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Résumé :
L’innovateur est la personne qui définit l’innovation (le standard technique et le modèle économique) et réalise les premières ventes significatives. En d’autres termes, en gestion, il développe un produit, service ou organisation plus rentable. En termes économiques et sociologiques, il développe un paradigme social plus efficace que le précédent. Cette fonction ne doit pas être confondu avec celle d’entrepreneur qui se limite à l’optimisation de ce qui existe. Selon Coase, dans une économie de marché, l’entrepreneur est celui qui “se substitut au système des prix pour optimiser l’utilisation des ressources ». Au sens de Knight, l’entrepreneur gère le risque alors que l’innovateur travaille dans l’incertain.

Bonne lecture !
Innovativity

▶ Measuring Organizational Climate for Creativity and Innovation

Innovator

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Synonyms

Entrepreneur; Inventor

The term of innovator is not specified in the economic works. Since some decades, this term has appeared in political statements or journalistic papers.

The nearest concept is entrepreneur and sometimes inventor or even growth leader. Since Cantillon, in the eighteenth century, the entrepreneur has been a man who manages its own business and takes risk. In his book “Theory of economic development” (1911), Schumpeter used this word for the “capitaines d’industrie” who innovate. So he began confusion between the two concepts of entrepreneur and innovator. Today, it appears there are two distinct words for one single concept: the nearly academic word of entrepreneur conceptualized by Schumpeter and the commonly used term of innovator.

This short study will clarify the differences between entrepreneur and innovator and will specify the characteristics and the functions of an innovator.

Definitions

Innovation

To define an innovator, one needs a clear definition of innovation, and strangely, this is not so obvious.

In this entry, an innovation is the implementation of a novel technique at the macroeconomic level, a novel tool, or a new organization in the broadest meaning of those words, in order to sustainably improve the overall economic efficiency of society as a whole.

The innovation value is the “technical rent” of the new efficiency that can be assessed as a Ricardo rent.

Innovation is the implementation of a new kind of value creation.

It should be noted that innovation is a societal phenomenon and that a social choice is required to move from the old to the new technology, organization, or process. This is a complex process that we call the “fragmentary social choice.” See hereafter Section “Diffusion: The Fragmentary Social Choice”.

The Innovator

The innovator is not totally an inventor or a scholar or a manager. He is not neither a “capitaine d’industrie” nor even an entrepreneur. He is a part of all and assumes the central decision-making functions in the innovation process. This complex function enables the invention (or the idea) to become an innovation through four near-simultaneous operations: financing (1), setting of technical standards (2), definition of the economic model (3), and then the first sales that confirm the previous choices (4). Thereby he initiates a process of “social choice” of innovation. He works more on the market side than on technics. A single person usually performs this complex function. Sometimes several people are needed.

The innovator is usually preceded by the inventor who has almost all the ideas, but the inventor does not know how to organize them for making them suitable for the public. Seizing the opportunity, the entrepreneur gives an industrial dimension to the innovation, follows the innovator. Sometimes, one individual supports two or three functions, mainly as an innovator and entrepreneur, and then begins the confusion between the different functions.

In small-scale innovations, said incremental, this innovation function persists but in
a reduced shape, as J. Schumpeter had stressed it in 1942 (Schumpeter 1942/2008).

We have to underline that innovation is a matter of global efficiency of the society. That means that innovation may include all that has an effect on overall economic efficiency, including some laws or organizations.

**Innovator and Entrepreneur**
Entrepreneur is a self-ruling person with an objective of “value creation,” whereas an innovator is a man who creates new kind of value.

All have a common objective of “value creation.” But the nature of the value (or the quality of the opportunity) and its recipients are not the same: if there is an innovation, it is a new kind of value, with a “technical rent.” Otherwise, it is only a move of the value inside the society from a recipient to another, not a creation of new kind of value. This is detailed in the Fig. 1.

The Fig. 2 shows the different kinds of innovator and entrepreneur and how these concepts are close, related, and nevertheless different.

As a consequence of the partial recovery of the two concepts of innovator and entrepreneur, we will see overlap between innovation policy and entrepreneurship policy.

**Innovation Value and Innovative Company**
The innovation is a new kind of increase of efficiency and therefore is the source of new kind of value creation. And the value creation is the key figure of the innovation. It is the dimension of the innovation. This concept is a kind of the technical rent which is a Ricardo rent. The greatest this innovation value, the easier it will be to beat conservatism if there is any need of it.

From an economic point of view, the innovative company is the tool of the innovator to spread the innovation value among users, makers, inventors, and himself, through the price and the business model (see Fig. 3, below).

**Innovator’s Ecosystem**
As the innovator is a living being, he has got an ecosystem for living with resources, regulation, and other people around (see Fig. 4). The capacity of innovation is therefore dependent upon environmental factors without quantity effect, except a minimum effect as for artists. But these minima are dependent upon laws, social values, or even civilization as a whole, and even unwritten social rules.

This ecosystem approach is rather new and has been developed outside classic economics by practitioners of law and venture capital. Seen in the “Rainforest” in the references section (Hwang and Horowitt 2012).

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Kind of value creation</th>
<th>Recipients of value</th>
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<tbody>
<tr>
<td>INNOVATOR</td>
<td>- New kind of value, with a technical rent.</td>
<td>- Mainly, the society as a whole and sometimes the entrepreneur.</td>
</tr>
<tr>
<td>ENTREPRENEUR, Founder of any new company including one person company (excluding innovator)</td>
<td>- Value move with a new vector / often, cost cutting.</td>
<td>- Mainly, the founder and his company.</td>
</tr>
<tr>
<td>INTRAPRENEUR Growth leader</td>
<td>- Value move, but greater</td>
<td>- The company, and often poorly, the growth leader.</td>
</tr>
<tr>
<td>SOCIAL ENTREPRENEUR (Sometimes innovator)</td>
<td>- No market value but a great social value.</td>
<td>- The society as a whole.</td>
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**Innovator, Fig. 1** Value created by entrepreneur and innovator (Source: Author)
Innovators Cases

Through history, there are several examples of innovators. They may be also inventors or entrepreneurs in the same time. These examples help to understand the nature of functions and the profile of men.

Fifteenth Century: Gutenberg Created the First Innovative Company

The path of the printing invention before Gutenberg stays sketchy: some people argue that he may have got information about Chinese or even Korean tools. Nevertheless, he has to make, to finance, and to sell. History got
some information about the work of Gutenberg to finance and build the first printing press and complete set of movable types using metal alloy, including oil-based ink. And he did sell his product defining together the economic models of publisher and printer. At the end, he has got some big trouble with his financial partner.

He became a legend in innovation history. Please note that Gutenberg is the first innovator of the Western civilization with a name. He also is the first creator of an innovative company.

Eighteenth Century: Watt and Boulton Established the First High-Tech Venture

The story – maybe, the legend – of Watt is better known. He is not the inventor of the steam engine but (only?) an improver of the previous steam engine invented by Newcomen 60 years before (see Rolt and Allen 1997). The result was a sharp decline (75%) of coal consumption. Watt used to be an assistant at the University of Glasgow. Boulton has been the second business angel of Watt. The first one, Roebuck, went bankrupted.

Watt has been considered as the inventor, and he was actually kind of an inventor. His partner Boulton was the main innovator. He brings the money, imagined the business model, and sold the steam machines. Nobody knows Boulton, as it is often the case for the main innovator. And nobody knows Newcomen who is the main inventor as it is also often the case for the main inventor.

Nevertheless Watt took part to the innovation by improving the technical standard of Newcomen. And for this reason, he is also an innovator.

The business model was very modern: the machines were rented (not sold), and at the beginning, the rent was half of the money saved by the leaseholder, by comparison with the Newcomen machine. Roughly, the lease ranged around 1–1.5 times the cost of the coal used by the Watt machine.

Nineteenth Century: Thomas Watson, Graham Bell, and Theodore Vail

Graham Bell is probably one of the most inventive people in the history. But few people know that he needed two more persons to reach success: an assistant (Watson) for inventing and a CEO (Vail)
to manage the business! Together, these three people assumed the innovator function in the Bell Company.

**Twentieth Century: The Box of Malcolm Mac Lean (the “Container”) Might Be the Biggest Innovation of History with Lowest Scientific Content**

Malcolm Mac Lean is both a major innovator and totally unknown. He imagined the container while he was the president, owner, and driver of a “one truck” trucking company, but he developed it several years later when he became the president and owner of a shipping company. As it is explained by Levinson (2006), the Box allowed cutting cost of 90%! It is the main tool of the international trade. Without the Box, the economic development of the world would not be the same. He was an inventor, an innovator, an entrepreneur, and a “capitaine d’industrie.” Although the technical side of the innovation was quite simple, the innovation was still complex due to social, legal, and business context. Perhaps the innovator function is often so complex that it requires two or three people to assume it.

**Twentieth Century: Steve Wozniak and Steve Jobs**

The design and the making of the first microcomputer are well known today. It required two people at least to manage this conception. One must note that neither Job nor Wozniak was CEO of the Apple Company at the beginning. There are pure innovators, but one is on the technical side and the other one on the marketing side. And there is a third one, the CEO on the management side (Gallo 2010; Isaacson 2011).

### Theoretical Analysis

Few more details on the innovation process are needed to understand it and to specify the role of innovator.

**The Process of Innovation and the Functions of Innovator**

In 1911, J. Schumpeter described the innovation process for the first time. Almost always, people only memorizes a simplified diagram which can be summarized in a linear and seemingly rationale way (Fig. 5). In 1945, Vannevar Bush (inventor and director of the Office of Scientific Research and Development of President Roosevelt) has popularized this model in his report “Science, the endless frontier.”

A more detailed analysis shows that there is no linear process but two kinds of complex, random, or unpredictable processes before and after the innovation, and a very complex “step” operation in the middle, named “innovation” which consists in finding in the same time the right technical standard and the good business model and then to finance and to begin to sell successfully (Fig. 6).

The history of technics often shows us that only one man holds this innovation function. We call him “Innovator” (see Fig. 7). The Innovator is the head of the innovation process: he is (or they are) the man (men) that organizes and finances the first definition of the technical standard and of the business model. Then he shows the quality of his choices by the first significant sales, thus initiating the process of fragmentary (or progressive) social choice that will transform the product “invented” into a product widely used (diffusion).
He is not the inventor who creates and designs the object. He comes at the end of the chain of inventions. He is the man who makes the final choices, or more properly the techno-economic “arbitration” for matching the product to market. He is the man who turns ideas and prototypes into a concrete project suitable to the market and accepted by society. He is followed by the entrepreneur who expands the industrial scale of innovation. Sometimes, he is also a technician, an inventor, a marketing man, a social inventor, or an entrepreneur.

The core of innovation process with “finance + technical standard + business model + marketing” is a solution to a complex question. This solution is generally based on the combination of a wide range of knowledge and an extraordinary choice due to a nonrational analysis (e.g., inspired by a vision of the future). It was the case for microcomputer, later PC. The idea of IBM and other companies was a professional tool, whereas the idea of Steve Jobs, Bill Gates, and others was a home computer. The latter imagined and designed a home computer, whereas IBM designed a PC for offices. The market was the home computer concept with possibilities of professional uses. Or in other word a professional computer designed as a home computer. And more important, the business model was standard software and not specific software developments (Gundling 2000; Hargadon 2003; Wessner 2005; Christensen 2011; Goldberg et al. 2011; Cooter and Shäfer 2012).

Diffusion: The Fragmentary Social Choice

If we stay at a level of storytelling, the keywords for diffusion are the percentage of users, with a description: innovators, early adopters, early majority, late majority, laggards (Rogers 1962–2003).

If we want to go through process analysis, we may need a new concept, that is, the fragmentary social choice. This is mainly a market process.

This is a new concept and a significant part of the innovator’s work. The innovator begins this process by completing the first substantial sales.
But this is just the beginning. The social choice is not over. New consumers should confirm it. During this period, the innovation (technics and economics) may be improved and sometimes significantly.

Usually, this fragmentary social choice lasts from 10 to 30 years. Among the shortest cases, there are mobile phone and compact disk, which need only few years to get a choice and 10 years to reach a high rate of diffusion over 80%. Among the longest, there is mobile steam engine for railways, which needed several decades from 1795 up to 1830 only to find the correct technical standard. The key problems are economics and technic. But as a whole, the apparent cost paid by the end user is often the main cause for delay. The real keys are the business model plus social behavior and habits.

Patent and imitation were the traditional technical keywords of the diffusion. Even if there are not the real main ones, it must be recalled that patent (invented in Venice in years 1570, to boost an imitator of Gutenberg) is often supposed to help innovators. The questions remain the existence and the length of patent. The only solid argument is history: during the last three centuries, only countries with a solid patent system were innovative.

**Men and Functions, Typology of Innovators**
The innovator function is different from the man (men) who assumes it. The innovator may be an entrepreneur or an inventor but also a senior corporate executive or a political leader. This typology is the first step in the way to linking man and function.

From Gods to Human People
Six thousand years ago, the ancient civilizations had imagined the “gods of innovation”: the Mesopotamian Apkalus under the leadership of Enki must be seen as the distant base common to all Western technological civilizations. Closer to us, 2,000 years ago, and still more unknown, Lug dominates the Celtic pantheon, but he is on the losing side against the Romans. And that is why he has no descent. The Egyptian god Thoth and the Greek god Prometheus have a moderate significance, very far from the influence of Enki and Lug.

Now, let us go down from this pantheon toward the daily reality of innovation. Through economics and history, there are four main types of innovators. This is only a typology with overlaps between functions.

The Innovator–Entrepreneur (Sometimes Inventor)
It is the “mythical” innovator often discussed in economic literature devoted to entrepreneurship. This innovator has been characterized and named by Joseph Schumpeter as an entrepreneur. Sometimes, he is also inventor as was the case for T. Edison or even Louis Blériot. The greatest examples are Steve Jobs, Bill Gates, Thomas Edison, Henry Ford-I, Armand Peugeot, or Louis Renault.

The Lord Innovator (Who is also Often an Entrepreneur)
(Baumol et al. 2010) first used this word for history of enterprise. It refers to these gentlemen who have assumed the role of innovator during the Middle Ages and before. During the nineteenth century, there were many “lords” (rich people) who were committed to innovation from railway to water treatment. Often, they developed some key elements in the economic model as Rothschild and Pereire for French railways (Chemins de Fer du Nord et PLM, now SNCF) or Henri Siméon for the business model of water treatment in France (Compagnie Générale des Eaux, now Veolia, world leader of water treatment).

The “Intrapreneur,” Growth Leader or Catalyst
The “intrapreneur” is an employee who develops new ways of working and new products as part of an existing business. He has to deal with hierarchy as well as with the market. In this field, there is no consensus on a well-defined denomination. Finally, one would add all the small players named “Kaizen.” They all work on incremental innovations more than on breakthrough
innovations. They are the main stakeholders of the “innovation machine” of Baumol (2002).

The Politician
The social choice is sometimes directly made by politicians, especially for the legislative innovations and for the national programs of “modernization.” In these cases, the innovator will naturally be a politician. General de Gaulle in France was an archetype of this approach by launching innovative programs but focusing more on research than on innovation. His successor, Georges Pompidou, launched major innovative industrial programs (Ariane, Airbus, civil nuclear power, TGV) which are still the grounds of the industrial power in France 40 years later. Mustafa Kemal in Turkey and John Kennedy in the USA are other icons of this type of approach.

As a conclusion of this portrait gallery, we may add the copycats (Shenkar 2011), followers, and imitators who greatly help modernization, development, and even diffusion. But, of course, they are not truly innovator!

Perspectives on Economics and Sociology
The innovator is someone who not only changes economics, that is, the coefficients of the exchange board of Leontief, but even the rules of the world by finding and developing new products. This is obvious for Edison, Bell, Watt, et al. This is still almost true for small innovators (Kaizen) who also contribute to change the economic efficiency of the world. This fact offers two prospects for development:
1. Nowadays, economics is based solely on a mathematical rationality that is expressed and summed up by the systematic search for quantitative relationships such as “cause and effect.” The mathematic model is the archetype of this “school.”

The “innovator” approach proposes to fulfill the current void in innovation by introducing an element of “chance” in a world of “necessity.” It deals with the everlasting question of “change” outside the rules. This question is reminiscent of the biology for the genetic mutations. Basically, it proposes that the innovator is the agent for change. He characterizes his action but does not specify causal relations.
2. The Innovator function initiates and conducts the changes of the society. This function of “innovator” seems to be the same type as that of a farmer, a warrior, or a priest detailed by Dumezil. In fact, their function is to modify the human condition.

Conclusions and Future Directions
This structuralist approach of the innovator function places the innovator at the center of the innovation process that is the Gordian knot of wealth creation. In other words, this put again the man at the center of economics, even if short-term regulation remains a mathematical science.

This approach opens three major debates on the deepening of new concepts, on innovation policies, and on rationalism and humanism.

Deepening New Concepts
All the concepts around the innovator are already known from a managerial point of view. The correlation table is rather quick to set up: the ecosystem is the environment, innovative company is often start-up company, social choice is market penetration, and breakdown of created value is business plan. But they are not the same and they have to be deepened from an economic point of view to become new economic concepts. This maybe the roadmap of innovator and innovation economic studies for the next years.

The Debates on Innovator Policy Versus Innovation Policy
This may be the most important consequence of the birth of a solid innovator concept: a new base for innovation policy.

After a long dispute over the past 20 years, it is now accepted by main international organizations that the key factor of development is innovation. The question remains how?
From many reports and studies on the path to success in fostering innovation and from our own experience, we can say that the following rules may avoid you the bitterest failures, but they cannot warrant any success.

Do Only Politics to Avoid the "Broken Dreams" of Traditional Innovation Policies
Through examples, Josh Lerner (2009) showed two points: in each leader regions in entrepreneurship and innovation, such as Silicon Valley, the public sector has played a significant role. However, merely every direct state intervention in the world went to failure!

This point seems to become the first part of the consensus of the policy makers around the world: be politic and not operator. Do not try to manage everything by yourselves. Stay on politics. Do influence your local leaders and establishment but do not try to manage the economy – except with public purchasing policy.

Entrepreneurship Policy is a (Major but not Unique) Part of Innovation Policy
The second part of consensus seems to be that the entrepreneurship policy is a major part of any innovation policy, meaning that innovator–entrepreneur is often the best way to transfer technology from lab to economy. Often, innovation policy is only entrepreneurship policy.

However, innovation policies have to include national innovation strategy with major projects such as the space program or the human genome program.

Tech Transfer (TT) through Start-up as a Key of Innovation Policies
At the end, the TT, by transferring ideas from laboratories to economy, is the key of the innovation capacity. But the shortest way from laboratories to the economy is not what could often be thought: from laboratories toward existing companies through tech transfer offices. On the contrary, in most cases, the shortest way is to transfer to start-up companies through people and mainly innovators.

Take Care of Local Scientific Base
On the long run, you will need a scientific base for innovation. And this scientific base needs a good education, a large university, and some large laboratories. This is the soil where innovations will grow.

Be Ambitious, Realistic
Remember that innovation is global, complex, and diverse. Innovation policies may have several levels and shapes as shown in Fig. 8.

Rationalism and Humanism
In economics, the innovator is at the center of the dispute between rationalism and humanism. Since Adam Smith, economics is mainly a matter of market (offer and demand) and organizations. On the other side, the Marxist approach ignores the market and sees only structures. Even modern statistical approach focuses on markets and sectors. The best symbol of the rationalist approach of the modern economics is the input–output matrix of Leontief. Unfortunately, this does not explain all the economic activity but only its short-term rational side due to the organization of production. On the other side (nonrationalist), we find more people than structures: this is the human side (and humanistic) of the economy. And the innovator belongs to this nonrational side.

Economics has ignored innovation for two centuries. Technology was an external factor. Until now, 50% of the growth is unexplained by
rational economics. By now, scholars try to explain 50% of growth with endogenous growth based on the knowledge economy. This knowledge economy totally relies on the combination of tech transfer and the marketing capacities of people. And the idea is to find innovation factors or the best structure to increase tech transfer and marketing. Unfortunately, history shows that there is no direct or rational relationship between laboratory capacities and innovation capacities. For example, research and innovation were not linked for IBM and the home computer, for USSR globally, for the “box” which was developed without any research at all. On the rational side of economics, you only would have to put people in structures and laws to generate innovation. The main objective of this academic science is to identify innovation factors. But they do not exist.

As sociology has to take into account psychology (Moscovici 1980–1991), the “other” side of economics tries to take into account some nonrational people like innovator to overpower the complexity of the modern economy. For instance, we underline that main laws and rules are the same all over the USA and that two small territories are leaders in innovation: Silicon Valley and Road 128. Innovation relies on innovators, not only on written laws. That is why you need an ecosystem approach and not only a regulation approach. Hwang and Horowitt (2012) use the term of “rainforest” for this ecosystem. Coming back to the question of tech transfer, we have to understand that it is mainly dependent on the innovator who is nearly the obligatory go-between from knowledge to the economy. The idea of innovator policies is to find and position the right people in the right ecosystem or even to foster the right people by establishing a right ecosystem.

However, we have also to consider that at the end, conclusions of both sides may join on some decisions like education, tech transfer organizations, fiscal status. Instead of being a question of fight, the innovator could open the door between the two economics: rational and nonrational, structured and humanistic. The combination of both sides is politics. But this is still another great disputation.

Cross-References
▶ Business Model
▶ Corporate Entrepreneurship
▶ Entrepreneur
▶ Entrepreneur’s “Resource Potential,”
  Innovation and Networks
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Effects of Intuition, Positive Affect, and Training on Creative Problem Solving

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Institutional Entrepreneurship, Innovation Systems, and Innovation Policy
E.G. Carayannis, George Washington University, Washington, USA (Ed.)

**Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship**

- This three-volume reference set uniquely covers the broad spectrum of topics relating to innovation—from the psychology of creativity to regional economic development, from new product design to education in entrepreneurship. It features some 300 topical entries and 400 exhibits from a global array of more than 250 researchers, business executives, policymakers, and artists, developing a comprehensive, trans-disciplinary set of perspectives on the process of innovation.

The Encyclopedia of Creativity, Invention, Innovation, and Entrepreneurship (CI2E) is a three-volume electronic and print reference that uniquely covers the broad spectrum of topics relating to the process of creativity and innovation, from a wide variety of perspectives (e.g., economics, management, psychology, anthropology, policy, technology, education, the arts) and modes (individual, organization, industry, nation, region). The resource is comprised of some 300 topical entries, definitions of key terms and concepts, and review essays, from a global array of more than 250 researchers, business executives, policymakers, and artists, illuminating the many facets of creativity and innovation, and highlighting their relationships to such universal concepts as knowledge management, economic opportunity, and sustainability. Entries feature description of key concepts and definition of terms, full-color illustrations, case examples, future directions for research and application, synonyms and cross-references, and bibliographic references.

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