

Intentional action and economic evolution

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Abstract: The paradoxical relationship between intentional human action and the ‘blindness’ of evolutionary processes has recently started to be addressed in the literature. However, from our perspective the economic literature that goals pursued by agents (individuals or organisations) as key elements in the explanation of evolutionary processes is not yet sufficient. In this paper we propose an ‘intentional action framework’ that allows us to consider the role of intentionality in the explanation of human action (individual as well as collective action). Based on this conceptual framework, the paper addresses the logical relationships between goals, means, connections and intentionality in order to contribute to a better understanding of the logical linkages between intentional action and economic evolution.

Keywords: intentionality, evolutionary economic processes, economic rationality, evolutionary efficiency

JEL Classification: B41, B52, D89, O10, O31

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1. Introduction

An important challenge to evolutionary economics consists of tackling the paradoxical relationship between intentional human action and the ‘blindness’ of evolutionary processes. Recent papers have insisted on these issues. This is the case of Vanberg (2006) discussing Witt’s position on the role human intentionality plays in the explanation of evolution in economics. Vanberg has highlighted certain problematic aspects of the relationship between individual intentionality and the ‘blind’ nature of social evolutionary processes. In Witt’s words, ‘culture, institutions, technology, and economic activities evolve according to their own regularities’ (Witt 2004, p. 132). Moreover, Witt adds that ‘humans have sufficient intelligence and incentives to anticipate and avoid selection effects. The selection metaphor may therefore divert attention from what seems crucially important for economic evolution —the role played by cognition, learning, and growing knowledge’. Because it is driven by intentional human actions, Witt concludes that cultural (and economic) evolution cannot be adequately analyzed in Darwinian terms.

It is because of the special emphasis a Darwinian approach puts on the ‘blindness’ of variation, that Witt and others find it inappropriately applied to the socio-economic or cultural realm where intelligent human beings act on insight and pre-meditated plans. However, Hodgson (2004, p. 175) claims that ‘at the core of Darwinism are presuppositions concerning causality and causal explanations’ and ‘contrary to widespread belief, these presuppositions do not downgrade or ignore human intentionality.’ (See also Hodgson and Knudsen 2006a, 2006b, 2006c; 2007, and Nelson 2006. For a discussion on the ontological implications of this debate see Vromen 2008.)

Despite some attempts to make both positions compatible (Witt’s position and neo-Darwinism) it seems to be an unresolved debate. Contrary to biological evolutionary theories (mainly Darwinian) we agree with Witt in that (socio)economic evolutionary change involves human creativity and cognition and that the driving force of recombinatory search for novelty here is human endeavour (Witt 1999). Moreover, important endeavours have been made to cope with the challenge facing economic and

social theory by the consideration of intentionality (e.g.: Malle et al. 2001; Searle 1983, 2001; Simon 1983 and North 2005) and, therefore, the formulation of goals, strategies, plans, etc. in the explanation of evolutionary processes. However, in our opinion, a paradoxical relationship between intentional human action and the ‘blindness’ of evolutionary processes remains. On the one hand, human action if rational has to be intended; on the other hand, evolution (also economic evolutionary processes) is a blind process.

Most of the writings that analyse the foundations of evolutionary economics usually describe economic evolution as the process of the growth of knowledge (Dopfer and Potts 2004; Loasby 1999, 2002). For instance, Metcalfe and Foster (2004, p. *xi*) point out that the knowledge agents acquire, as well as the interaction of that knowledge, is at the base of economic evolution and the complexity of economic processes. The evolutionary literature argues that knowledge is the foundation of capabilities and is structured in routines (Nelson and Winter 1982; Becker 2004), cognitive, behavioural, social and technological [CBST] rules (Dopfer and Potts 2008) and organisational frameworks, etc. However, this literature also recognises that the goals pursued by agents (individuals or organisations), the dynamics of their own evolution, which affects the connections between them, their hierarchy and content, as well as the agents’ intentionality, are key elements in the explanation of dynamic processes and have not been sufficiently considered (see Witt 2003a). The fact that new goals may arise, the hierarchy of agents’ goals may change, objectives that have been reached may be removed from plans and goals that have not been reached may be replaced with others, etc., imply learning processes, as well as the emergence of new actions that cannot be explained solely as a mere consequence of knowledge acquisition; they produce special connections between new goals and new actions-means. Beliefs, actions, plans, goals, etc., are intentional categories of human action (Searle 2001, 1983) that play an essential role in the explanation of human behaviour in philosophy, psychology, neurosciences, etc. but not in economics.

We find that a clue to resolve this apparent paradox (and its consequences) is the revision of the concepts of intentionality, rationality and evolution commonly used in the debate about the blind character of evolutionary economic processes. We address these issues by means of ‘intentional action framework’ that connects micro and meso

analytical levels and allows us to consider the role of intentionality in the explanation of human action (individual as well as collective action). Based on this conceptual framework, the paper addresses the logical relationships between goals, means, connections, intentionality, etc. in order to a better understanding of the logical linkages between intentional action and economic evolution.

In this context, the very concept of economic rationality needs to be reconsidered. This approach implies an open-ended economic rationality concept: as Felin & Foss (2009) show instead of imposing a limitation to rationality (in the sense of Simon) what is needed is to explore rationality itself in order to make it compatible with open-endedness process of decision in intentional action context.

An open-ended rationality implies the revision of efficiency criteria. Agents in practice judge the degree of which what has been planned is being executed and is thus producing the pursued goals; the degree of (revealed) inconsistency or unfeasibility of action plans is a proxy measure of their inefficiency.

The paper is organised as follows: section 2 explores the concept and role of intentional actions in economics and social sciences: a bibliographic account on these topic is offered. In section 3, we present the basic analytical structure of intentional action and its relationship with economic rationality. Section 4 points out how the interactive deployment of intentional action is at the base of socioeconomic evolution. In this context an evolutionary efficiency criterion is proposed. The paper finishes with concluding remarks.

2. Intentional action in economics and social sciences

It is a fact that human beings (and thus, economic agents) have the capacity for purposeful behaviour: action is ‘governed by reasons so that it is always directed by some beliefs, or knowledge, and towards some end(s)’ (Lawson 1997, p. 177).

This process of reasoning associated with such goal-driven behaviour must take place in the discursive conscious, since it requires reflection upon our (often competing) aims and our knowledge of the world that dictates how best to achieve these aims.

The functioning of beliefs, intentions and knowledge at the discursive level of consciousness that generates the reasons behind purposeful actions, and the functioning of knowledge concerning the nature of social structures that typically takes place at the tacit level of consciousness plays a key role in the explanation of human (economic) action (Faulkner 2002).

Beliefs, intentions, knowledge, etc. are intentional states of human mind. That is, they are related with the category of intentionality. By intentionality, Searle means the specific property possessed by some mental states by which they are intrinsically 'directed at, or are about or of, or refer to, or aim at, states of affairs in the world' (Searle 1999, p. 64).

Intentionality is a medieval term that was reintroduced by the Austrian philosopher Franz Brentano in his 1874 book *Psychology from an Empirical Standpoint*, although Brentano himself did not use the word 'intentionality' explicitly. Brentano's famous two theses on intentionality are:

[I]ntentional in-existence is characteristic exclusively of mental phenomena. No physical phenomenon exhibits anything like it. We can, therefore, define mental phenomena by saying that they are those phenomena which contain an object intentionally within themselves. (p. 89)¹

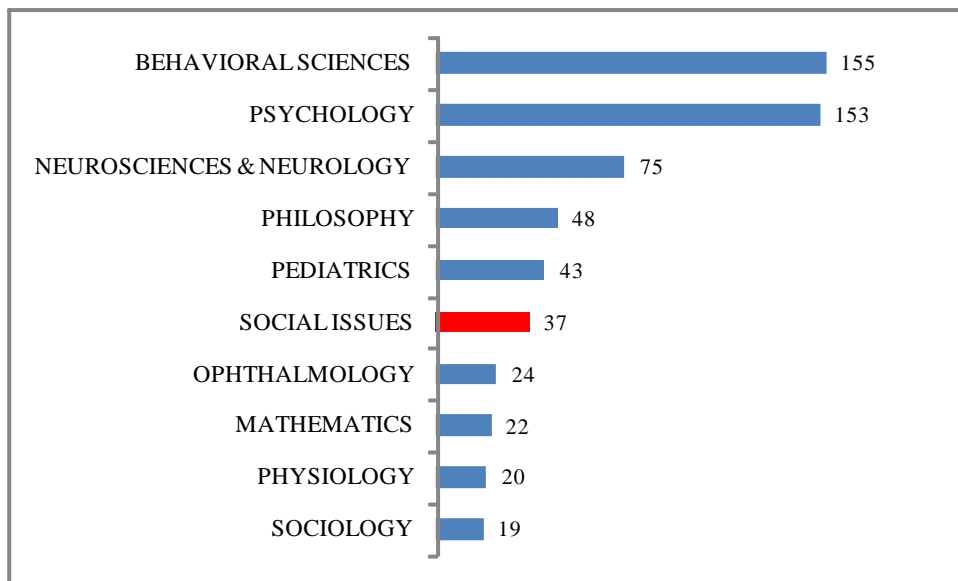
These theses have been deeply revised and criticized (even discredited). However, the topic has always attracted the attention of social scientists. For instance, in recent times the interest for intentionality and intentional action is soaring in social sciences. A simple account of this in ISI-Thomson database will support this claim.²

¹ Brentano's first thesis is that no "physical phenomenon" has intentionality. Brentano's second thesis is that intentionality is *the mark of the mental*: all and only mental states/events have intentionality. For a brief history of the terminology, and further references, see Crane 1998.

² We have selected this database because it provides a coherent, homogeneity and worldwide accepted criterion of classification of scientific papers. Other databases get even a huge number of papers, however they are not as consistent as ISI-Thompson results.

If we search for the topic ‘intentional action’ in Thomson database we obtain at least 168 records for the period 1970-2010. These records can be classified by scientific disciplines. The result is shown in Figure 1. It is important to observe that the numbers attached to each histogram add for more than total records. This is due to the fact that the papers that contain this search criterion in its title, abstract, and keywords may be classified in two or more areas.

Figure 1. Topic=[intentional action]

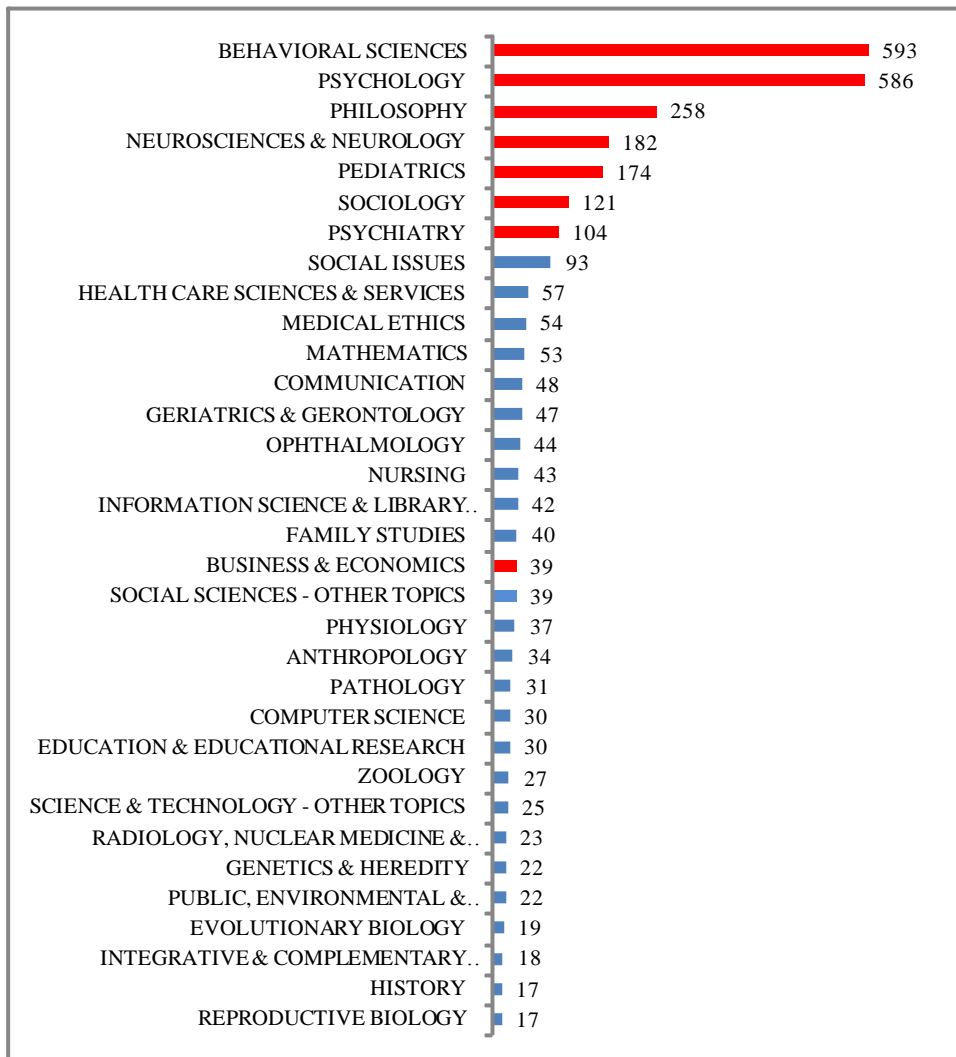


Note: 168 records.

As the chart above shows intentional action is a more important topic in behavioral sciences, psychology and neuroscience and neurology, and a much less influence in philosophy and social issues (that includes economics).

It should be noted that this does not mean that intentional (or purposeful) action has attracted little interest in economics (see for example the very interesting debate on this topic in the Journal of Evolutionary Economics in 2006-2007-see Hodgson and Knudsen and Nelson papers). The search strategy of ISI-Thomson database does not always localize all the papers involved (however, as we have tested, those papers may appear if we change the search criteria, changing ‘intentional action’ with ‘intentionality’. Figure 2 shows the result of this change in the topic search criterion.

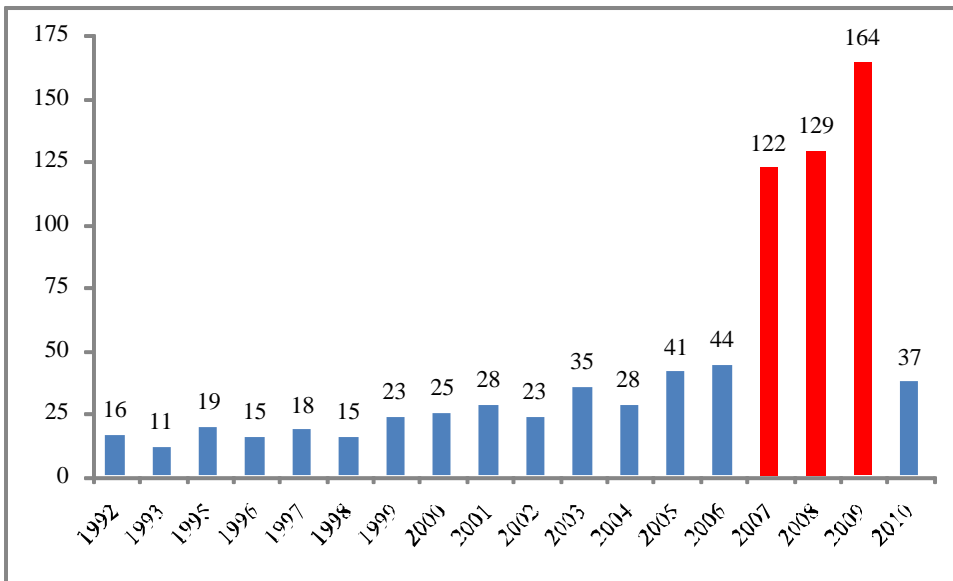
Figure 2. Topic=[intentionality] by Subject areas



Once again in behavioral sciences, psychology and neuroscience and neurology, together with pediatrics, sociology and psychiatrics dominates this research field. Business and Economics represents only a small number of papers (39).

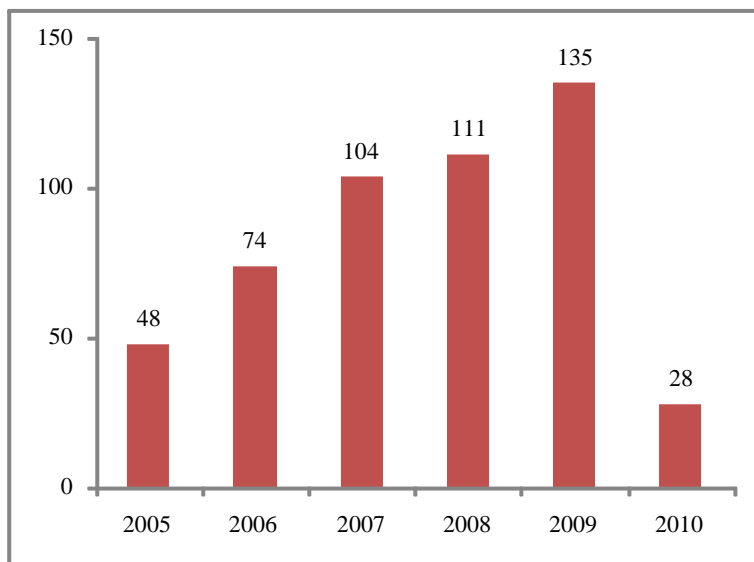
A very interesting issue is how active research that involves intentionality has been in recent years. Figures 3 and 4 show the account of papers related to these topics from 1992 to 2010. The search has been refined in order to show the records attached to the more relevant areas from our standpoint of view. Year 2010 is obviously underrepresented due that we still are at first half of this year. The recent trend in the number of papers associated to intentionality is outstanding.

Figure 3. Topic=[intentionality].Number of papers by year of publication.



Note: search refined by Subject Areas=(BEHAVIORAL SCIENCES OR EVOLUTIONARY BIOLOGY OR PSYCHOLOGY OR PHILOSOPHY OR NEUROSCIENCES & NEUROLOGY OR PEDIATRICS OR SOCIOLOGY OR PSYCHIATRY OR SOCIAL ISSUES OR BUSINESS & ECONOMICS). 869 records.

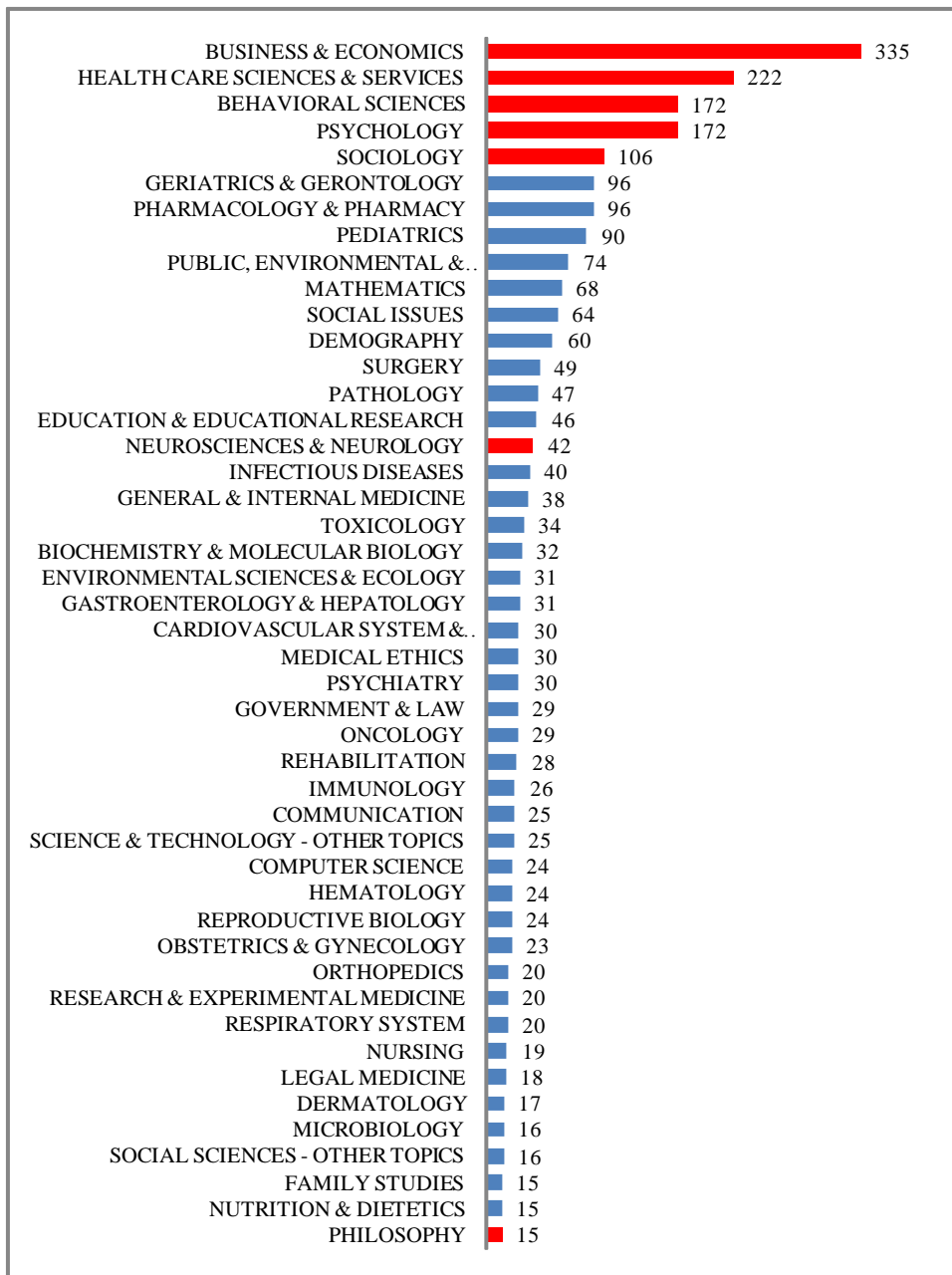
Figure 4. Topic=[intention* economics]



Note: 1,257 records.

Finally, Figure 5 shows the result of introducing 'intention* economics' as search criterion in ISI-Thomson database. This criterion includes both intentional and intentionality as topic.

Figure 5. Topic=[intention* economics]



Note: 1,257 records.

Intentionality seems to attract an increasing attention in social sciences and neuroscience. It is not exactly the same with Economics. Although recently some economists have focused or discussed about the role of intentional or purposeful action and even of intentionality, the number of papers seem to be much lower than in other (more or less related) disciplines. It is very interesting, for example, that although Economics has directed increasing attention to psychology (see the case of Kahneman)

and even neurosciences (as is the case of neuroeconomics), an analytical gap in the consideration of intentionality in Economics remains. In part, this is due to the fact that ‘intentionality’ is not free of paradoxes. However it is, in our opinion, a topic that deserves more attention by economists. In the next section we explore how intentionality may be localized within a framework that allows us to explain the analytical structure of human action and its consequences of this for economics.

3. The basic analytical structure of intentional action and its relationship with economic rationality

For evolutionary economics, evolution is seen as the process or set of processes that combine the generation of novelties with the selective retention of some of these novelties (Dopfer and Potts 2008), following the three-phase schema: generation-selection/adoption-retention of variety (Foster and Metcalfe 2001). Evolving systems -such as economic systems- are characterized by continuous endogenous change induced by the generation of novelties and subject to selection processes that operate on self-organized processes (Kauffman 1995).

Immediately a question arises: what changes? What, if any, is the unit of selection in such selection-retention processes? And what about the causal explanation of renewed variety? There is intense debate on these issues. For some authors, the unit of selection is routines (Becker 2004); for North (2005) and Hodgson (1993), it is institutions; for Boulding (1981), Hayek (1945, 1952) and Loasby (1999), it is knowledge which evolves, to the extent that they identify the basic economic problem with that of the social organization of knowledge; for others, it is capabilities (Dosi et al. 2000), etc. Finally, there are those who, like Dopfer and Potts (2008), on a more abstract level, consider that it is rules or “it is connections that change” (Potts 2000, p. 57).

3.1 Action plans

An analytical unit of selection is needed in order to explain the dynamism of an economy from an abstract system perspective. The action plan concept here proposed will serve us for this purpose.

Because intentionality is directness, the action plan is a core construct that allows us to distinguish between the different kinds of elements that are connected: *means and actions* and *goals (objectives)*, which determine the *direction* of connections.

Thus, economic dynamics may be understood in a complementary way to that previously exposed as the process of generation, adoption and an attempted interactive deployment of the agents' action plans and the resulting 'products' (Encinar and Muñoz 2006). As Rubio de Urquía (2005) poses, agents' action plans are the result of a key operation that consists of agents allocating means/actions projectively in order to reach the goals/ends/objectives they pursue. In other words, at each instant of time, an action plan may be interpreted as a template or 'guide' for action that projectively *connects* elements of a different nature: something the agent wants to achieve (goals) with the actions and means the agent 'knows' afford him/her success.

Agents choose -or better, agents *produce*- their goals of action on the basis of a myriad of psychological, social, and cultural factors, as well as ethics and beliefs (Metcalf 2004). Agents constitute their action plans using their imagination (Loasby 2007) and creativity, taking into account that the goals they pursue are located in an imagined future (Lachmann 1978). Thus, it could be said that agents 'invent' the future on which they focus their actions. This idea is valid whether we consider objectives in the short, mid or long term. The opportunities for acting in a specific way (entrepreneurial action, for instance) are not hidden somewhere in reality, waiting to be discovered by entrepreneurs or visionaries, but they 'emerge' initially in the mind of agents regardless of the fact that at some time in the future they may be embodied in a written document or an organizational form, etc.³

³ Very close concepts to (economic) action plan are routines (Nelson & Winter 1982; Becker 2003) and strategy. Both may be understood from the point of view of action plans. On the one hand, plans may include routines (as parts of plans) as far as a routine would be a 'mechanized' part of an action plan. On the other hand, actions plan imply strategy inasmuch as strategy implies expectations and expectations are at the basis of projective action. The relationship between strategy and plan has been explored by Mintzberg (1987) among others. For Mintzberg 'strategy' has been related to the concepts of 'plan', 'pattern' (in the stream of actions), 'position' and 'perspective'. In our view strategy has to do with a deliberation about what means/actions are more effective for the achievement of a goal, while goals (and expectations) are linked to choice. Anyway strategy shapes plans. Thus, strategy operates as a guideline for actions to goals. However, the goals or objectives of action have to be set in advance of the actions to which they apply.

The set of actions and goals linked projectively by means of an action plan may contain different kinds of elements: material or immaterial elements, localized at different moments in time (obviously not all at the same time); with a monetary price (in official currency) or without a monetary price (a subjective level of satisfaction of a need), etc. Action plans are an analytical open representation of agents' projective action, in which actions and goals are not given, but rather *produced* by the agents themselves. These analytical constructs enable the depiction of any kind of action plan, such as a planned trip, a business plan, a strategic plan (Day 2008, pp. 264-265), an EC plan to implement the objectives of the Lisbon agenda, etc., with structures of hierarchical dependence between goals and with as many analytical periods of time as necessary. Moreover, these analytical structures may be used to represent how agents' action plans configure the economic dynamics of a society when they are deployed interactively.

3.2 Knowledge, intentionality and agents' goals

Knowledge stands as cognitive networks in the human brain; routines; habits and patterns of behaviour, cognitive, social and technological rules; institutions; organizations, etc. It is also the foundation of capabilities. Evolutionary economics describes the evolution of an economy as a consequence of the growth of knowledge. However, the locus of the goals agents pursue (as well as their internal dynamics of evolution, which alter their hierarchical interdependence and contents) and their intentionality as elements that encourage action and knowledge remain beyond its scope or at least remain problematic. However, the goals –and thus intentionality- of agents play an essential role in explaining the emergence of novelties and evolving capabilities (Langlois 2006; Cañibano et al. 2006), institutions (Nelson 2008a, p. 7) and learning processes (Dosi et al. 2000, pp. 2-4).

In general, evolutionary economics proceeds in its models and theories as given goals pursued by agents. However, until recently the analysis of the role played by agents' intentionality and the goals they pursued in the development of new capabilities, new patterns of behaviour, etc. has been postponed.⁵ Any theory that aspires to explain human (and social) actions and their historical products (in terms of institutions, production, etc.) should consider the real fact that *new* goals of action may emerge, that the hierarchical ordering of goals may change, that goals reached now (or never) may be

removed from or replaced in agents' plans, etc. All these changes involve learning processes, as well as the emergence of completely new actions that cannot be explained only by means of mere knowledge acquisition. They are special connections that are established between new goals and means.

In our approach, intentionality, which can be defined technically as that feature of representations by which they are about something or directed at something (Searle, 1995), is linked to goals, and it activates the development of capabilities, the testing of new connections within a system, and, therefore, the generation of new knowledge (learning). Aligning, coordinating, reordering and even inventing new goals are intentional activities that generate novelty and are therefore sources of true dynamism in economic processes.⁶ For example, the child's vague idea of becoming a doctor may allow him to discover an 'innate capacity' (or vocation); this would lead him to want to 'become a professional doctor' (a new goal), and thus to study medicine at university, which finally enables him to work in the profession.

The goals of action evolve over time, inducing changes in agents' capabilities, which may result in the formulation of renewed goals and intentions and, therefore, in the development of renewed capabilities. Agents differ in knowledge and capabilities, *but also in the goals they pursue*. Agents are heterogeneous because they also conceive and pursue different goals and/or different hierarchies of goals and, consequently, they develop different capabilities, deploying interactive learning processes to carry out their plans. The result is that agents introduce a wide variety of changes in both their physical and social environment by means of their actions, thus altering the spaces of action (and the plans) of other agents.

To sum up, it is the concern for the inherent dynamic dimension of intentionality and goals that makes the individual and organizational capabilities truly evolutionary. The emergence of new courses of action linked to the conception of new goals renews agents' capabilities. Therefore, evolving capabilities open up new possibilities for action that allow the conception of new goals, generating continuous feedback between capabilities and intentions (Loasby 2008).

Of course, not all changes in society are the result of intended or intentional actions. In fact, not all actions carried out by agents are intended. Furthermore, not all the consequences of actions are intended or even expected. The consequences of actions may be and usually are very different from what agents pursue. Interaction in complex situations, un-knowledge, etc. may lead to completely unexpected results. Moreover, it has been said that evolution is a 'blind' process (Vanberg 2006) because new properties and unintended consequences emerge within it (Popper 1948). Nevertheless, human action, *qua* rational, within human constraints, is intended action: there must be goals (reasons) *for* acting (Mises 1949). It is rationality *in* action what is of special interest for economics.

From the perspective of action plans, it is possible to analyze how agents' cognitive dynamics might, for example, imply the introduction of new (projected) actions or means in agents' plans and the discovery (invention) of new relationships between actions and goals as a consequence of novelties in the agents' projective *space of goals*, thus implying a change in the connections between elements within a system. Consequently, although not all actions are intended and not all novelties are a consequence or the pursuit of particular goals, the evolution of agents' goals and intentions is a key explanatory factor because it triggers processes that establish and renew the connections within a system (Muñoz et al. 2008).

3.3 *Some examples*

In order to have a more accurate idea of the meaning of an action plan, the following figure shows an open representation of one of these plans.

Figure 6. Representation of an action plan (Rubio de Urquía 2007, p. 30).

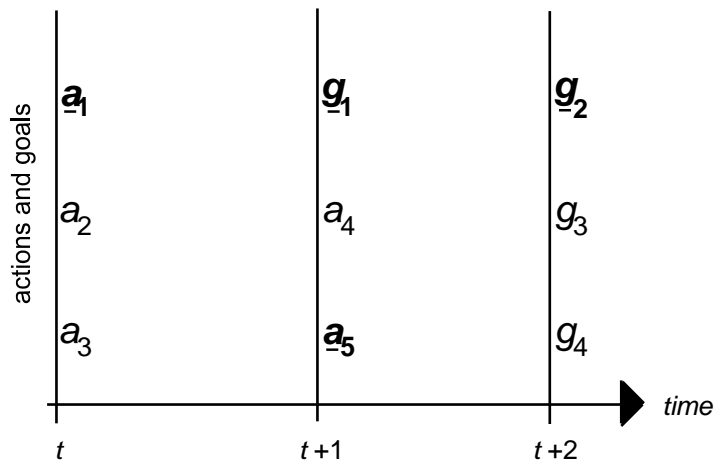


Figure 6 represents an action plan of an agent (an individual, a group or an organisation) at instant t . The plan depicted here consists of executing actions a_1 , a_2 and a_3 at instant t ; executing a_4 and a_5 in order to reach goal g_1 at the next (analytical) instant ($t+1$); and finally reach goals g_2 , g_3 and g_4 in ($t+2$). The underlined actions and goals (\underline{a}_1 , \underline{a}_5 , \underline{g}_1 and \underline{g}_2) represent actions and goals ‘with a price’ (for example, actions such as purchasing and selling, which have a monetary revenue, etc.; and goals such as reaching a rate of return, a level of sales, etc.); while the non-underlined actions and goals (a_2 , a_3 , a_4 , g_3 and g_4) are actions and goals ‘without price’ (thinking, ‘do nothing’, etc.); and goals such as learning something, protecting the natural environment, etc.

At this point, a reader may ask the following questions: if Economics refers to all this, what do the characteristic purpose of economics as a reality and that of economic theory as a science comprise? If the conception of ‘the economic’ characteristic of economic theory is what is proposed above (a theory of human action and its products), may we claim that contemporary economic theory is pure economicism? However, a meaning of what is ‘economic’ would be economicism if it implied that the elements ‘with a price’ in action plans had pre-eminence over all the other elements in the said plans; otherwise, it would imply that all the elements considered in action plans were ‘economic’ in the popular sense of elements ‘with a price’. In our argument, the meaning of what is ‘economic’ does not involve or imply any such thing; although, as is evident, it would not exclude it if it were the case.

However, the current meaning attributed to what is ‘economic’ refers to a_1 , a_5 , g_1 and g_2 , i.e. to the elements ‘with a price’, but not to the others. Nevertheless, within the approach proposed here, the whole structure of plans, and, therefore, all their constitutive elements are ‘economic’ in the sense we attribute to economic theory here (further explained below). It should be noted that, despite this fact, it would not be possible to isolate the elements a_1 , a_5 , g_1 and g_2 from the rest without considering their role in the context of the action plan.

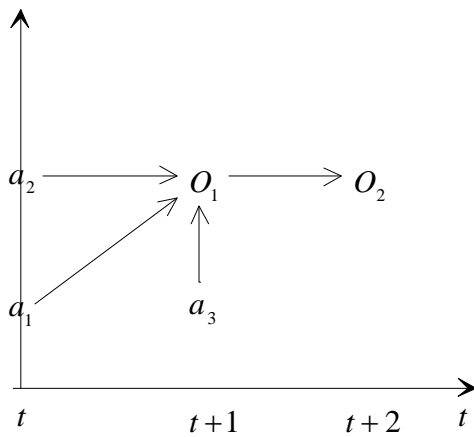


Figure 7

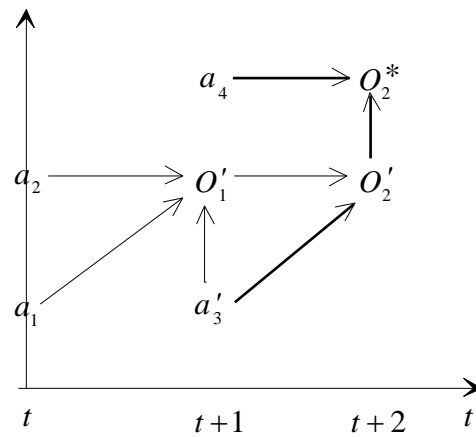


Figure 8

The emergence of renewed goals and intentions can be represented, for example, as follows. Figures 7 and 8 represent, respectively, the sudden appearance of a new objective (goal), O_2^* , that is hierarchically superior to, O_2 , (Fig. 7), and its consequences in the action space (Fig. 8): O_2^* alters the nature of objective O_1 , converting it into O_1' . This affects action a_3 , which no longer leads to objective O_1' . Action a_3 is replaced by action a_3' , which now leads to O_2 . Action a_3' no longer leads to O_1' (arrow crossed out). Also, linked with O_2^* , a completely new action, a_4 , appears.

It is important to take into account that, in this perspective, the appearance of a new action a_4 , the transformation of a_3 into a_3' and of O_1 into O_1' , are all changes explained by the appearance of a new objective (O_2^*).

As an example, consider the impact on production and consumption spaces and on the relationships between agents, of an electoral campaign with the slogan “Internet for

everybody". In this case, "Internet for everybody" is a new and hierarchically superior objective, O_2^* . Let a_1 be the human, a_2 the financial, and a_3 the technological capital employed to achieve O_1 "to develop the infrastructure for communication". This objective is the intermediate step to attaining the general objective of "social communication", O_2 (Fig. 7). The emergence of the new objective O_2^* transforms the initial plan. Now social communication is linked to a particular technology: the Internet. Therefore, new needs for infrastructure arise. What is required is "communication via the Internet", O_2' . Action a_3 is redirected to the design of the new kind of communication technology. In Figure 8 above, this change is represented by the emergence of a_3' . But reaching the new objective O_2^* , "Internet for everybody" requires new actions (a_4) to disseminate a special kind of knowledge consisting of skills for Internet usage. The policy measures to disseminate the necessary skills also open new possibilities of interaction among agents. New ways of interacting might emerge, transforming the spaces of action (spaces of representation) of agents and producing economic change. The new action plan is depicted in Fig. 8, and is more complex than the previous one.

As shown by the previous example, renewed goals and intentions are integrated, or in a sense "endogenized", into the theory. However, it should be stressed that intentional action is *not* explained from within economics. It is rather that the action plan approach aims at locating, and thus "explaining" the exact place and role of intentionality (what its nature is from the point of view of the action plan) and also at forecasting its consequences when it appears.⁴

Changing goals operate in economic systems because economic agents incorporate them into their spaces of representation, thereby producing choice *ex novo*. "Rational choice is an inadequate explanation for behaviour, because neither the empirical premises nor the objectives of behaviour can be logically derived." (Loasby 2002, p. 1231). As Loasby points out, the search for novelty cannot be *rational*, for "no kind of reasoning can give rise to a new idea" (Hume 1978 [1739], p. 164).

⁴ From this perspective we can no longer conclude, as Schumpeter does (1932) that "[n]ovelty is the true centre of everything that must be accepted as indeterminate in the most profound sense". Novelty is only indeterminate as far as its precision or content is concerned, not its structure nor its properties.

The action plan approach is compatible with this view: creating choice is, in the first place, producing new goals of action. When agents incorporate new objectives into their space of representations they may trigger the discovery of new means to achieve these objectives. This is not incompatible with the possibility of agents also representing new means (actions) within their space of representations. However, this would be a particular case where, given certain objectives, agents incorporate (discover, learn, imitate, etc.) new means in order to achieve them in the best possible way. The most general case is the one in which objectives are produced (imagined, set, etc.) by the agents. Considering changes in objectives as the most general case enables us to treat other particular cases such as novelty in means, given objectives, given means, etc.

Thus, actions such as producing, consuming, innovating, working and organizing, etc., are conditioned by agents' desires and the goals they pursue, which vary greatly and are subjected to change over time (Cañibano et al. 2006). Consequently, diversity and changes in pursued goals should be considered a key explanatory element of the process of self-transformation of social and economic systems by means of the renewed intentional actions they induce.⁵ These are the imagined realities deemed as possible and desired towards which the agent directs his / her action (Loasby 1996) and they are also a source of complexity (in a broader sense than Metcalfe and Foster 2004). Important features of novelty generation and innovation processes may be addressed by focusing on the dynamics of the agents' formulation of goals.

In this approach, agents' rationality depends on the goals and motivations they pursue, their expectations and beliefs, etc.; that is, on intentional states of their minds. Thus, we claim that what directs economic activity is not only the economic calculus (instrumental rationality), but also the possibility of developing a true open rationality, the rationality of the unexpected in a context of radical uncertainty. Intentionality fuels the constitution of plans and their deployment; that is, individual actions.

In this context, the very concept of economic rationality needs to be reconsidered. The fact that humans respond in an intentional manner to the problems they face is perfectly

⁵ For the role of intention, desiderata, principles and connections, etc. in the process of invention and development of technologies, see Arthur (2007).

compatible with a view that emphasizes the conjectural nature of their problem-solutions and the open-endedness of the process in which the validity of their conjectural solutions is tested. This approach implies an open-ended economic rationality concept: as Felin & Foss (2009) show instead of imposing a limitation to rationality (in the sense of Simon) what is needed is to explore rationality itself in order to make it compatible with open-endedness process of decision in intentional action context.

The identification of a place for intentional action in economics is of little interest in itself if the consequences in terms of (structural) economic change are not explored. In the next section we explore, briefly, the logical link between interactive deployment of intentional action and economic evolution. The hypothesis here is that the interactive deployment of intentional action is at the basis of economic evolution.

4. Intentional action at the base of socioeconomic evolution

The *Smithian* framework contains a paradox as it sums up as co-explicated elements a self-organized process resulting from agents interaction on the one hand and, on the other hand, a spontaneous co-ordination process. The self-organized process presents its own tendential dynamism in which the whole is different from the sum of the constituting parts, while the spontaneous co-ordination process is non-intended or based on a deterministic intention (which actually implies denying intention) which a priori guarantees equilibrium, understood as co-ordination. The invisible hand thus expresses a significant antagonism between evolutionary socioeconomic (complex) processes and the deterministic explanation of their dynamism.

The analytical alternative we propose in this paper is simple: it eliminates that deterministic element of the paradox and replaces it with an approach based on ‘action plans’ in which substantive (non deterministic) intention can be accommodated.

From this perspective we may address the links between intentionality and economic evolution. By economic evolution we mean ‘dynamic endogenous structural change

capable of inducing or generating novelties' (Rubio de Urquía 2003, p. 64). Let G_t be a society formed by successive contemporaneous groups of agents (persons and organisations). These groups deploy their action plans in mutual interaction. There is also at every point in time a state of the environment U_t . The action of each agent can alter the dynamics of other agents, and it can alter U_t as well; the reverse is also true. The idea of global dynamic transformation of a social system could be represented as follows.⁶ At any given instant, consider the diverse *structural elements* that characterise the whole system G_t : the cognitive dynamics of each agent i , his ethical dynamics, the cultural dynamics of society as a whole, as well as the state of the environment, U_t . The global dynamics of society, denoted $\Delta(G_t)$, are the dynamics of transformation from G_{t-1} to G_t .

In this context, economic evolution refers to processes that transform the structural elements, and novelties –mainly changes in agents' objectives- refer to the occurrence of something that has not previously taken place in any of them. The occurrence of structural change and novelties induces a process that is self-organised. It is necessary that mutual interaction of action plans among agents generates structural changes endogenously. Endogenous change means changes in the agents' dynamics: not only in their cognitive dynamics, as has been largely recognised by the literature.

The main argument can be summarised as follows: *if* economic change is “dynamic endogenous structural change capable of inducing or generating novelties”; *if* structural change refers to processes that transform these structural elements; *if* novelty refers to the occurrence of something that has not previously taken place within any of these elements; and *if* novelty could be produced by changes in intentional states of the agents—that usually manifests in changes in agents' goals and/or hierarchy of goals-; *then agents' intentionality generates economic evolution.*

Assuming this argument, a deeper inquiry into the nature and consequences of all these processes would be necessary. But the objective of this paper is to point out the logical connection of all these elements in order to contribute to the theory of economic change, and in particular to bring the role of intentionality into this explanation.

⁶ See, for a formal argument-proof, Rubio de Urquía (2003), especially Section III.

5. Concluding remarks

If our proposal is correct, the consideration of intentionality in the economic theoretical discourse has the following implications. First it would be fundamental for economic analysis trying to explain why interactive agents adopt some specific action plans instead of any other and secondly to study the effects that the adoption of certain action plans has on the environment and the agents themselves. In other terms, the task would consist in analysing why agents choose certain specific courses of action and what happens when they try to deploy their plans.

It is possible to address the above issues in the context proposed in this paper, using an open analytical structure which is genuinely dynamic and permits us to address interactive action and its consequences in terms of evolutionary economic processes. The analytical alternative that we have proposed in this paper eliminates the deterministic element of the Smithian paradox because of a substantive (non deterministic) intention can be accommodated in the explanation of evolutionary economic processes.

Economic evolution is linked to the occurrence of structural change that induces a process that is complex and self-organised. The necessary condition for these processes to generate structural change endogenously is the mutual interaction of action plans among agents (individual and organisations).

Moreover, the spontaneous co-ordination process of the invisible hand based on a deterministic agents' intention which a priori guarantees equilibrium, is incompatible with the generation of structural change endogenously linked to novelties and intention in agents' action plan. Using the framework proposed in this paper the deterministic paradox can be overcome by allowing the analytical inclusion of intention within evolutionary economic theorizing. Selection, variety generation, retention and change are thus made compatible with intentionality in human action. The identification of a place for intentional action in economics and the explanation of the logical link between

interactive deployment of intentional action and economic evolution have been the prerequisite for that compatibility.

The interactive deployment of agents' action plans transforms both the external (physical, cultural and social) and internal (revised individuals' frameworks) reality of individuals and becomes a source of complexity. Social dynamics is the result of this concurrence of agents' dynamics. The emergent properties of socio-economic processes operate on the individuals' frameworks in different ways (mainly through reflection and learning processes) and these frameworks, to the extent that they generate plans, provide renewed variety which fuel evolutionary processes. It is the invention and selection of new goals that determines the content and direction of agent's opportunities for action and therefore, the direction of the evolutionary process.

Obviously not all human actions are the result of conscious planning not is every consequence of human action intended. The unintended consequences of actions may be very important (to the extent that Popper (1948) thought that the analysis of the unintended consequences of decisions as the main research topic for economics). The proposed approach does not eliminate the unintended consequences of action, neither at the individual nor at the social level. However, even though not every action is intended and not every novelty is the result of intended action, we believe the evolution of agents' intentions and their goals is a key process in the explanation of economic change and its direction and sense. This introduction of 'sense' in economic processes explains why they are not 'blind' unlike natural biological ones.

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