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Smart Specialization: theory and brief case studies

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The 'Smart specialization' (SS) project of the European Union is both an innovative project and an ongoing experiment on industrial and innovation policy, probably the biggest such experiment globally. This approach makes it possible to rediscover mechanisms that have been extremely successful creating wealth in the past, and may contribute importantly to the eradication of poverty also in the future. An important aspect of this project is that it emphasizes the importance of solving the problems of relative poverty and backwardness by interfering in the productive sector of the relatively poor areas, not by transfer of purchasing power from other and richer geographical areas. Rather than alleviating the symptoms of poverty through transfers (focusing on the poor as *consumers*), the Smart Specialization approach attacks the causes of poverty in the realm of production (focusing on the poor as producers). This reflects the original intention from Maastricht that the European Union should avoid becoming a 'transfer union'. In the end, in the opinion of this author, a better understanding of smart and less smart specialization would also bring us closer to comprehend the uneven financial flows within the European Union, often originating in the productive sector.

Recognizing the importance of this project, not only inside the EU but also globally, this paper focuses on two issues. First a theoretical view, comparing the concept to other similar ideas over time – once extremely influential but now largely forgotten – and secondly with some brief case studies. The case studies come from two different countries and focus on two kinds of SS: the first set of three brief case studies focuses on how to increase income in the relatively poorest regions in a rich country (Norway), the second set of brief case studies focuses on using SS in order to raise the general wealth level of a country whose real wages were higher at the time of the Fall of the Berlin Wall in 1989 than now (Ukraine)².

How economic activities differ

At the core of SS seems to lie a conviction that – for the purpose of creating human wealth – economic activities differ, either *statically* or *dynamically*, either *alone* or *together* (as in *clusters*, *growth poles*, or *development blocks*). The SS approach contrasts with that of David Ricardo (1817) and his idea of comparative advantage. Ricardo, whose theory dominates the present world economic order, models international trade as barter of *qualitatively identical* labour hours.

¹ The subject has already attracted academic interest, the most important work probably being Radosevic, Slavo et al. (eds), *Advances in the Theory and Practice of Smart Specialization*, London, Elsevier, 2017.

² See Appendix I for data on this.

Economic activities differ on several dimensions. US 19th century economists employed a metaphor from the Old Testament and visualized the economic world as a *hierarchy of skills*. Some of Israel's tribes were cursed and had to work as 'hewers of wood and drawers of water for the house of my God.' (Joshua 9: 23). In a static world, specializing in cutting wood and carrying water for the rest of the world was an *unsmart specialization* according to these economists.

In a dynamic world with technical change, the perceived direction of technological change would determine SS. Employing a term coined by Carlota Perez, at any point in time different economic activities provide different *windows of opportunity* for technological change. To use a prosaic example, towards the end of the Stone Age, SS would mean investing in Bronze Age technology rather than sticking to a comparative advantage in Stone Age technology. Appendix II, using a 1942 graph produced by the US National Bureau of Economic Research, visualizes the wide divergence of windows of opportunities in US manufacturing from 1899 to 1939, in terms of change in *demand*, change in *labour productivity*, and the resulting differences in employment. During this period, the degree of SS would go from *very smart* to the left (car production) to *unsmart* to the right (carriages and sleighs).

The further we go back in history, the less cluttered the world and the clearer the mechanisms. Therefore two examples here. The so-called First Industrial Revolution only happened in the cotton spinning industry; if your country did not spin cotton you would not have had any industrial revolution at all. Any specialization not related to the cotton spinning cluster would be unsmart specialization. I have referred to this as the activity-specific element of economic growth (Reinert 2007). Appendix II also conveys an idea of this *activity-specific* element in economic growth, the economic activities furthest to the left in the diagram contain much more residual than the activities to the right.

A second historical example enlarges the idea of 'growth poles' (Perroux 1956) and 'development blocks' (Dahmén 1961). Henry VII who ascended the British throne in 1485, had spent his formative years in Bretagne where he observed the wealth not only of the people spinning cloth made from English wool, but also the wealth of the bakers and artisans within the same community – within the same labour market – as the cloth producers. It became clear to Henry that – contrary to the production of wool – the production of woolen cloth was a smart specialization. The industrial policy toolbox created by Henry VII was a pioneering effort, where the main tools were tax exemptions for new producers of woolen cloth, bounties paid to the same producers, and – above all – an export

tax on raw wool that would make raw material more expensive to foreign producers of woolen textile than to England's clothiers. Under Elizabeth I (ruling 1588-1603) the English woolen industry had established sufficient capacity to turn all English raw wool into woolen cloth, and Elizabeth prohibited the export of raw wool under penalty of death. There is little doubt among historians that the smart specialization plan of the Tudor Rulers – 1485-1603 – laid the foundation for England's long-lasting world hegemony.

Another key mechanism in the creation of smart specialization becomes evident when one looks at the mechanism of increasing and diminishing returns. In other words, if – after specialization – the production costs decrease (increasing returns) or, after a point, increase (diminishing returns). In the first edition of his *Principles of Economics* (1890) the founder of neo-classical economics – Alfred Marshall – in the spirit of smart specialization recommends *taxing* economic activities subject to Diminishing Returns and *give bounties* to activities subject to Increasing Returns.³ This had already been the principle of the Tudor Strategy.

When introducing increasing and diminishing returns in his economic textbook Alfred Marshall interestingly brings up another link between smart specialization and the Old Testament. If a country or a region specializes in activities where one factor of production is limited by Nature - i.e. agriculture, mining, or fisheries - diminishing returns will sooner or later set in. The biblical example used by Marshall comes from herding animals when the human population outgrows the resources of the land: 'And the land was not able to bear them, that they may dwell together...' (Genesis 13: 6). In the biblical case Abraham and Lot solved this problem of carrying capacity of the land by Lot taking his huge herds Eastward into the plains of Jordan and Abraham taking his herds to the land of Canaan. Alfred Marshall pointed out in 1890 Diminishing Returns (capitalized as here) is 'the cause of most migrations of which history tells.'^{*} The deindustrialization of many countries in Latin America starting in the 1970s, and - later in the Middle East due to War – emphasizes Marshall's point with a new twist: the elimination of increasing returns activities, leaving countries void of increasing returns activities, is the cause of most modern migrations.

Early theorizing about development economics – with Giovanni Botero (1589) and Antonio Serra (1613) – the progress and wealth of some cities only (and not the countryside) was based on ideas about smart specialization and its opposites.

³ Marshall, Alfred, *Principles of Economics*, London, Macmillan, 1890, p. 452.

⁴ *Ibid*, p. 201.

Giovanni Botero introduces the idea that increasing wealth is linked to Mankind's ingenuity in adding value to the products of Nature. It is not an exaggeration to say that the large number of editions of Botero's *On the Greatnesse of Cities* – part of his *Reason of State* dominated European economic discourse during the 1600s.⁵

...some will aske me; whether Fertilitie of Land, or Industrie of Man, importeth more to make a place Great, or populous? Industrie, assuredly. First because Manufactures framed by the skilfull hand of Man, are more in number, and price, than things produced by Nature: For Nature giveth matter, and subject: but the Curiositie and Art of Man addeth unspeakable varietie of formes. Wool, from Nature, is a rude and simple Commoditie: What fair things, how various, and infinite, doth Art make out of it? Compare the Marbles, with the Statues, Colossuses, Columns, Borders, and infinite other Labours, taken. Compare the Timber, with the Galleys, Galleons, Vessels of many sorts, both of Warre, Burthen, and Pleasure: Compare also the Timber, with the Statues, the Furnitures for Building, and other things innumerable, which are built with the Plane, Chesill, and Turners-Wheele. Compare the Colours with the Pictures . . . [etc.]. (Botero 1635, 88-89)

During the centuries following, the ideas about international trade tended to focus on the idea of *emulating* – copying with the intention of improving upon – the economic structures of rich countries.⁶ At the time when The Dutch Republic was the wealthiest country in Europe – up to about 1750 – Smart Specialization was an attempt to create an economic structure similar to that of the Dutch.⁷

During the Enlightenment ordering and classifying the surrounding world was – in the spirit of Linnaeus – an important activity. In 1721 English economist Gregory King in his very influential work[®] made a classification of international trade in the same spirit as that of Smart Specialization. Importing manufactured goods and exporting raw material was 'bad trade' for a country, while importing raw materials and exporting manufactured good

⁵ Reinert, Erik S. et al., '80 Economic Bestsellers before 1850: A Fresh Look at the History of Economic Thought', *The Other Canon Foundation and Tallinn University of Technology Working Papers in Technology Governance and Economic Dynamics*, No. 74, 2017.

⁶ For a discussion of this see Hont, Istvan, *Jealousy of Trade: International Competition and the Nation-State in Historical Perspective*, Cambridge MA, Harvard University Press, 2005, Reinert, Sophus, *Translating Empire: Emulation and the Origins of Political Economy*, Cambridge MA, Harvard University Press, 2011.

⁷ The pre-1750 literature in Reinert et al. (2017, above) makes this abundantly clear.

⁸ King, Charles, *The British Merchant; or, Commerce Preserv'd*, London, John Darby, 1721 (3 vols.). There were translations into Dutch, French, and German.

was 'good trade'. Interestingly exchanging manufactures for other manufactures was considered 'good trade' for a nation. The principle expressed by King was based on the same observations as those of Giovanni Botero (1589) and Antonio Serra (1613). 250 year later UNCTAD's idea of *symmetrical trade* as being good for all trading partners recalls King's ideas.

Classical development economics – starting in the 1940s – stuck to this idea under the term *industrialization*. There was disagreement about the mode and speed of industrialization, whether balanced growth or big push. But everyone at the time agreed that industrialization was needed. In the 1970s the same subject was continued with UNCTAD under the term 'value added'. In a sense both were forerunners of Smart Specialization. The last time this was expressly seen in EU policy was with the integration of Spain into the European Common Market in the 1980s, when tariffs were lowered gradually over a period of many years in order to insure the survival of Spanish industry. The theories of the 1988 *Cecchini Report* – which was to lay the foundations for the Single Market – were still rooted in the Marshall Plan industrial logic. The main benefits from the Single Market – up to 85 per cent – were seen as coming from increasing returns manufacturing production. With hindsight the 1989 Fall of the Berlin Wall carried with it a worldwide ideological watershed.

In an attempt to understand economic growth, two US economists – MITs Robert Solow (1956) and Stanford's Moses Abramowitz (1957) – looked at the combined contribution of the two main factors of production, capital and labour, to economic growth in the US economy. They found that additional capital and labour would explain only about 15 per cent of the annual growth of the US economy. The biggest factor in economic growth was what came to be called *the residual*, the 85 per cent that could not be explained by the traditional economic factors.

At the time Abramowitz called this residual an 'index of ignorance', and – although attempts have been made – the question of the 85 per cent residual is far from solved. The residual is one theoretical angle from which to approach the issue of SS. In this paper I shall argue that economic activities are different in the sense that some economic activities contain more 'residual' than others, and that one key aspect of 'smart specialization is producing in the economic activities that contain the most *residual*. In other words, economic growth is industry specific, and one form of SS is to be in the economic activities with most residual, in the activities where technological progress is found at any point in time. In a 1996 letter to this author Abramowitz writes: 'I agree in particular that the "residual" and growth in general are industry-specific. That has seemed clear to me since I was a graduate student in the Thirties and read the (Simon)

Kuznets and (Arthur F.) Burns books...' Appendix II shows how economic activities differ in terms of increase in output, increase in number of workers, and increase in productivity (the latter measured in terms of decreasing worker output per unit of production). The further to the left, the 'smarter' the specialization in this particular industry would be.

Closing this part of the theory section, one important aspect which has not yet been raised is that the productivity-specific 'residual' may spread in the economy in two different ways: either only as lower prices (as economic theory would tend to assume under perfect competition), or, alternatively, important parts of the *residual* would spread as higher wages and higher profits in the producing region. I have referred to the spread under perfect competition as the *classical* spread of productivity improvements, and when labour and capital – due to imperfect competition – are able to appropriate large parts of the gains as the *collusive* spread the of productivity increases.[®]

Briefly, in agriculture the productivity increases resulting from employing tractors instead of horses would spread *collusively* in Ford's tractor factory (where it was *a product innovation*), whereas in the farmers' fields (where the tractor was *a process innovation*) it would mainly cause lower prices for agricultural commodities. This is of course the reason why the most efficient farmers in the world – in the US and the EU – still need subsidies and tariff protection: they live under the scourge of perfect competition.

In Appendix II we can assume that industry No. 4 – beet sugar – would not experience the type of wage increases that e.g. the automotive industry would. Beet sugar is a commodity, and productivity increases tend to spread as lower prices to the consumer rather than as higher income to the producers. Appendix III – The Quality Index of Economic Activities – looks at broader criteria than does Appendix II.

Appendix IV shows how the different qualities of different economic activities translate into large differences in real wages across 255 European regions. In the final analysis, an increase in real wages must be a main criterion for Smart Specialization.

The historically last, and extremely important, large-scale expression of what we could call *the cult of manufacturing* that has been the core of European Smart Specialization policy since the 1500s, was the Marshall

⁹ For a discussion, see Reinert, Erik S., 'Catching-up from way behind - A Third World perspective on First World history' in Fagerberg, Jan, Bart Verspagen and Nick von Tunzelmann (eds.) *The Dynamics of Technology, Trade, and Growth*, Aldershot, Edward Elgar, 1994, pp. 168-197 and Appendix V to this paper.

Plan which was launched in June 1947. The subjugated Germany after World War II was, according to the 1943 Morgenthau Plan, to be punished by deindustrializion and made into an agricultural and pastoral nation. The Morgenthau Plan was abruptly stopped with George Marshall's 1947 announcement of what came to be called the Marshall Plan. A key element that led to the establishment of the Marshall Plan was the discovery that an agricultural nation could not feed as many people as an industrialized one. Ex-President Herbert Hoover of the United States made this point very clear when he reported from Germany to Washington in March 1947: 'There is the illusion that the New Germany left after the annexations can be reduced to a 'pastoral state'. It cannot be done unless we exterminate or move 25.000.000 out of it'.

The swift turn-around, in two-three months, from the deindustrializing Morgenthau Plan to exactly the opposite – the re-industrializing Marshall Plan - could be seen in a humanitarian context, but it was clearly also a result of political urgency. The deindustrializing Morgenthau Plan was only carried out in the British, French, and US zones of occupied Germany, not in the Russian zone to the East. The allies, also through the eyes of Herbert Hoover as President Truman's special envoy to Germany, observed a politically dangerous extreme poverty in West Germany. This was the background for Hoover's remark about exterminating or moving 25 million people out of West Germany. In this political context it is not surprising to find that Marshall's 1947 speech on the plan had been drafted by a Russia specialist and interpreter, Chip Bohlen. Bohlen used a memorandum from Under-Secretary of State for Economic Affairs William Clayton, who graphically described Europe's situation: 'Millions of people in the cities are slowly starving,' if the standard of living continued to deteriorate, 'there will be revolution.'"

The European periphery may again be seen in this context. In countries like Ukraine and Georgia, which relatively faithfully have followed the advice of the Washington Institutions and the European Union, most people are poorer than they were at the 1989 fall of the Berlin Wall (Appendix I). On the other hand, Belarus – also considered as 'the last communist state' – which was poorer than the Ukraine in 1989, now has real wages double those of the Ukraine. Just as in 1947, political reasons may now require allowing heavier industrial policy in the European periphery than what is presently allowed in the treaties Georgia and the Ukraine have signed with the European Union. It is not in the interest of the European Union that because it carries on with old-fashioned industrial policy, the least democratic European state, Belarus, now appears as the most

¹⁰ http://marshallfoundation.org/marshall/the-marshall-plan/marshall-plan-speech/

successful of non-EU former Soviet Republics. Percentagewise the deindustrialization of Latvia caused a large migration, the population decreased by 18 per cent (reduced fertility is also a factor here). 18 per cent of the Ukrainian population is almost 8 million potential migrants.

Does the reduction of manufacturing as a percentage of GDP over time change this picture? I do not think so, particularly not in the poor periphery where many raw materials could still be industrialized locally (wheat into spaghetti in the Ukraine for example). Many high-added value services were born from the demand from manufacturing and still need manufacturing, and manufacturing still a main determinant of 'good' and 'bad' effects of trade in Charles King's perspective. As with the heart's percentage of the body weight – which is fairly low – percentages are not the only determinant of the importance of an organ. In addition, particularly in wealthy countries, there are of course many non-manufacturing / service activities with high barriers to entry that make them into high-quality activities in the Quality Index in Appendix II.

Having closely observed the economic structure of the Dutch Republic, English economist Wilhelm Petty (1623-1687) formulated what was to be called Petty's Law: Countries go through stages where at first agriculture is dominating, then comes a period when manufacturing dominates, and finally the service sector will take over. It is difficult to understand how Petty could arrive at these observations about 100 years before the power of the Dutch Republic peaked, but he did. In some cases economic stages may obviously be skipped – all nations did not have to go through the Age of Steam.

But manufacturing adds two qualitatively different things to society, and is therefore probably a mandatory passage point. First of all, the balance of countervailing powers¹¹ between big business, big labour, and big government was what increased national wages across the board in all presently rich countries at the pace of the productivity increase in the manufacturing sector. Secondly, manufacturing changes the mentality of people. To quote Italian bestselling economist Ferdinando Galiani in 1770¹², 'From manufacturing you may expect the two greatest ills of humanity, superstition and slavery, to be healed'. Maybe, as an Italian book suggested some years ago, Europe has the choice between declining like the Dutch Republic, no longer the world's economic powerhouse

¹¹ This term was coined by John Kenneth Galbraith in his 1952 *American Capitalism: The Concept of Countervailing Powers*, Boston, Houghton Mifflin.

¹² Galiani, Ferdinando. 1770. *Dialogues sur le commerce des Bleds*, London UK, and Paris, France (no publisher).

- but still having a strong manufacturing sector - or like Venice, becoming a deindustrialized museum.

From local production to mass production and on to *Nichification*: A brief Analysis.

The 20th Century was dominated by standardized mass production. Henry Ford's statement in 1909 that 'Any customer can have a car painted any color that he wants so long as it is black' was a statement that expresses the need to standardize in order to keep costs down. Gradually, and especially with the introduction of information technology, it was possible to produce smaller runs. The need for standardization diminished.

In agricultural production, more so in Northern Europe than in Southern Europe, standardization increased as a by-product of the economic crisis of the 1930s. Agricultural economists claim, probably correctly, that agriculture is the first economic activity to enter into an economic crisis and the last to leave it. Due both to market power and to strong unions, during the crisis of the 1930s the industrial workers who kept their jobs tended to keep their wages. The crisis had a completely different effect in agriculture: farmers' sales prices and their incomes fell precipitously. John Steinbeck's 1939 *Grapes of Wrath* captures the drama of the situation.

After WW II it was understood that farmers could not produce their way out of their problems, this would only cause overproduction and falling prices. Agriculture was seen as needing more market power, in that sense agriculture ought to be more like industry. For this reason national farmers' cooperatives were given monopoly powers, and in the United States agriculture was (and still is) exempt from anti-trust.

This brought agricultural production – previously locally based – into the logic of Fordist mass production. While previously every farm, or every region or valley, had its own cheese, cheese production became more and more industrialized and more and more standardized. This coincided with the rise of big supermarket chains that came to dominate the retail food market. Farm products became bulk products, and when competition slowly opened up the farmers found themselves in the clearly inferior position of being specialized in bulk products, basically left to compete on price alone. A very bad specialization.

In Southern Europe the local and regional pattern survived much longer, and big supermarkets also came to dominate later there than in Northern

Europe. People wanted their local cheese and their local *salame*, so price competition between bulk producers was much less dominant. The local niche products, and with them decentralized production, survived.

General de Gaulle once rhetorically asked 'How can you govern a country which has two hundred and forty-six varieties of cheese?' According to a book on Italian cheeses, Italy beats that number by more than 200 varieties, registering four hundred and fifty-one different varieties of cheese.¹³ Having avoided the bulk- and mass-production paradigm, French and Italian cheese – as well as some cheeses from Spain and Switzerland – became a 'smart specialization'.

The organizational principle of Fordist mass production in bulk was *economies of scale in hierarchies*, while 'smart specialization' depended on *economies of scope among small players in networks*. Competition here is based on quality and product differentiation, not on price as in the mass production paradigm.

In agriculture and food production there is today an ever increasing diversity, more so in Southern Europe than in Northern Europe. Italy has of course hundreds of different types of pasta, and this diversity multiplies because regional differences between pasta types – often with the same names – are enormous. The *casoncelli* of Lombardy – a kind of *ravioli* – are very different in Cremona from those in Bergamo or Brescia. In many ways this Italian diversity is a remnant of pre-Fordism. More than most countries France and Italy have managed to preserve a variety in food and agriculture, while at the same time utilizing the industrial economies of scale. At the other extreme of the scale, Norway, with only about 4 million people, was probably the country where Fordist mass production – killing off previous niches – most came to dominate agricultural production, both meat and milk. This was also partly a conscious political emulation from the Soviet Union.

The development and importance of diversity is illustrated by figures from modern biological research. Figure 1 is from the Harvard biologist Stephen Jay Gould's book: *Full House. The Spread of Excellence from Plato to Darwin*¹⁴. The illustration shows the evolution of the diversity of biological species from a common 'ancestor'. In the case of horses, it would be a kind of *Urpferd* or *Sifrhippus*. Each end point further to the right represents a new biological variety descending from the same 'ancestor' (to

¹³ di Corato, Riccardo, *451 formaggi d'Italia. Catalogo storico-gastronomico delle varietà regionali*, Milano, Sonzogno, 1977.

¹⁴ New York, Harmony Books (Crown Publishers), 1996.

the left in the drawing), like Shetland ponies, Peruvian paso horses, zebras, and donkeys. In Gould's scheme a small number of varieties – as a result of random evolution – grow much larger than the rest. This is represented by the larger varieties at the bottom of the time axis (the varieties to the right, seen from the point of view of the 'ancestor').

If we transfer this illustration to *economic* diversity, each end point represents a *product*. For example let this common 'ancestor' be milk (the single starting point to the left). As the biological 'ancestor' the starting point is generic and *non-specialized*. Milk can come from a variety of animals, from cows to sheep, reindeer, and moose. The first more specialized branch could be the product *cheese*. The product cheese is again divided into new and ever more specialized products as we move towards the right of the time axis. Other products could be yoghurt, buttermilk, whole milk, cream, sour cream and so on. Far out to the right on the diversity tree of cows' milk, we find e.g. Appenzell cheese, which is only produced in two small cantons in Switzerland, or – as an extreme example – 650 Parmesan cheeses coming from 650 different cheese factories which all produce technically slightly different cheeses. (On the biological axis far out to the right we find e.g. one type of panda which is so specialized it only eats the leaves from one specific kind of eucalyptus.)

Wine is an example of extreme nichification. If we look at Gould's starting point at the left (bottom) of Figure 1, the single starting point would be that by fermenting grapes you can produce wine. If we add that there are green and red grapes, and that red grapes may be left with the skin for a while to create rosé wine, you have the next stage of diversification in Gould's graph: white, red, and rosé wine. Then, further to the right, a huge variety of grapes and climates produce a never-ending variety of niche wines. These niches – from Barolo in Piedmont to Zinfandel in California – make it possible to compete along other aspects than price. The wine industry was the first to use *terroir* – clusters of environmental factors affecting quality – as a marketing tool. Reportedly the first such geographical protection was established in 1716 by Cosimo III de'Medici, the Grand Duke of Tuscany, for the Chianti wine.

With the end of Fordist mass production and the introduction of information technology, the potential for decentralization increased: on Gould's axis many production processes moved towards the right, towards a far greater diversity. The possibilities not only vary from industry to industry, but also from product to product. In the last instance it is also the human will – no invisible hand – deciding to what extent the decentralizing element in the present economic paradigm shift should be used to strengthen the economic periphery. Also in the new organizational paradigm we have large industries – like Boeing and Microsoft in Seattle – representing the larger varieties at the bottom right of the time axis. When it comes to both large and small industries, it is the increasing human amount of knowledge that advances the process. One of Gould's main points in the book is that over time the small units – in spite of the many visible large units (read 'firms') – dominate ever more. We see the same development in the economy during the transition from the Fordist to the future techno-economic paradigm. Gould's second important point from this worldview is that to utilize *average values* becomes more and more meaningless as development advances.

In the economic world there are different degrees of demand for the original generic product (the 'ancestor' and the basis for the illustration) – *commodities* like e.g. generic 'milk'. It is only natural that different business strategies make some firms specialize in production of the generic product, where the demand is for low prices rather than high quality. Here the margins are very small, and this strategy needs an enormous turnover (and/or low wage rates) to survive (a result of economies of scale). Here we find giants like Cargill in the world grain markets. It is worth noting that the strategy in this volume market essentially implies a fight for market shares because *high volume = low unit costs*.

Emilia-Romagna in Italy is an interesting area from the point of view of nichification. In Emilia-Romagna the *high volume-low cost* strategy was represented by the production of ultra-pasteurized milk by the giant firm Parmalat, building on the importance of globalization and economies of scale in this market, by e.g. buying up 36 dairies on the East Coast of South America. However, at the time operating in more than 30 countries, Parmalat came close to bankruptcy in the midst of a financial scandal.

The high volume-low cost strategy bulk production failed Emilia-Romagna's agriculture. What makes Emilia-Romagna agriculture so special is the fact that in many agricultural products – milk, ham, vinegar, olive oil – local raw materials are used. Producers in this region receive higher prices than the producers of the same raw materials do in in the rest of Italy. The explanation is that Emilia-Romagna delivers very high-quality niche products that we find far to the right in Gould's figure 1 below. Industrial giant Parmalat mass-produced its standard quality milk based on milk imported from Bavaria in Germany. When this author researched this issue in 1996, the producers delivering milk for Parmesan cheese achieved 40 % higher prices than did the producers of normal consumer milk in nearby regions. When it comes to milk production this region has managed to get the best from all worlds:

- 1. High prices for local raw materials for niche products, higher prices that for the same products in many parts of Europe.
- 2. A decentralized production of niche products utilizes the partly rugged geographical territory in the Apennines very well (1996: 650 dairies producing milk for Parmesan cheese).
- 3. And to the extent this still lasts economies of scale in hi-tech mass production of bulk milk based on import of cheap milk imported from Germany (Parmalat etc.).



Figure 1. Increasing diversity and specialization over time (='tid'). Source: Stephen Jay Gould, *Full House. The Spread of Excellence from Plato to Darwin*, New York, Harmony Books, Crown Publishers, 1996.

| | Table 1. | 'Smart | specialization' | and | its | Opposites. |
|--|----------|--------|-----------------|-----|-----|------------|
|--|----------|--------|-----------------|-----|-----|------------|

| Characteristics of economic activities that are 'smart' to specialize in. | Characteristics of 'unsmart' economic activities. |
|--|---|
| Increasing returns to scale (higher volume = lower costs) | Diminishing returns (unless SS also present) (higher volume = higher costs, after a point) |
| Rapid technological development (steep learning curves) | Slow technological change (flat learning curves) |
| Technical change leads to higher wages to the producers ('Fordist wage regime') | Technical change tends to lower prices to the consumers |
| Dynamic imperfect competition | 'Perfect competition' (commodity competition) |
| Have stable prices | Show strong price fluctuations |
| Generally skilled labour Create a middle class Irreversible wages ('stickiness' of wages) | Generally unskilled labour Create 'feudal' class structure Reversible wages |
| Create large synergies (linkages, clusters) | Create few synergies |

Brief cases: Norway, smart specialization helping lagging regions in a wealthy country

REINDEER MEAT: AN ETHNIC MINORITY PRODUCING A TRADITIONAL NATIONAL LUXURY PRODUCT. Northern Norway.

The case of Norwegian reindeer meat is on the one hand a very successful case of SS by an ethnic minority. On the other hand the case is an example of the fragility of an initially successful case being destroyed by government policies.¹⁵

¹⁵ For a broader discussion, see Reinert, Erik S. 'The Economics of Reindeer Herding: Saami Entrepreneurship between Cyclical Sustainability and the Powers of State and Oligopolies', in *British Food Journal*, Vol. 108, No. 7, 2006, pp. 522-540.

At the end of the last Ice Age, the ice cap covering the Scandinavian Peninsula appears to have melted simultaneously both from the North and from the South. Northern Fennoscandia ('The Nordic Countries') consequently came to be inhabited by two different ethnic groups, the Saami – a Fenno-Ugric ethnicity originating East of the Ural Mountains – moving into the Northern part, and by Germanic tribes moving into the Southern part.

As would be expected the Nomadic tribes in the North and the agricultural tribes in the South had many conflicts, but an interesting part of this story – which makes it different from that of most other nomadic tribes – was that the reindeer meat produced by the Saami herders developed into an almost iconic national dish among the bourgeoisie of the capital Oslo. The lean reindeer meat was served at the king's table and made the groups of Saami specializing in this production wealthy.

Traditionally the herders controlled key parts of the value chain of reindeer meat, including the slaughtering. Wholesalers would gather, and informal auctions would take place around the very de-centralized places of slaughter. In 1976, the herders would fetch a princely sum of 108 NOK per kg. – equivalent of UK£ 9 at the time – or about the double of beef. A collapse of the price of reindeer meat followed. Ten years later the price of beef would be higher than that of reindeer meat, and by 1990 the price to the herder – in constant kroner – had decreased by more than 50 per cent (see Table 2 below). The once wealthy herders, who even attempted to use helicopters to gather their herds, were suddenly poor.

Table 2. Price of reindeer meat pr. kg. to herders, in fixed Norwegian Kroner(NOK) of 2013.

| 1976 | 108 NOK/kg |
|------|------------|
| 1980 | 91 NOK/kg |
| 1990 | 51 NOK/kg |
| 2000 | 60 NOK/kg |
| 2007 | 67 NOK/kg |
| 2008 | 80 NOK/kg |
| 2009 | 76 NOK/kg |
| 2010 | 69 NOK/kg |
| 2011 | 65 NOK/kg |

The story of the demise of this successful smart specialization is complicated, but the main elements are relatively few and carry with them important lessons for the sustainability of smart specialization. First of all the reindeer population – particularly in the Northernmost county of Finnmark – is very cyclical, and the cycles are parallel in all the Nordic countries with reindeer herding, Finland, Norway, and Sweden. The number of grazing animals typically doubles from trough to peak, and there have been four such cycles during the 20th century.

1977 represents a year with a new legislation for reindeer herders. New veterinary rules prohibited the traditional decentralized outdoor slaughtering, and the slaughtering was to be carried out in large factories that gradually came to belong to other actors than the herders themselves. The market power of these new actors – largely belonging to the farmers' cooperative having a legal national monopoly on beef production – put huge downward pressure on the herders who were now faced with a monopsony (a purchasing monopoly). Government regulation establishing annual target prices for all agricultural products failed to understand the cyclicality of production, and prices were allowed to drop when production increased, but failed to rise again when production – as a result of the natural cycle – fell drastically during the 1990s.

Perhaps the most important lesson here is the need for local producers to control the key points in the SS value chain. A parallel case to this would be if the decentralized suppliers of milk for the production of parmesan cheese had been forced to deliver their milk to the biggest cheese producers in Germany.¹⁶ The Saami producers are slowly regaining some market power, but the fight has been an uphill one because the national beef monopoly failed to maintain the high value niches and the quality of production for reindeer meat. For example, in the name of 'efficiency' most meat started to be frozen twice, deteriorating the value of the traditional reindeer steak which tolerates freezing once, but comes to pieces if the meat has been frozen twice.

DESTINATION RØROS / FOOD FROM THE MOUNTAIN REGION. Røros Area, Counties of Hedmark and South Trøndelag

After World War II the mountainous areas in Central Norway – including the small town of Røros that earlier had been a thriving mining community for 300 years – saw a general decline of both agricultural production and population. Since WW II Norwegian agricultural policy was based on bulk production of standard products, and the climatically marginal areas were not able to compete on price. Starting in the 1990s, people in

¹⁶ This example is not realistic, the production of Parmesan cheese depends on delivery of fresh unpasteurised milk every morning and evening and therefore needs extremely decentralized production, the point made is only one of market power resting with 'foreign' interests.

Røros formulated a new strategy focusing on marketing the high-quality agricultural products from the region. The local food products, including reindeer meat, which traditionally had been a luxury product in Norway, was combined with cultural tourism and outdoor sports all year. The old mining town of Røros with its Medieval appearance, consists of about 2000 one- and two-storey houses and a smelting house, and is on UNESCO's world heritage list. The fact that modern people live and work in these old buildings adds to making the town a living symbol of the whole region.

The Røros strategy is essentially one of niche products, among them marmalade made from locally grown mountain berries and milk thickened using butterwort, a local carnivorous herb. The old dairy plant – abandoned by the national milk monopoly in search of economies of scale – was taken over by local farmers, and their organically produced milk is also being distributed in the most populated areas around the Oslo fjord. In the case, the smart specialization outgrew the normal niche market.

This author was present when, in 2017, *Food from the Mountain Region* celebrated the 20th anniversary of the successful programme with a conference in Røros.

THE GOLDEN DETOUR, Inderøy Peninsula, County of North Trøndelag.

Archeological finds show that the fertile Inderøy peninsula in the Fjord of Trondheim has been inhabited since the Viking Age. Located to the West of the main thoroughfare towards Northern Norway (E 6), the peninsula gradually fell outside the itinerary of tourists ever more in a hurry.

Already the home of a church consecrated in 1184 and of a big distillery of aquavit, the traditional Norwegian spirit, in the 1990s around 20 small artisans and art galleries, producers of food and of traditional costumes, restaurants and hotels joined in what was appropriately called *The Golden Detour*. Their marketing is based on the idea that if you just drive the main road it will take you 12 minutes. Driving *The Golden Detour* will only take you 8 minutes more, plus any stops you may wish to make.

Informally the association informs that the local farmers have not 'struck gold', but they have managed to approximately double the income of the farmers involved in The Golden Detour.

Brief cases: Ukraine, smart specialization creating national economic growth in a poor country

EXPORT DUTY ON SUNFLOWER SEEDS

Ukraine used to produce sunflower seed for export, but imported the final product. Today it exports sunflower oil to over 90 countries around the world.

In 1999 the Parliament of Ukraine passed a law which introduced a 23% ad valorem tariff on sunflower seed exports (this duty went down to 17% in 2001, then to 16% in 2008 and to 10% today).

The oil production capacity has increased 8 times since 1999 and Ukraine's annual 2017 sunflower oil export reached 5.8 million ton amounting to \$4.3 billion. Ukraine consumes only 20% of the sunflower oil it produces, the rest 80% is exported.

Today Ukraine is No. 1 in the world in sunflower oil production and exports. Ukrainian share of the world sunflower oil market is over 55%.

BAN ON TIMBER EXPORT

Almost 3 million ton of timber was exported from Ukraine from 2011 to 2015 annually. As a result of totally uncontrolled logging Ukraine was on the verge of environmental disaster. The local wood processing industry, however, did not develop. In spite of having the same forest area as Poland, Ukrainian wood processing, paper and furniture companies produce only 1/10 of what Polish companies in the same business do.

In 2017, a 10-year ban on timber exports entered into force (since January 1, 2017 it is prohibited to export pine timber, which used to account for 80% of all timber exports). The corresponding law was passed in Parliament of Ukraine in 2015.

As a result of the first year of the effective ban on timber export:

- 1. wood processing industry attracted \$77 million of additional investment;
- 2. thousands of new jobs have been created all over the country;
- 3. non-timber export of wood manufacturing increased by \$54 million.
- 4. the state budget received an additional \$15 million in tax revenue.

INCREASED EXPORT DUTY ON METAL SCRAP

Metal scrap is a key strategic raw material for the Ukrainian metallurgical sector, which generates around 25% of the country's foreign exchange earnings and employs more than 250,000 people. On top of that, the metallurgical sector supplies raw materials to the defense industry, whose uninterrupted operation is of great importance to Ukraine under the current geopolitical circumstances.

Despite this fact, the national metal scrap supply was cut in half from 7.5 to 3.5 million ton per year in 2011-2016, while at the same time its exports almost doubled from 0.7 to 1.2 million ton per year between 2011 and 2015. As a result, metallurgical companies experienced a crucial metal scrap deficit, which reached 22% of industry needs, and consequently were forced to operate intermittently or even to stop melting.

The Parliament of Ukraine passed a law which introduces a two-year (September 15, 2016 – September 15, 2018) export duty increase on metal scrap from 10 EURO/ton to 30 EURO/ton, which helped to:

- 1. save 35,000 jobs as well as to earn \$1.6 billion in foreign currency;
- shorten metal scrap deficit by 40% for the needs of metallurgical companies;
- 3. gain threefold tax revenue from metal scrap exports.

Presently Members of the Ukrainian Parliament have presented another draft law which introduces an extended export duty on metal scrap amounting to 42 EURO/ton for a period of 3 years starting from September 15, 2018 due to its increased cost on global markets (due to the higher costs this reduced the share of duty in metal scrap cost from 19% to 13.5%). According to analyses carried out it is estimated that this measure will contribute to ensure an additional \$1.1 billion of tax revenue into the State Budget and create 4,000 new jobs.

Appendix I. Economic Growth since 1989 (Fall of the Berlin Wall): percentiles of population with income growth above/below the 1989 level / the G7 average level.



CHART 1.13. Percentiles of the population with income growth above/below the G7 average, 1989-2016

Source: Branco Milanovic.

Appendix II. How different economic activities have different 'residuals' (activities to the left in the graph have more *residual* than those to the right).



Source: Salomon Fabricant, US National Bureau of Economic Research, 1942. Quoted in Reinert (1994)

| Appendix III The Quality Index of Economic Activities | | | |
|--|---|--|--|
| new technologies | | | |
| Dynamic imperfect competition (high-quality activity) | Characteristics of high-quality | | |
| | new knowledge with high market value steep learning curves high growth in output | | |
| | rapid technological progress high R&D-content necessitates and generates learning-by- | | |
| Shoes (1850-1900) | imperfect information investments come in large chunks/are indivisible (drugs) | | |
| Golf balls | -imperfect, but dynamic, competition -high wage level -possibilities for important economies of scale and scope | | |
| Automotive paint | high industry concentration high stakes: high barriers to entry and exit branded product | | |
| | produce linkages and synergies product innovations standard neoclassical assumptions irrelevant | | |
| | Characteristics of low-quality activites -old knowledge with low market value -flat learning curves -low growth in output | | |
| | -little technological progress -low R&D-content -little personal or institutional learning required | | |
| House paint Shoes (2018) | perfect information divisible investment (tools for a baseball factory) | | |
| Baseballs | perfect competition low wage level little or no economic of scale /risk of diminishing returns | | |
| Perfect competition (low-quality activity) | Industry Iow stakes: Iow barriers to entry and exit commodity produce few linkages and synergies process innovations, if any | | |
| | Append he Quality Index of E innovations new technologies Dynamic imperfect competition (high-quality activity) Shoes (1850-1900) Golf balls Automotive paint Automotive paint Shoes (2018) Baseballs Perfect competition (low-quality activity) | | |

 neoclassical assumptions are reasonsable proxy

Source: Reinert 1994 / 2007.

Appendix IV. Average wage differences per cluster category in Europe (2013).

| Aerospace | 44,718€ | Paper products | 24,995€ |
|-----------------------------------|---------|----------------------------------|---------|
| Financial services* | 43,930€ | Sporting and children's goods | 23,498€ |
| Biotech | 42,384€ | Building fixtures | 22,827€ |
| Pharmaceuticals | 40,735€ | Stone quarries | 21,183€ |
| Analytical instruments | 39,519€ | Processed food | 20,993€ |
| Chemical products | 38,381€ | Construction | 20,894€ |
| Information technology | 37,360€ | Construction materials | 20,063€ |
| Oil and gas | 36,073€ | Textiles | 17,902€ |
| Telecommunication equipment | 35,960€ | Jewelry and precious metals | 16,303€ |
| Production technology | 32,371€ | Furniture | 16,131€ |
| Automotive | 29,399€ | Leather products | 15,594€ |
| Plastics | 29,066€ | Maritime | 14,274€ |
| Medical devices | 28,928€ | Tourism and hospitality | 13,961€ |
| Power generation and transmission | 28,927€ | Agricultural products | 13,852€ |
| Lighting and electrical equipment | 28,767€ | Tobacco | 13,567€ |
| Transportation and logistics | 27,462€ | Education and knowledge creation | 13,132€ |
| Heavy Machinery | 26,393€ | Apparel | 11,885€ |
| Metal manufacturing | 26,269€ | Footwear | 11,238€ |
| Business services | 25,964€ | Entertainment | 11,034€ |
| Distribution | 25,888€ | Farming and animal husbandry | 3,859€ |
| Media and publishing | 25,556€ | | |

Table 1. Average wage per cluster category in Europe

Data based on 255 European regions.

Source: http://www.foreurope.eu/fileadmin/documents/pdf/Workingpapers/WWWforEurope_ WPS_no014_MS47.pdf **Appendix V.** Characteristics of the two modes of diffusion of productivity improvements, the *collusive* and the *classical* modes.

| | Collusive | Classical | | |
|--|---|--|--|--|
| Characteristics of mode | | | | |
| Divisibility of investments Degree of perfect information | Indivisible, comes in 'chunks' Imperfect (e.g., patents, internal R&D) | Divisible Perfect (competitive market for technology itself) | | |
| Source of technolo- gy from user com- pany point of view | Internal, or external in big chunks = high degree of economies of scale | External | | |
| Barriers to entry Industry structure Economies of scale Market shares | Increase Increases concentration Increase Very important | No change Neutral No change Unimportant | | |
| How benefits spread | | | | |
| GNP as measured | Highly visible (at producer level) | Tends not to appear (Solow-paradoxes) | | |
| Profits level | Increases stakes: possibilities for larger profits or losses | No change | | |
| Monetary wages Real wages (nationally) Price level Terms of trade | Increase Increase No change No change | No change Increase Decreases Turns against industries experi- encing technological progress | | |
| Examples of innovations in the two groups | New pharmaceuticals, automotive paint production, Microsoft. Google, Facebook | Electricity, online sales of hotel bookings and used books, use of PCs, dispersion paint pro- duction, containers | | |
| Where found | Traditionally mainly in industry, in recent products and processes, IT-related monopolies. | In primary and tertiary industry, use of new basic technologies, mature industry | | |

Source, Reinert 1994 (modified)

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The Other Canon Foundation, Norway, and the Technology Governance program at Tallinn University of Technology (TTÜ), Estonia, have launched a new working papers series, entitled "Working Papers in Technology Governance and Economic Dynamics". In the context denoted by the title series, it will publish original research papers, both practical and theoretical, both narrative and analytical, in the area denoted by such concepts as uneven economic growth, techno-economic paradigms, the history and theory of economic policy, innovation strategies, and the public management of innovation, but also generally in the wider fields of industrial policy, development, technology, institutions, finance, public policy, and economic and financial history and theory.

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