

# CHAPTER

## Higher-Education Systems Dynamics and Useful Knowledge Creation

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### INTRODUCTION

**E**conomic history is about the economic successes and failures of companies, regions, countries and continents. Generally speaking, economic historians argue that economic growth is the result of the accumulation and application of knowledge. Economic growth is created because individuals develop new ideas and apply these in processes of production and distribution. And because the capacity of each individual to acquire knowledge is limited, the processes of knowledge accumulation and application are in essence social processes: only by means of specialization of labour and cooperation will we be able to continue our processes of creating and applying new knowledge.

This argument is certainly not new. It was already developed by Adam Smith in 1776 and it has played a central role in economic theory ever since. Economic growth implies the continuous development of increasingly complex patterns of division of labour, in which the market usually plays a crucial coordinating role.

Generally speaking, the market is a system for the allocation of scarce resources. In the economic sense, a free market allocates resources through the price mechanism, subject to the discipline of supply and demand.

The market also is a mechanism of social coordination. Out of the decisions of many actors it creates a "spontaneous social order" (Hayek, 1967), not so much by grand design and rational planning, but rather by allowing auto-

mous actors to develop mutual relationships. The market is a mechanism for “coordination without a coordinator” (Wildavsky, 1979, p. 90).

The market as a coordinating mechanism, in its turn, is embedded in a context of rules, norms and practices, leading to specific processes and outcomes of coordination. Trying to influence these rules, norms and regulations in order to stimulate the coordinative capacity of the market appears to be the objective of many current policies in our modern knowledge economies.

According to the general policy arguments in these modern knowledge economies, the key to economic success is the ability to develop new knowledge and to apply it in economic processes. In addition, this ability is assumed to be to a large extent determined by institutional economic contents. One of the major challenges for policy-making in our knowledge economies is to find and influence the institutional factors that have an impact on the processes of the accumulation and application of knowledge.

In this paper I intend to explore the dynamics of higher-education systems. I will especially focus on the behaviour of higher-education institutions in policy-contexts in which market coordination plays a major role. My objective is to analyse the dynamics of higher-education systems and to explore some of the conditions that might stimulate the processes of the accumulation and application of knowledge in modern societies.

## USEFUL KNOWLEDGE

In order to be able to conceptualize the role of knowledge in economic development, we need a theoretical framework. For this, let me first once more go back to Adam Smith. According to Smith, the “improvement of machines” (which is crucial for economic development) is the result of the efforts of two groups: the “common workmen” and the “philosophers or men of speculation”. The common workmen are continuously looking for ways to improve their operations: “A great part of the machines made use of in these manufactures... were originally the inventions of common workmen who, being each of them being employed in very simple operation, naturally turned their thoughts towards finding out easier and readier methods of performing” (Smith, 1776/1976, p.115). The philosophers form a second source of innovation. “Improvements have been made by the ingenuity of those who are called philosophers or men of speculation, whose trade is not to do anything, but to observe everything; and who, upon that account, are often capable of combining together the powers of the most distant and dissimilar objects” (Smith, 1776/1976, p.115-6).

Adam Smith here addresses one of the most crucial institutional factors that, according to economic historians, appears to have influenced the economic development of the Western world. The historical argument is that,

until the Industrial Revolution took place, technological progress was the result of serendipitous discoveries. “Although new techniques appeared before the Industrial Revolution, they had narrow epistemic bases and thus rarely if ever led to continued and sustained improvements. At times these inventions had enormous practical significance, but progress usually fizzled out after promising beginnings. Such techniques are also less flexible and adaptable to changing circumstances...” (Mokyr, 2002, p19). After 1800 a transition took place which allowed for the growth of useful knowledge as a moving force in economic development. This transition implied the interaction between the knowledge of the “common workers” and that of the “men of speculation”.

In a recent book Joel Mokyr (2002) develops the argument that the genesis of the Industrial Revolution can be interpreted as the result of the specific development of the knowledge economy of Western Europe in the 18th century. Building on a wide variety of studies on the Industrial Revolution, he stipulates the well-known theory that this Revolution is the effect of the application of the scientific knowledge gained during the 17th and the 18th centuries to the processes of industrial production. However, Mokyr also develops a theoretical framework that tries to explain the interaction between two layers of knowledge: propositional knowledge and prescriptive knowledge, two types of knowledge that are clearly related to the two groups of Adam Smith. It is this theory that might help us to analyse the role of knowledge in economic development.

According to Mokyr “useful knowledge” consists of knowledge “what” (propositional knowledge, or sets of beliefs) and of knowledge “how” (prescriptive knowledge, or techniques). Propositional knowledge is the knowledge of scientists and scholars, the men of speculation. Prescriptive knowledge is the practical knowledge of artisans and craftsmen, of the common workmen. It is the interaction between these two types of knowledge which, according to Mokyr, explains the dynamics of a knowledge economy. In this process of interaction propositional knowledge is “mapped” into prescriptive knowledge, while prescriptive knowledge can produce a feedback into propositional knowledge. The characteristics of both types of knowledge have an effect on the conditions of the process of interaction, and thus on the results in terms of the economic dynamics.

Mokyr argues that the existence of some piece of propositional knowledge can serve as an epistemic base for new techniques. However this existence does not guarantee that any mapping into prescriptive knowledge will occur. “... the existence of a knowledge base creates opportunities, but does not guarantee that they will be taken advantage of” (Mokyr, 2002, p.17). If the epistemic base (the propositional knowledge) of techniques (prescriptive knowledge) is wide, inventions occur rapidly and efficiently. If the epistemic

base is narrow, solutions to problems are costly or even impossible. The propositional knowledge sets thus are potential preconditions for the development of useful knowledge. But also the feedback from prescriptive knowledge sets to propositional knowledge is of importance. Such feedback processes can direct the epistemic bases, and increase their width and density. The combination of the two processes is crucial. "If there is sufficient complementarity between an upstream and a downstream process in the system, persistent, self-reinforcing economic change can occur" (Mokyr, 2002, p.21).

The crucial question of course is when this "sufficient complementarity" occurs and whether it can be stimulated. I would like to argue that the appearance and the nature of the processes of interaction and complementarity between the two types of knowledge are an effect of the institutional contexts in which they are situated. In our modern knowledge economics the relationships between universities and society at large form a crucial aspect of these relationships. In the rest of this paper I will focus on these relationships. I will analyse the dynamics of the present-day higher-education systems of the Western world, looking both at their internal driving forces and their external policy-environments.

## CONSUMER SOVEREIGNTY IN HIGHER EDUCATION?

It is a familiar argument by now: the Western world has entered the phase of the "knowledge society"; our future prosperity and welfare will to a large extent depend on our ability to create and apply knowledge; our economic growth is dependent upon the ways we are able to work with useful knowledge. Nation states and whole continents underline their ambitions to become global competitors in terms of the knowledge economy. The European Union has, for instance, indicated that it intends to become the world's most dynamic and competitive knowledge economy by the year 2010.

The "knowledge economy" is at the heart of many governmental policies these days. Governments design policies that intend to stimulate the creation and application of knowledge in economic activities; they try to stimulate "academic entrepreneurialism", the use of IPR, the setting-up of venture capital funds and the intensity of cooperation between universities and business and industry.

Given these ambitions, political leaders increasingly address higher-education institutions. They craft higher-education policies that intend to influence the behaviour of these institutions and of the faculty working within them. Generally speaking these policies regard the trade-off between autonomy and accountability; between less state control and more self-management on the one hand (Van Vught, 1992) and more efficiency and especially responsiveness to societal needs on the other (Meek, 2003).

The policy-argument that governments use is rather straightforward and goes as follows. Higher-education institutions need to become more responsive to the needs of the knowledge society. They need to increase their capacity and willingness to become engaged in the production of useful knowledge. In order to stimulate these institutions to do so, the mechanism of market coordination can be used. Reinforcing the demand side of the market (by increasing consumer sovereignty) will increase both the sensitiveness to consumers' wishes and the level of competition between universities. The result will be higher-quality outputs and an increased responsiveness to societal needs.

It seems to me that the validity of this policy-argument can be questioned. First, the outputs of higher-education institutions are usually heavily subsidized, both by public funding and by private gifts. Supply and demand do not set a market-clearing price for the outputs of higher-education institutions (Geiger, 2004, p.17). The subsidization processes also create market distortions, especially because of the uneven distribution of the public and private resources that are poured into higher education (Newman, *et al.*, 2004, p.90). In higher-education systems the price mechanism works imperfectly.

Secondly, the introduction of more consumer sovereignty in higher-education systems does not necessarily trigger the behaviour of higher education institutions that governments are trying to accomplish. Given the specific nature of their "products and services", higher-education institutions often are able to use their autonomy to resist the pressures of the increase of consumer power.

There is simple explanation for this. The products and services that higher-education institutions offer are "experience goods" (Dill, 2003): the clients of universities are only able to judge the relevance and the quality of the outputs of higher education, when they are able to experience them. Students can only really judge the quality of a course when they take it; and research clients can only really judge the quality of a research project when they are offered the results. When confronted with the question to take a decision in favour of a certain product or service of an institution for higher education, clients (including potential students) are hampered with the well-known market failure of imperfect information. Higher education institutions, on their part, are enticed by these conditions to represent themselves in the best possible ways. They underline their self-acclaimed qualities hoping that by emphasizing these, they will be able to convince the clients of their attractiveness.

As a result of this the consumer market works imperfectly in higher-education (Massy, 2003, p.42). In the words of Joseph Stiglitz: "Recent advances in economic theory have shown that whenever information is imperfect and markets incomplete, ... then the invisible hand works imperfectly" (quoted in Friedman, 2002, p. 50). Increasing consumer sovereignty therefore does not automatically lead to an increase of responsiveness to societal needs by

higher-education institutions. Rather the behaviour of these institutions is triggered by the conditions of another market, that of competition for institutional reputation.

## MARKETS AND REPUTATION IN HIGHER EDUCATION

In his classic *The Higher Education System* Clark explores three major types of markets that are relevant in higher education systems: consumer markets, “where people normally exchange money for desired goods or services” (Clark, 1983, p. 162), labour markets, “in which people offer their capabilities and energy for money” (p.164) and institutional markets, “where enterprises interact with one another, instead of with consumers or employees” (p.165). It is the first market (consumer markets) that appears to be the object of many governmental policies that try to increase the coordinative capabilities of market forces in higher education. By increasing the capacity of the consumers of higher education outputs (students, clients) to choose among the various products of higher education institutions, these policies intend to strengthen the consumer market. However, exactly because of another higher-education market mentioned by Clark, these policies are usually only marginally effective. Let me explain this.

The actions of universities and other higher education institutions appear to be particularly driven by the wish to maximize their (academic) prestige and to uphold their reputations (Garvin, 1980; Brewer *et al.* 2002). Universities seek to hire the best possible faculty (on the higher-education labour market) and they try to recruit the most qualified students (on the higher-education consumer market). They do so because they are “intensely concerned with reputation and prestige” (Geiger, 2004, p.15).

Given this drive, higher-education institutions are first and foremost each other’s competitors (on the institutional market). They compete amongst themselves for the best students, the best faculty, the largest research contracts, the highest endowments, etc. They compete for all the resources that may have an impact on their institutional reputation.

Geiger (2004) argues that this competition for reputation is played out in two principal arenas, one comprising faculty scholarship, and the other reflecting the recruitment of (especially undergraduate) students. In the first arena, universities try to recruit and employ the best scientists, i.e. those scholars with the highest recognition and rewards, the highest citation impact scores and the largest numbers of publications. In order to be able to do so, they continuously feel the need to increase their staff expenditures, especially in research (since it is this context that scholars are attracted to), creating a continuous need for extra resources. The second arena regards the recruitment of students. Given their wish to increase their reputation, universities try to

attract the most talented students. They use selection procedures to find them, but they also offer grants and other facilities in order to be able to recruit them, again leading to a permanent need for extra resources.

The concept of “reputation in higher education” needs some further exploration. The reputation of a higher-education institution can be defined as the image (of quality, influence, trustworthiness) it has in the eyes of others. Reputation is the subjective reflection of the various actions an institution undertakes to create an external image of itself. The reputation of an institution and its quality may be related, but they need not to be identical. Higher-education institutions try to influence their external images in many ways, and not only by maximizing their quality.

The dynamics of higher education are first and foremost a result of the competition for reputation. Higher education systems are characterized by a “reputation race”. In this race higher-education institutions are constantly trying to create the best possible images of themselves as highly regarded universities. And this race is expensive. Higher-education institutions will spend all the resources they can find to try to capture an attractive position in the race. In this sense Bowen’s famous law of higher education still holds: “...in quest of excellence, prestige and influence... each institution raises all the money it can... [and] spends all it raises” (Bowen, 1980, p.20).

## THE UNINTENDED CONSEQUENCES OF PUBLIC POLICY

As indicated before, in many countries across the world, a shift is taking place in public policy regarding higher education. Even in countries where state regulation used to be the dominant factor with respect to the dynamics of higher-education systems, now new policies are emerging designed to create markets in higher education and to encourage inter-institutional competition.

Newman *et al.* (2004) see two main causes for this international development in public policy. One is the previously mentioned wish of political leaders to use the assumed positive forces of increased competition and consumer sovereignty to make higher-education institutions more responsive to the needs of society, especially with respect to the knowledge economy. I argued before that this argument fails to appreciate the strength of another market in higher education, that of institutional reputation.

The other cause for the international shift of public policy towards markets and an increase of competition, is the behaviour of universities themselves. When confronted with the temptations of more autonomy and self-management, university leaders are most willing also to accept the increased competition that usually comes with them. As a matter of fact, the increase of competition is often used as an argument for even more autonomy: “We need greater autonomy in order to compete” (Newman, *et al.*, 2004, p. 34).

However, the introduction through public policy of increased competition may lead to a number of unintended consequences in the dynamics of higher-education systems that do not necessarily contribute to a better responsiveness to societal needs.

First, the total cost of higher education appears to be growing immensely. The reputation race implies that universities are in constant need of more resources. They need these resources to recruit better staff, to offer more study-grants, to upgrade their facilities, to improve their PR, etc. "Universities press their pricing up to the limits that markets, regulators, and public opinion will allow. They justify their actions in terms of the rising cost of excellence and other factors beyond their control, but that is only part of the story. The impetus for price hikes stems from the university's own choices..." (Massy, 2003, p. 39). It stems from its drive to engage in the academic reputation race.

The effect is an impressive increase of the spending levels of higher-education institutions. Geiger (2004), for instance, shows that the per-student spending between 1980 and 2000 in the U.S. rose by 62% at public universities and more than double that at private institutions (Geiger, 2004, pp. 32, 262). In the U.S. higher education has become far more expensive during recent decades. And although participation rates have grown and students have certainly benefited from these increases of spending levels, it may also be pointed out that, in particular, the private costs of higher education have gone up dramatically. In the U.S. "the costs of higher education borne by students nearly doubled in real terms from 1978 to 1996... The costs of going to college... grew nearly twice as fast as the economy" (Geiger, 2004, p. 33). When public policies in other countries tend to follow the U.S. example of increasing the competition in a system where reputation is the major driving force, similar cost explosions should be expected.

It should also be pointed out that the shift of the costs of higher education from public to private sources implies that the social returns of higher education are increasingly being overshadowed by the private benefits. In this sense, the introduction of consumer sovereignty and competition implies a "privatization" of higher education. Students and graduates increasingly demand "value for money" for their investments, and higher education institutions may be tempted to "reduce the value of learning to simply the opportunity to earn more upon graduation" (Newman *et al.*, 2004, p. 44).

A second consequence of the introduction of increased competition appears to be an increase of the wealth-inequalities among institutions. In traditional continental European public policies with respect to higher education, institutions were assumed to be equal and (largely) similar. The new policies however emphasize the importance of differences between institutions. Universities are stimulated to compete and to develop specific roles and profiles, to relate to specific stakeholders and to respond to regional needs. This



increase of competition leads to greater inequalities among institutions, because there is no “level playing field”. The reputation race works out differently given different levels of resources; the higher these levels are, the more an institution will be able to climb the ladder of reputation. Higher-education institutions can only hire the faculty whose salaries they can afford. But they can also only charge the tuition fees that are justified by the level of their reputation. The reputation race is fuelled by an insatiable need for funding. Richer institutions are more easily able to increase their reputation than poorer institutions. And this process is self-reinforcing: as the race goes on, the wealth-inequalities and the differences in reputation tend to increase. The result is the establishment and strengthening of institutional hierarchies. Increased competition thus creates hierarchical differentiation in higher-education systems.

Thirdly, the new public policies (and the creation of institutional hierarchies) are accompanied by a greater social stratification of students. Highly reputable institutions try to enrol high-ability students. In order to accomplish this, they apply high-tuition/high-aid strategies, trying to attract and select those students who are most talented and whose enrolments reflect on their prestige. The result is a social stratification based on merit. Higher-education systems become more stratified by academic ability. Both students and institutions act in such a way that a meritocratic stratification is produced.

Even though student-aid policies are designed to create opportunities for the least advantaged, increased competition leads institutions to focus either on those students who have the financial resources themselves, or on those who have the highest abilities (and who can be offered grants). According to Newman *et al.* (2004), in the U.S. the less-advantaged students have become the victims of this development. “The price war that has broken out among institutions and even among states, grounded in the financial aid offered to attractive students, favours the already advantaged. They are also the ones knowledgeable enough about the system to seek out and attract competitive offers” (Newman, *et al.*, 2004, p. 87).

Cost explosions, institutional hierarchies and the social stratification of the student body are not necessarily the consequences that political actors have in mind when they design the public policies that should stimulate higher-education institutions to become more responsive to societal needs. They are, however, possible effects of the introduction of an increase of competition in higher education systems. Because of the dynamics of the reputation race, these effects may very well occur. The more autonomy higher-education institutions acquire, the more they will intend to engage in this competition for reputation. Public policy makers in higher education should be aware of these dynamics and look for more effective ways to create the contexts that can stimulate the accumulation and application of knowledge in our modern societies.

## THE INSTITUTIONALIZATION OF USEFUL KNOWLEDGE CREATION

What then could such a more effective way be? Let us go back to Mokyr's theory of useful knowledge. Mokyr argues that useful knowledge is the combination of propositional and prescriptive knowledge. The mutual interaction between these two types of knowledge (through processes of mapping and feedback) can lead to self-reinforcing economic development (see paragraph 2, above). The challenge, of course, is designing an institutional context that will stimulate a strong interaction between the two processes of knowledge creation.

Our analysis of the dynamics of higher-education systems shows that the introduction of more consumer sovereignty and competition on the consumer market does not necessarily lead to more responsiveness from higher education institutions to the needs of the knowledge society. The behaviour of higher-education institutions is driven by a competition for institutional reputation rather than by a competition for consumer needs. In addition, introducing more autonomy for higher-education institutions in such a "reputation race" creates several unintended consequences (costs explosions, institutional hierarchies and social stratification of the student body).

An effective institutionalization of the interaction between the two processes of knowledge creation should take this into account. It should even take the existence of the reputation race as given and offer a context in which the reputation-driven behaviour of higher-education institutions can stimulate a fruitful interaction. Rather than on the objective to stimulate competition for consumer needs, increasing institutional autonomy should be focused on a successful and effective interaction between the two types of knowledge creation. Higher-education institutions should be challenged to address this interaction and they should see the positive effects of it as contributing to their reputation. This is what public policies for the knowledge economy should do. This is the way the coordinative capacity of the market should be used.

This is, of course, more easily said than done. The design of an effective institutionalization of useful knowledge creation is a challenge that many countries are facing and that is only beginning to be addressed. Let me, by way of conclusion, offer a few elements that might perhaps contribute to further facing this challenge.

Through human history, curiosity and the thirst for knowledge for its own sake have been the major driving forces behind the growth of propositional knowledge. And although these forces are still important and powerful today, their importance is declining relative to the importance of the motives for the accumulation of prescriptive knowledge. Even "pure" science today is no longer completely detached. "Somewhere in the back of the minds of most

pure scientists are funding considerations. Funding agencies, somewhere in the back of their minds, think of legislators. And legislators, one hopes, in a remote corner of the back of their minds, have society's needs at heart" (Mokyr, 2002, p. 288). In our modern knowledge societies curiosity-driven research certainly has not disappeared, but it is increasingly being combined with the more pragmatic mechanisms of prescriptive knowledge creation.

A potentially fruitful way to stimulate the creation of useful knowledge is, I argue, to reinforce this combination of curiosity-driven and solution-driven research. This implies that the growth of propositional knowledge should be stimulated both by allowing for maximum freedom for curiosity-driven efforts and by processes of agenda-setting (trying to steer research efforts into specific fields of application). Alternatively, the growth of prescriptive knowledge should be reinforced not only by the search for pragmatic solutions for high-priority problems, but also by stimulating researchers to scour the bodies of propositional knowledge for guidance on how to create new mappings for new techniques.

In order to realize a stronger interaction between the two processes of knowledge creation, new partnerships between the public and the private sector should be developed. Substantial combinations of public and private funds should be made available for the universities that (either by themselves or in consortia) are willing and able to engage in these interactive research processes. The level of these combined budgets should be such that they can have an impact on the positioning of the institutions in the academic reputation race. Higher-education institutions should feel challenged by these budgets and they should accept it as self-evident that their efforts in this context will bring them a higher potential to increase their reputation.

The budgets for useful knowledge creation should of course be allocated in competition. Higher-education institutions should feel the necessity to compete for these funds. They should be willing to hire the best scientists and scholars to contribute to the programs that are funded by them. And they should feel challenged to adapt their curricula to reflect the characteristics of useful knowledge production.

Given this content, public policy making should not so much be focused on increasing competition between higher-education institutions on the consumer market. Rather it should consist of a set of "social contracts" between public authorities and higher-education institutions in which the mutual responsibilities are laid down. In these contracts governments should provide a large autonomy to higher-education institutions, but at the same time keep them accountable for fulfilling their specific missions and roles. Higher-education institutions should accept the social and economic responsibilities of the modern knowledge societies. They should design their missions with these responsibilities in mind. Depending on their specific positions and roles in

society, these missions will imply different contributions to society in the crucial fields of teaching, research and social service.

The institutionalization of useful knowledge creation thus asks for new partnerships between political actors, business and industry, and higher-education institutions. In these partnerships each group of stakeholders has its own role to play. The political actors should carefully design the trade-offs between more (conditional) autonomy for universities and their willingness to fulfil their missions and to compete for the budgets of useful knowledge creation. Business and industry should accept their role in the processes of agenda-setting, guiding the accumulation and application of knowledge. Higher-education institutions need to understand their crucial social responsibilities and to face the challenge that the creation of their reputation can be influenced by external considerations and budgets. But more important in these new partnerships are the cooperative efforts of the three groups of stakeholders. Only by cooperating will they be able to show the many positive effects of the creation and application of knowledge as a social process.

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