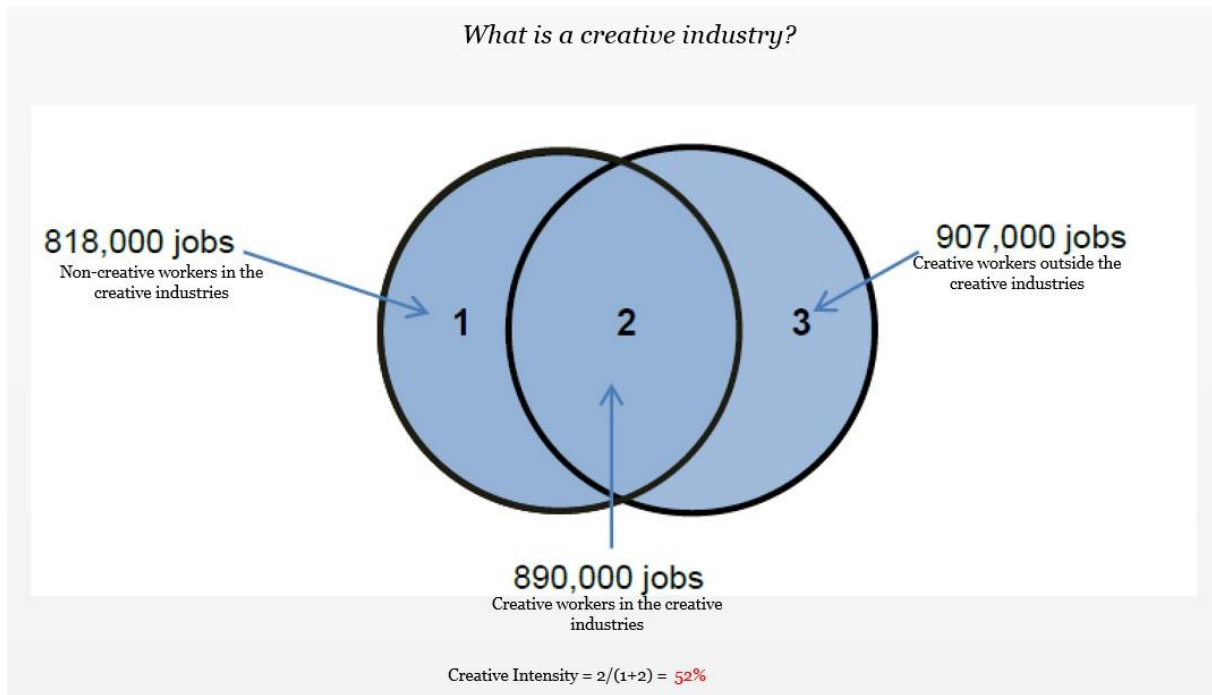
Does this assist us understand how to develop, and make use of, the wider intellectual capacities which we find in other areas where high-end labour is applied, notably scientific labour? What is the relation between the creative economy and the scientific and technical economy? If we grasp this point, it will allow us to understand why high-end labour is so special and unique, and why it is important to invest in it

Two relations are key. The first is the emergence of content as the decisive factor in whether any sector can attain world leadership, which we have already discussed.

The second is the characteristics of the labour involved. The special feature of creative labour – which it shares with scientific labour – is that humans are needed to do it. It is that part of the labour force which cannot be mechanised or replaced by a machine. I call this non-substitutable or high-end labour. It is the driver of the new technology of the age. It is the key factor which the new growth industries have in common, and the key to a successful industrial strategy. It is precisely because this labour cannot be replaced by machinery, that it cannot be imported or made out of steel and concrete; it is a national resource, which has to be consciously developed and supported, and made the cornerstone of industrial strategy.

As figure 4 shows, more than half of the UK’s creative workers work in the creative industries. This is the fastest-growing component of the creative economy, growing at nearly six per cent per year.

Figure 4: components of the creative economy



Source: DCMS, op. cit., author calculations

US researchers call this 'smart' labour. Russia is well-endowed with it. In the IT sectors that I work in, Russian experts are to be found the world over and are among the best. Russian society has a high cultural and technical level, a product of its long history and continental scale which has brought it in contact with many civilizations. It is known and respected for it; it has a world brand.

My argument is that Russia's strategy for re-industrialisation should be organised around developing this workforce, and its historic world brand as a cultural and scientific anchor of world civilization. Russia should develop this in tandem with the specific technologies that its creative and scientific workforce needs in order to deliver its full potential. ICT is at the forefront, but so is modern transport and modern cities. Russia should deploy the combined results on two fronts:

- (1) It should develop and deploy modern science-based technologies in a new wave of industrialisation to replace its existing outdated infrastructure
- (2) It should develop world leadership in selected key areas in which creative content dominates consumer choice, where necessary in partnership with appropriate other countries.

Core and carrier technologies

Old thinking finds it hard to understand the new technology because its main resource is a type of labour – not a new machine or a new material. Yet, as the statistics show, the employment of high-end labour is growing four times faster than that in traditional industries and is transforming existing industries – which is why reindustrialization has to be based upon it.

Misconceptions of the machinocratic age

In discussing how to understand this new age we are entering, the most important requirement for thinking people is an open mind. When manufacturing first arrived, the dominant philosophy in Europe was the Physiocratic outlook, which argued that all value came from the land, taking the form of food. For the Physiocrats, the towns added nothing additional of worth, but merely worked up the produce of nature into a more pleasant form. Today, in the advanced countries, less than 5% of the workforce is employed on the land.

Radhika Desai and I have coined the term ‘Machinocracy’ to describe the modern form of this illusion, which supposes that all value is created by machines, and takes the form of things. Yet today, in the industrialised countries, 80% of the workforce is engaged in producing services. Machinocratic thinking is thus far out of touch with economic reality.

However, in trying to escape from outmoded ways of thinking, it is quite easy to make trivial or exotic generalizations which can sound very attractive, but are not a proper basis for sound strategies that are based on real evidence. We should therefore discard two of the most common illusions, paying especial attention to the evidence, in order to see what is really happening.

First of all, we are not entering the ‘Age of the robots’. Actually, human labour is even more decisive than ever, because as labour becomes automated, what remains is precisely non-substitutable labour. Robotisation does not eliminate human labour; instead, it separates it out into those parts that can be mechanised and those parts that cannot. Non-mechanisable labour therefore becomes more predominant as a proportion of the labour force, not less so. This process has already reached a surprisingly advanced stage, but dominant economic thinking still supposes that machinery is an indefinitely substitutable resource for human labour.

Conversely, the result is not a ‘post-industrial’ stage, as people used to imagine in the 1980s, when machines produce all our needs and humans concentrate on those activities that do not involve machines. Actually, creative labour cannot function without machinery – especially Electronics, ICT, digitalization, cities, and transport. This is the technology that supports massively enhanced service delivery. The idea that modern creative labour can function without any kind of machinery is

economically delusional. Just take away a modern artist's cellphone, internet, urban living facilities, exhibition space and access to prospective buyers, and see what happens.

What is emerging is a new relation between humans, machines and urbanity, which requires a new type of human, a new type of machine, a new kind of urban space and a new relation between the urban and the rural.

The humans that this new configuration calls for are in a sense, truly human, because they can realise the creative talent and capacity for aesthetic appreciation that is latent in everyone. The material substrate is one that appreciates humans instead of treating them as an extension of itself, as did the assembly line and the factory. Therefore, the new economic age we face contains great potential for human emancipation. However the old ways of thinking bear down on us. The dead generations weigh like a nightmare on the brains of the living. It is time to wake up.

«Wake up, my beauty, time belies: You dormant eyes, I beg you, broaden...»

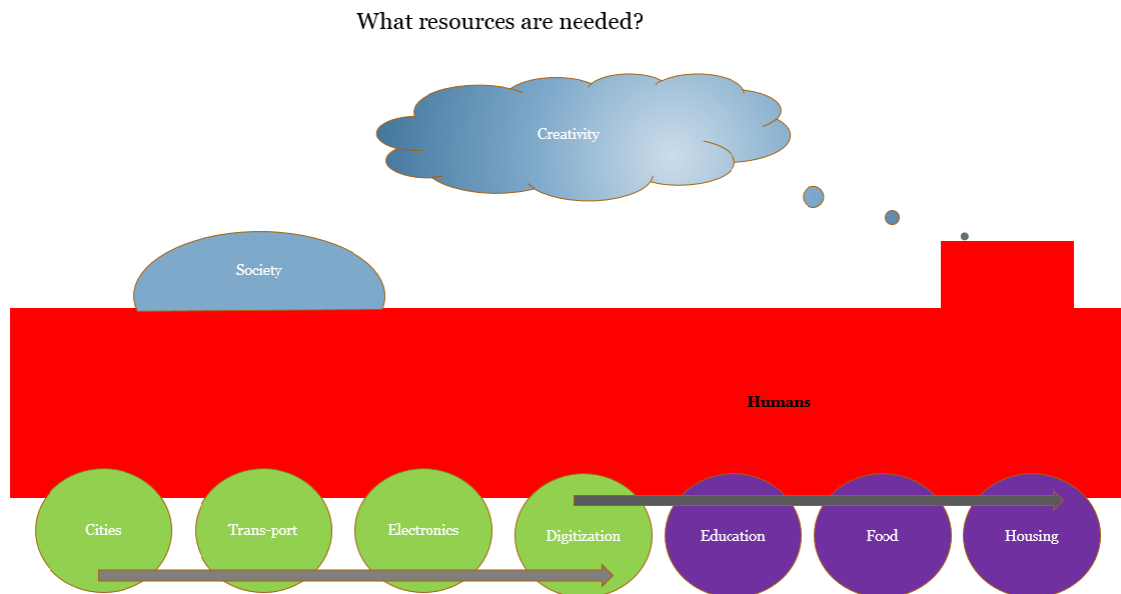
What kind of resources do we need? Pushkin in his «Winter morning» provides a clue: we have to wake up, and look at what brings us joy. Creativity, the wellspring of humanity, is the primary economic resource to develop. The nations who concentrate on things – oil, minerals, gold, or agricultural commodities – are the ones who get left behind. They deserve it.

Creative human labour however poses a unique challenge, because traditional investors are not used to curating and nurturing human resources. However, it poses a unique opportunity, because Russia is already rich in these resources. The problem is to harness them. What is required is

- (1) To develop these human resources through widespread investment in education, training and research
- (2) To develop the complementary technologies they need: ICT, creative cities, transport networks, and so on.
- (3) To develop a national system of innovation which ensures their outputs are systematically applied, in particular to re-industrialization

If any of these factors is missing, the resource will not function, just as one cannot develop a competitive agriculture on even the most fertile soil without farm machinery, fertilisers, and scientific methods of husbandry and crop development. I think this is the main reason that ventures such as Skolkovo have not borne fruit; they were not part of a rational overall strategy for the country.

Figure 6: an industrial strategy for harnessing high-end labour



How do we harness this resource? I am a very bad artist, so I have made an image and I invite artists to make it better. The engine of figure 6 makes creativity. It runs on two sets of wheels. The front wheels are human. The back wheels are material. At the top is society, which gives direction, and the wheels are connected by pistons which allow society to take control of its journey. The analogy may be a bad one because, however we no longer run on rails; instead we have a vast new sea to sail on.

There are many challenges. We don't know how to 'produce' creative individuals; rather, we must ensure they can create themselves. Thus, human development has to be the top productive priority. We have to invest in education, artistic self-realisation, self-development.

But humans cannot exist without their material requirements. They need housing and nourishment. If we do not provide this, their creativity will not flourish.

But mere food and housing are not enough because what is required is to give creativity full reign. That is why the whole infrastructure of modern creativity is also required, from inspiring creative places to fully functional connectivity that will allow the creative people to form the networks that are their natural mode of production.

In short, if the back wheels are not there, the engine won't run. But if the front ones are missing, it will fall flat the minute it tries to advance.

One last word on where we are going. It is an example of how, to understand this new world, you have to turn conventional thinking upside down. A lot of literature is consumed with 'robots taking over'. This has suddenly preoccupied British writers, but it's been around since the 'Golem' and Karel Capek's coining of the word 'robot' itself.

This fear comes from three centuries of making humans behave like machines. Factory-based capitalist machine production reduced humans to imitations of machines, depriving them of any autonomy, just following instructions. The fear of robots that behave like humans, properly understood, is nothing more than a fear that humans will become machines.

The new age needs humans no longer enslaved by machines. It needs machinery that serves human development. The problem is not to stop robots from becoming people; it is to stop making humans into machines. That's what a modern industrial strategy is all about.

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