The Foundations of Evolutionary Institutional Economics

Generic institutionalism

Manuel Wäckerle

Routledge

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Generic institutionalism offers a new perspective on institutional economic change within an evolutionary framework. The institutional landscape shapes the social fabric and economic organization in manifold ways. The book elaborates on the ubiquity of such institutional forms with regards to their emergence, durability and exit in social agency–structure relations. Thereby institutions are considered as social learning environments changing the knowledge base of the economy along generic rule-sets in non-nomological ways from within.

Specific attention is given to a theoretical structuring of the topic in ontology, heuristics and methodology. Part I introduces a generic naturalistic ontology by comparing prevalent ontological claims in evolutionary economics and preparing them for a broader pluralist and interdisciplinary discourse. Part II reconsiders these ontological claims and confronts it with prevalent heuristics, conceptualizations and projections of institutional change. In this respect the book revisits the institutional economic thought of Thorstein Veblen, Friedrich August von Hayek, Joseph Alois Schumpeter and Pierre Bourdieu. A synthesis is suggested in an application of the generic rule-based approach. Part III discusses the implementation of rule-based bottom-up models of institutional change and provides a basic prototype agent-based computational simulation. The evolution of power relations plays an important role in the programming of real-life communication networks. This notion characterizes the discussed policy realms (Part IV) of ecological and financial sustainability as tremendously complex areas for institutional change in the political economy, leading to the concluding topic of democracy in practice.

The novelty of this approach is given by its modular theoretical structure. It turns out that institutional change is carried substantially by affective social orders in contrast to rational orders as communicated in orthodox economic realms. The characteristics of affective orders are derived theoretically from intersections between ontology and heuristics, where interdependencies between instinct, cognition, rationality, reason, social practice, habit, routine or disposition are essential for the embodiment of knowledge. This kind of research indicates new generic directions to study social learning in particular and institutional evolution in general.

Manuel Wäckerle is a lecturer and research assistant at the Vienna University of Economics and Business, Austria.

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Generic institutionalism

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Introduction – evolutionary economic programs

Generic institutionalism offers a new perspective on institutional economic change within an evolutionary framework. The institutional landscape shapes the social fabric and economic organization in manifold ways. This research monograph elaborates on the ubiquity of such institutional forms with regards to their emergence, durability and exit in social agency–structure relations. Thereby institutions are considered as social learning environments changing the knowledge base of the economy along generic rule-sets from within.

Since the seminal work of the early evolutionary economists such as Thorstein Veblen, Friedrich August von Hayek and Joseph Alois Schumpeter we can speak of an evolutionary turn in economics. This turn deals with the recognition of a continuity of change in economic operations and the self-transformation of the economic system from within. It is also due to these scholars that institutions have received major reception in the economic discourse, not only with respect to the governance of economic systems but also for the transmission and persistence of economic knowledge over time and space. In evolutionary economics we consider this knowledge as embodied and naturalized in economic agents and in institutions. This double character of agency and structure as knowledge repositories drives the co-evolution of the economic system. However, till today we have not elaborated any proper and foremost common synthesis of these co-evolutionary processes leading to self-transformation within an evolutionary institutional economics. Actual major economic problems, such as the ecological transition towards a sustainable mode of production and consumption, the interdependence between finance and industry in credit-driven innovation and, most importantly, the necessary redesign of democratic practices in political economy, imply crucial institutional problems of change. The fact is that the complexity of these problems is not addressed within the standard economic canon and conclusively the burning significance of an institutional economic discourse is tremendously marginalized. The present work delivers an introduction to this discourse, signalizes its generic importance as provoking all spheres of socioeconomic life and articulates a prototype synthesis across the affected fields.

For evolutionary economics, a turn towards a synthetic scientific discipline could truly be a future challenge. Generic institutionalism outlines the

cornerstones for such a possible trajectory by looking into the semantics of evolutionary language in economics, insofar as generic institutionalism is designed as a development kit for evolutionary economic programs with a focus on institutional change. The present work is not trying to state foundations in a paradigmatic, but in a pragmatic way. The foundations of evolutionary institutional economics are developed as constituents of a scientific language for generic evolutionary processes in the social and economic sciences. A language needs libraries for expressions and terms, procedures to form sentences and narratives to build meaningful sets of sentences. Generic institutionalism focuses therefore on ontology, heuristics and methodological considerations to draft evolutionary economic programs in a bottom-up, pluralist and interdisciplinary way. The differentiation between ontology, heuristics and methodology offers a qualified structure for such an endeavour and provides semantic and synthetic power ultimately to arrive at policy implications. Learning a language is always challenging and from my personal experience I can only admit that learning 'evolutionary economics' was far more complicated than orthodox economic languages or any foreign or programming language. Generic institutionalism provides a selected array of evolutionary institutional economic thought and method in order to understand this language, communicate and argue with it. It shows how evolutionary economic programs look alike and how one may re-implement existing narratives or even create novel ones.

To this extent, it is not a coincidence that we speak of programs and not of paradigms in this regard, but why do we not speak of programmes? In British English the term program is used only for computational programs, in American English there is no distinction met and the term program is used for any set of procedures, schedules or rule-based definitions of a greater process-oriented whole or event. When it comes to science we speak of a research programme in the following way: 'The programme consists of methodological rules: some tell us what paths of research to avoid (negative heuristic), and others what paths to pursue (positive heuristics)' (Lakatos 1980, p. 47). Imre Lakatos conceives the history of science as the history of research programmes, where the positive and negative heuristics shape the 'conceptual framework' of a science. When Lakatos defines a conceptual framework as a scientific language, he understands the history of science as the history of scientific languages then. Now, if we move on to the particular scientific language of evolutionary economics it seems fruitful to refer to *programs* instead of *programmes*, as articulated by Hanappi (2003). The notion of a *scientific research program* – whether British or American English – extends the concept of a scientific language by the category of a programming language from a computational perspective. Science is considered as a collective programming project, from a semantic and synthetic point of view. Within such a perspective we may struggle with following question: does evolutionary theory provoke a paradigm change in the social and economic sciences or do we design science in a novel way by committing to the idea of evolution in a generic way?

Paradigms or programs? Hanappi (2003) revisits the differentiation of Kuhn's (1962) conception of scientific paradigm and Lakatos' (1980) scientific research

programme with convincing arguments. A paradigm consists of *core sentences* and a *protective belt* around the core, according to Kuhn (1962). The 'daily' business of science is located in the protective belt, where the core sentences, theorems or axioms are tested via empirical observation. This belt of auxiliary theories produces scientific knowledge to defend the core sentences against other potential paradigms. Scientific revolution happens if these core sentences disappear in favour of a new paradigm. This aspect of a scientific revolution relates only to 'research in the development of formal languages', Hanappi (2003, p. 3). However Hanappi argues that there is a second type of scientific evolution, which is concerned with the synthesis of two worlds – the world of formal representation and the world outside of language. This distinction carries quite deep philosophical content, goes back even to Immanuel Kant and is a central concern in linguistics nowadays. Generally it is about analytical and synthetic propositions, where the latter refer to the synthesis of both worlds. Therefore it is suggested that evolutionary programs in economics – with regards to its pluralist and interdisciplinary nature – focus on the formulation of *synthetic propositions or sentences*, in contrast to the establishment of a new analytical paradigm. Where Hanappi (2003) refers explicitly to a strategic scientific shift towards a variety of synthetic evolutionary economic programs in comparison to a unified analytical evolutionary economics paradigm, others are more implicit, such as Simon (1996) or more recently Mirowski (2002) and Beinhocker (2007, 2011). Today a computer program establishes exactly this synthesis between the world of formal representation and the world outside of language.

> It is written in a language but it also performs something outside the language.... At first glance rather innocent, the turn to synthetic scientific disciplines and their programs proves to be a severe shift in perspective, indeed a reversal of many of the features of analytic language developing sciences. Where consistency and timeless generality ruled as ultimate goals to be achieved, they now only figure as partially achievable side-constraints that are dominated by the time-dependent and particular success indicators outside language. Using Peirce's distinctions, semantic and pragmatic aspects dominate, even drive, syntactic aspects in synthetic scientific disciplines. [Peirce, 1988].
>
> (Hanappi 2003, p. 4)

Following Peirce (1998) in a very modest way, we aim for a categorization of different ontological and heuristic representations as well as interpretations of economic evolution, insofar as we identify a multitude of evolutionary economic programs and associate them in a sufficient way for further synthesis. Synthesis can be regarded as the magic word in this context, where economists may finally engage in modelling real world phenomena in a novel way. The fundamental difference between analytical and synthetic approaches relies on the distinction between *core sentences* and the *protective belt*, which becomes progressively redundant within a synthetic outline. Such an attempt switches from *discovering*

to *interpreting* the world. For those reasons the formulation and communication of a novel (evolutionary) language in economics becomes important. In evolutionary programs of economics we are able to simulate real-world phenomena within programs, rather than tweaking an analytical framework (*axiomatic variation*, cf. Kapeller 2011, p. 160) in tautological ways.

The proposed approach in this work follows an evolutionary way of analysis, where economists gain new insights through new interpretations and recombinations. All heterodox economic approaches emphasize and share an intense communication culture about real-world phenomena for good reason. By this they sustain the synthesis of ideas and concepts, meaning in particular the reprogramming of the scientific language with informal as well as formal programs. But heterodox narratives could benefit substantially from improved visualizations of their messages via bottom-up simulations, concrete formal actualizations in a programmed set of synthetic sentences. Nevertheless major complications may also occur when shifting from paradigms to programs:

> At least some sentences of programs refer to items outside the language, they try to spell out simplified non-linear dynamics that are suggested as a model of essential 'real' world dynamics. Since such programs are produced (not discovered) by participants in the real process, these programs contain images of their producers. They even may contain images of their own production processes. In short, the problem of self-referential circuits between real and model dynamics appears.
>
> (Hanappi 2003, p. 4)

This challenge makes computer simulation attractive as a formal language for synthetic sciences. The scientist becomes an active endogenous part of real-world dynamics. Concerning this matter, scientific achievement cannot be regarded as an isolated, pure and value-free artefact, which is still somehow a curious assumption within mainstream economic theory. In contrast, generic institutionalism categorizes, stresses and synthetizes differing or even contradictory value systems. Contradiction, distinction and diversity shape generic evolutionary processes by uploading spaces with power relations. Thereby it offers new research perspectives as well as policy implications in comparison to a *nomological institutionalism*. Institutional analysis cannot be drawn from a universal time-invariant law (*nomos*). Interdependencies between agency and socioeconomic structure are far too complex for a mere deductive derivation of expressions about the institutions analysed. Furthermore these interdependencies induce continuous change in institutional settings, transforming the political economy in an endogenous way.

Nomological research programs build upon a mechanistic perspective of how systems change and how they are perceived. Systems are conceived as closed in such a picture, meaning in particular that any change needs added energy from outside. Research, based on a closed system approach, faces critical problems with the analysis of endogenous system transformation, stemming from the

entities within. If the political economy is articulated, theoretically designed and modelled as a closed system, then institutions are exogenously fixed as externalities. The idea of a fixed and constant setup of institutions is a very weak point in economic research and needs to be advanced. Obviously such a design implies various crucial ramifications, which cannot be treated with axiomatic variation of the existing framework.

Evolutionary theory itself does not represent a single law, it is a layered program of methodological rules aiming to explain endogenous change in open systems, also allowing recursive change of evolution by evolution. Accordingly we do not focus on specific outcomes or final states of a transformation process, we rather look deeply into the evolution of the process itself, i.e. generic analysis in contrast to operant. Economic research mostly deals with operant analysis, which deals with entities and relations actualized by a generic process. The term *generic* is etymologically connected to *general*, *generative* as well as *genetic*. The common syllable *gene* is well known from evolutionary biology and genetics, but within a more basic interpretation, it just refers to a *carrier of information* for certain operations (compare Dopfer and Potts 2008, p. 6). We interpret it as an entity or sequence carrying a blueprint for an operation, which is then defined as a *rule* in the further exploration of this book. By considering an institution – in a very abstract and minimized way – as a system of rules, then generic institutionalism refers to the analysis and implementation of synthetic sentences about the endogenous change of such rule systems. Furthermore we delve more deeply into (1) naturalistic realities of involved entities in institutional setups – the question of *ontology*; (2) certain frames of institutional transformation processes – the question of *heuristics*; and (3) appropriate methods to model and simulate such processes – the question of *methodology*. The development kit of generic institutionalism thus provides a language for the implementation of certain evolutionary institutional economic programs in a four-fold process:

1 *ontological demands:* set up ontological libraries of necessary expressions and terms
2 *heuristic frames:* elaborate differing/contradictory evolutionary institutional economic heuristics as generic procedures
3 *methodological conceptions:* consider formal bottom-up languages to re-compile heuristics
4 *sustaining ontological demands with heuristic frames:* conduct institutional narratives in concrete policy realms for future simulations

This schema represents the structure of the book, inspired by Witt's (2008a) article on 'Ontological creeds and heuristic twists', discussed in Chapter 1. In particular, the first part of the book categorizes and analyses the ontological foundations of evolutionary economics. We give an overview of contemporary ontological strands in evolutionary economics as anchor points for evolutionary economic programs. This part provides new insights into the ontological roots of

evolutionary economics, forming the basic theoretical design for institutional analysis within a complex and rapidly changing world. It is interesting to note that these ontological roots have almost all been developed recently. Ontology became increasingly a significant issue since the rise of neo-Schumpeterian economics in the 1980s, especially with the seminal contribution by Nelson and Winter (1982). Today we differentiate between dualistic (Chapter 2) and monistic ontologies (Chapter 3), where the former broadly use evolutionary theory as analogy or metaphor in economics and the latter as ontology within a naturalistic picture of economic evolution. Part I of the book surveys this systematic categorization and introduces current attempts with a focus on naturalistic approaches. Conceptualizations of a naturalistic ontology have been elaborated by Geoffrey M. Hodgson and Thorbjørn Knudsen, Ulrich Witt, Kurt Dopfer and Jason Potts. Since this ontological debate improves continuously with new articles every year, we will focus on the basic expressions, terms and concepts in order to understand the different meanings of economic evolution sufficiently. The idea of a generalized Darwinism is defended especially in the works of Hodgson (2002) and Hodgson and Knudsen (2006). Generalized Darwinism considers a very high level of abstraction and approaches naturalism via a radical interpretation of the Darwinian trajectory of variation, selection and retention along the notion of complex population systems, as recently restated in Hodgson and Knudsen (2012). Contemporary generic naturalistic approaches are articulated via the continuity hypothesis in Witt (2003, 2008b, 2009) and via evolutionary realism in Dopfer and Potts (2004, 2008, 2010). The continuity hypothesis suggests continuity between biological, cultural and economic evolution, but emphasizes generic evolutionary principles for economic change like novelty, dissemination and diffusion, as also articulated in Hanappi (1994). Quite similarly evolutionary realism also follows the principle of evolutionary continuity, but focuses on a layered ontology where complexity increases from a physical layer to a biological and finally to an economic layer, insofar as evolutionary realism focuses not only on continuity but also on systemic embeddedness with regards to degrees of complexity. In the concluding Chapter 4 we reflect on the elaborated ontological library and look briefly into extensions from critical naturalism and more systemic approaches such as the evolutionary-developmental outline.

Part II leaves the realm of ontology and steps into discussion on heuristic frames of institutional change. An investigation of differing and even contradicting institutional heuristics provokes diverse procedural approaches and opens a space for the implementation of synthetic sentences on institutions, about their stability/fragility and life-cycles in general. In particular we present four different heuristics of institutional change, referring to the scientific legacy of Thorstein Veblen (1857–1929) – Chapter 6; Friedrich August von Hayek (1899–1992) – Chapter 7; Joseph Alois Schumpeter (1883–1950) – Chapter 8; and Pierre Bourdieu (1930–2002) – Chapter 9. The endeavour of this part relies on explaining major characteristics of central heuristic devices by focusing on following problems:

- agency–structure interdependencies
- basic vision of an institution and its change
- the role of evolution within the specific heuristics
- the socioeconomic effects of institutional evolution

By looking into these problems we are able to locate basic commonalities and discrepancies in their work on economic and institutional change. The generic-rule based approach – elaborated by Dopfer and Potts (2008) – serves as a semantic programming language for a further heuristic synthesis then in Chapter 10. Dopfer and Potts offer a clear-cut concept for the development of generic evolutionary language, which clearly inspired the ambitions for generic institutionalism. The concept of generic rules invites the idea of formal representation via synthetic sentences in programs and constitutes the integral schema of generic institutionalism therefore. Within this schema we are able to draft institutional modules of Veblen, Hayek, Schumpeter and Bourdieu rule-sets as basic evolutionary economic programs of institutional change. This modularization offers a perspective of potential synthetic links across the fields. Otherwise it informs us also on the active and passive power relations within institutional change, with regards to the destructive as well as creative potential for transformation in the economic system. Synchronization, coordination and correspondence of rules and rule-modules shape the evolving political economy by distributing knowledge and power in consequence, which leads the transition to Part III.

Concerning the formal character of evolutionary economic programs we refer to methods of bottom-up modelling, simulation and visualization. Chapter 12 gives an overview of potential candidates for such actualizations. Over the last decades the science of complexity has produced powerful concepts and tools to create formalized narratives of political economic change. The potential gains from bottom-up modelling and simulation demonstrating complex evolving problems by decomposing them in understandable modules are significantly high from a didactic and pedagogic point of view. In particular, evolutionary institutional economists, who build concepts and theories upon the idea of social learning, should consider this aspect as a cornerstone for the analysis of institutional change. In this respect we consider evolution itself as computation (Beinhocker 2011), as experimental and recursive bottom-up modelling, simulation and realization of life, culture, society, politics and the economy. The elaborated concepts in Chapter 12 are driven from various fields, such as the economics of organization, complexity and network science, game theory and computational agent-based modelling. Thereby it provides guidance from semantic to synthetic programming.

A great extent of this body of literature is then applied within an abstract agent-based model of institutional change with endogenous network formation in Chapter 13. Network analysis is used to outline the dynamics of power networks, with institutions as nodes and power relations between them as edges. Agents are able to interact and link each other in a simplified space. They play iterated games (prisoner dilemma) to structure institutions as cooperation enforcers, equipped with stylized social and economic capital. Furthermore, institutions also interact

iteratively through their leaders in a social network on a higher level in this artificial society (via a hawk–dove game). The interaction on the more *micro* level and the interaction on the institutional or *meso* level shall represent the complex, adaptive dynamics of this basic artificial political economy, where institutions emerge and exit endogenously. This approach attempts to visualize evolutionary institutional change in a very generic way within a computational agent-based network. Additionally it provides new insights on stability and fragility of a rule-based political economy, depending archaically on trust and power relations.

Chapter 14 concludes Part III with an elaboration of power as a network category, emerging out of synchronization, coordination and correspondence of institutional rule-modules. This more informal approach discusses the role of power in networked communities/societies, by elaborating on Herrmann-Pillath's (2004) work on power within networks. Where Michel Foucault's work is of great influence in the social and political sciences today, Castells (2009) integrates his discursive concept of power with other approaches and plays with the notion of power in a highly interesting way. He is concerned with communication power in the information society and conceives it as a relational ability to program and re-program society, which fits perfectly into the greater picture of generic institutionalism. We may generally refer to an increasing convergence between post-structural philosophy, generic evolutionary economics and the science of complex adaptive systems. First synthesizing attempts in such a direction are interpreted within the Deleuzian social-philosophy of DeLanda (2006, 2011).

Finally generic institutionalism would remain an empty hull of theoretical propositions if we would not consider it for the analysis of bottom-up power in current global challenges. Part IV of the present work considers evolutionary institutional economic programs as appropriate tools for policy analysis. Chapter 16 focuses on the ecological frontier, especially the relation between institutions, technology and nature. Schumpeterian innovation drives technological change and shapes institutions from the supply side. Hence the entrepreneur may act as a crucial element towards an ecological transition along green innovation. The other side of the coin is denoted from the consumption perspective of institutional change, in particular by Veblenian consumption dynamics. Obviously an energy transition is also possible along new sustainable socioeconomic practices. Both realms are capable of reducing entropy (Georgescu-Roegen 1971) via diversification within the economic system.

The complexity of credit-money is the topic of Chapter 17 and applies generic institutionalism with regards to the credit-channel of monetary transmission. Thereby we investigate an all-time economic problem, but with current significant importance, the policy complex between industry and finance or the banking-macro link. Besides a brief overview of the history of monetary thought, we elaborate on an integration of post-Keynesian endogenous money and Schumpeterian credit-driven innovation along Minsky's (2008 [1986]) blueprints. The institutional process of monetary transmission highlights the crucial role of the bank for systemic stability in the economy. Actually this emphasis was not only recognized by the post-Keynesian and Schumpeterian tradition of

economic thought, but also by Austrian economics and American institutionalisms. We may thus consider the issue of credit-money not only as highly controversial in the history of economic thought, but also as one of the most important issues in institutional evolution, concerning systemic vulnerability of, as well as innovative potential in, the political economy. Furthermore, with reference to current work on the structural evolution of firm–bank networks and agent-based macroeconomics, it is outlined how institutional processes in monetary transmission can get synthesized within bottom-up models. For that reason preparatory work is suggested along a generic credit-rule taxonomy of bank lending, allowing for evolutionary economic programs of the banking-macro link by opening the black box of banking.

Parallel to banking we also face major problems regarding the legitimization of power and power relations in our political economies. It is not by coincidence that new bottom-up movements emerged after the financial crisis of 2008. Democratic control of power establishes and justifies the existence of institutions in the first place. The challenges for appropriate democratic control in a globalized and highly diversified world are immense. It is therefore necessary to bring the issue of democratic practice (Chapter 18) to the forefront of evolutionary institutional economics. This last chapter excerpts a history of democratic models (Held 1996), elaborates the evolution of democracy and discusses current lines of the legitimization problem. We refer to Sen's (2010) substantial distinction between a transcendental and a comparative institutionalism and improve the latter by bringing in the roots of institutional thought. Amartya Sen's idea of justice and democracy is to a great extent congruent with early American pragmatism and institutionalism. It debates democracy as a theory of practice and raises the issue of information sharing to the top on the agenda. Knowledge controls democracy and its evolution shapes the political economy. Therefore it is important how decisions are made in a collective way with regards to private and public information, addressing the ultimate significance of social choice. Social choices depend on the variety of knowledge, therefore on the diversity of culture. We conclude this chapter with a subsuming argument for generic institutionalism as a development kit for evolutionary economic programs. Programming does not refer to a deterministic process, be it programming of a scientific language, of a formal model or even of nature, culture, society, politics or the economy. It is an open (evolutionary) process of learning by experimental testing of synthesizing individuality, sociality and the local environment in learning processes. It is a life-long process, it stops only by passing away. Now, we need to ask ourselves how learning is institutionalized in capitalism and what learning shall look like? *Not for profit* is the message delivered by Nussbaum (2010) and why democracy needs the humanities for its own survival.

Generic institutionalism emphasizes the notion of pluralist and interdisciplinary evolutionary economic programs with a focus on synthetic links, synergy and diversification, augmenting spaces for creativity and socioeconomic innovation from the bottom up.

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Part I

Evolution – ontological foundations

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1   Ontologies and heuristics

Ontology is definitely not a prominent topic in economics, but it has experienced increasing recognition from heterodox economic approaches during recent decades. And it turned out that ontology carries significant content for the making of economic theory. Heterodoxy is concerned with a more realistic re-compilation of economic science and therefore stumbled necessarily upon ontology, because it is about the nature and being of economic reality. The basic outline suggests that economic realities go beyond or even beneath mere individual preferences and their automatic coordination in virtual markets. Since heterodoxy aims at designing economics in a generic way, that means in particular addressing all economic provocations on life, one is interested in those beyond and beneath realities, like institutions for instance. The more we look into details, we find out that these realities also change themselves and their environment over time and are not accountable with static axiomatic conceptions. In sociology we find several principles of social causation (compare for instance Mouzelis 1995, 2007), capable of explaining dynamic change in society by looking into interdependencies between agency and structure. Why do we not just use these principles for a social ontology of economics?

Tang (2011) follows a synthetic approach in his philosophy of the social sciences by investigating the integrative potential of social theories along their ontological priority. Tang understands synthesis in science in a similar way to that we have already elaborated in the introductory outline by emphasizing evolutionary economic programs.

> Human society is made of both material forces and ideational forces. Thus, any social science must be based on both materialism and ideationalism. A purely materialistic approach is obviously untenable because human beings invent ideas and ideas have profoundly (re)shaped human society and the physical environment. A purely ideationalistic approach will not do either, because even if one insists that an idea matters – and ideas do matter – one still needs to explain how that idea comes to exist and matter. And unless one is prepared to accept infinite regression, there is no alternative but to look at the material world for explaining how and why an idea comes

to exist and matter. The challenge is how to synthesize materialism and ide-
ationalism organically.

(Tang 2011, p. 219)

Following Tang's outline there are only two integrative conceptions in the social
sciences capable of synthesizing materialism and ideationalism. On the one hand
we are dealing with what Shiping Tang calls the *Social System Paradigm* (SSP)
and on the other hand with the *Social Evolution Paradigm* (SEP). SSP was prin-
cipally elaborated in several works by Niklas Luhmann, but primarily in his
theory of *Social Systems* (Luhmann 1984). This unique endeavour could synthe-
size Bertalanffy's (2001 [1968]) *General System Theory* into sociological terms
of complex social systems. In SSP emergence and self-organization is already a
central topic, but it lacks one significant building block for fully-fledged synthe-
sis, i.e. transformation over time. SEP extends SSP by introducing time, by
allowing time to potentially transform social systems. Then SEP integrates SSP
and all other social paradigms into a greater theoretical whole.

> There cannot be any doubt that biological evolution provides the most
> fundamental part of human nature: socialization and antisocialization must
> have a material foundation, and this foundation could only have been pro-
> vided by the biological evolution of the ancestors of our species (i.e., pre-
> Homo habilis species). The part of human nature determined by biological
> evolution, which in all likelihood is inerasable and universal, obviously
> holds ontological priority over both socialization and antisocialization. As
> our ancestors after Homo erectus began to live in larger and larger groups,
> the weight of social forces gradually increased. At the beginning of our
> group living, institutional structure was sparse, and socialization by the large
> society was relatively weak and antisocialization was even weaker. As a
> society's institutional structure becomes denser, however, pressure for
> socialization becomes more pervasive and pressing.
>
> (Tang 2011, p. 228)

In consequence it seems logical to follow a concept with higher ontological pri-
ority than a social ontology. But it does not say that principles of social causa-
tion are less important: on the contrary, they frame institutional change, where
social pressures increase. The significance of social causation becomes apparent
at the level of *heuristics*. However heuristic vehicles are an integral part of a
greater evolutionary nature of being, but indicating also that natural selection
does not work as a heuristic of social causation.

> The problem with biological evolutionary determinism is apparent: it fails to
> take social forces into account, at least not adequately. Because human beings
> and human societies today are a product of social evolution, rather than bio-
> logical evolution alone, natural selection alone cannot possibly account for all,
> perhaps not even the major, drivers of human behaviors. Indeed, as I argue in

detail elsewhere, artificial selection by human intelligence but within the constraints provided by the material forces has become the more powerful selection force in human society as humans produce more and more ideas.

(Tang 2011, p. 228)

In this respect Shiping Tang suggests investigating what he calls artificial selection within social evolution driven by institutional change. Evolutionary economists started to think about ontology by regarding exactly this sort of question. What is the difference between natural and artificial selection in biological and economic evolution? Is artificial selection even an appropriate description for generic evolutionary processes on the socioeconomic level? What role does it play in the greater Darwinian ensemble of variation, selection and retention?

Early evolutionary economists such as Veblen, Schumpeter, Hayek or Georgescu-Roegen have also worried with these questions, some were more explicit, some more implicit. Today evolutionary economics delivers a broad and deep theoretical body capable of reflecting on its history, which is still one of the major driving forces of current theoretical contributions in the field. Witt provides a simple orientation schema to interpret not only the past of evolutionary economics but also its possible future.

Table 1.1 indicates evolutionary economic programs with regards to ontological and heuristic orientation and shows basic dimensions of evolutionary thought in economics. This categorization offers a constructive and comprehensive schema, which is extremely instructive for people new to evolutionary economics. Obviously we may identify concepts like this as scientifically innovative, because it offers orientation points within and between the economic communities. With ontology an additional dimension gets recognized as a major extension to the theoretically content of evolutionary economics:

the *ontological* level (what basic assumptions are made about the structure of reality), the *heuristic* level (how the problems are framed to induce hypotheses), and the *methodological* level (what methods are used to express and verify theories).

(Witt 2008b, p. 548)

Table 1.1 Ontological creeds and heuristic twists

Heuristic twist	Ontological creed	
	Monistic	Two-tier
Darwinian concepts (variation, selection and retention)	*General Darwinism*	*Neo-Schumpeterian*
Generic concepts (novelty, emergence and dissemination)	*Continuity Hypothesis*	*Schumpeter's Development*

Source: Witt (2008a, p. 14).

Each axis offers two options which lead us to four specific evolutionary onto-logical conceptions: *General Darwinism*, *Neo-Schumpeterian economics*, *Schumpeterian economics*, and the *Continuity Hypothesis* of evolution. The main ontological differences stem from different representations and interpre-tations of evolutionary theory in economics. Witt (2008a) supposes a distinc-tion between a monistic and a two-tier relationship between evolution (nature) and the economy (society/culture). The monistic picture refers to a synthesis of matter and idea, of nature and nurture, of body and mind, meaning in par-ticular that there is co-evolution between the economy and nature. It is further argued that economic change follows evolutionary principles in a generic way: because culture, economy and society are embedded within the system of evo-lution, it cannot escape. Alternatively the two-tier ontological perspective regards the economy and evolution as two separated systems. Therefore econ-omists emphasize the borrowing of ideas from evolutionary theory as analo-gies, and application of them in economic models, but remaining as two separate systems of thought.

> Constructing analogies between different disciplinary domains is a frequent *heuristic* device that is guidance in framing problems and setting up hypo-theses. A question to be distinguished from this is the *ontological* claims that theories make (often implicitly) regarding the connection between the disciplinary domains involved.
>
> (Witt 2008a, p. 10, original emphasis)

Within this quotation Witt (2008a) urges on the one hand that it is necessary to borrow ideas and implement them in economics to create new hypotheses, com-parable to the Schumpeterian system of new combinations. On the other hand scientific analogies may confuse things in a dramatic way, especially when it is not clearly defined which domain hosts the ontological core. Ontological claims are often different and incompatible with the imported heuristics. For that reason we need to ask whether an 'imported' theory meets the stated claims or whether the claims of the 'foreign' domain are congruent with the 'domestic'? In our case we are confronted with two domains – biological evolution and socio-economic evolution. Once a biological analogy is formalized in economics, we may benefit from a new heuristic projection in the economic domain, but we may also confuse the ontological base. It is exactly this synthetic problem which occurred in the evolution of evolutionary economics, as following proper defini-tion exemplifies:

> If the ontological question of how economic change relates to change in nature is not entirely ignored, a kind of two-tier ontology is usually assumed. This means that economic and biological evolutionary processes are considered independent and disconnected elements of reality.
>
> (Witt 2008a, p. 11)

Otherwise differences in the foundations of a theory occur also in heuristic twists, projections or devices. 'These attitudes determine how problems are framed and hypotheses are formed in developing a theory' (Witt 2008a, pp. 12–13). Projections determine the mechanisms *of* and *for* change in evolutionary economics by framing the problem of change in a generic way. We have started the discussion by citing Hanappi (2003), as to whether there is a common mechanism of dynamic endogenous change in economics, driven by evolutionary rules or not. As Witt (2008a) follows, we may conclude that there is not a common agreement on the specific systematics of and for change in evolutionary economics. Apparently there are two major outlines which appear within the monistic conception: (1) the Darwinian logic driven by *variation–selection–retention* – briefly the Darwinian trajectory and (2) a generic approach with an emphasis on *novelty, emergence* and *dissemination*. Generalized Darwinism proposes a theoretical abstraction for all change in life along the Darwinian trajectory in a self-similar way, whereas a generic approach stresses the importance of different transmission mechanisms in economic, social and cultural environments, still recognizing the ubiquity of evolution. Both approaches follow the principle of co-evolution between genetic and cultural evolution and consequentially the idea of dual-inheritance, as highlighted by Boyd and Richerson (2005) for instance. Dual-inheritance represents a contested territory at the moment and seems to be the key element for future research in this realm. Scholars debate the plausibility of different vertical and horizontal mechanisms of economic, cultural and social reproduction, by repeating that genetic evolution is also driven not only by vertical mechanisms of reproduction. Hence the interaction between vertical and horizontal mechanisms specifies the modularity of the process. Otherwise we also observe huge gaps between biological (dual-inheritance) and reflexive cultural anthropology, the former focusing more on the grand themes of the emergence of culture and its evolution and the latter more on concrete narratives about social and cultural spaces with regards to field experiments. These gaps will not get closed soon, but efforts have to be taken in such direction.

One major pillar within the generic economic outline of a naturalistic ontology is given by the *continuity hypothesis* (compare Witt 2003, Parts I and III, for instance). The hypothesis means in particular that there is continuity between genetic and cultural evolution. Quite similar, Hanappi (1994) suggests co-evolution between evolutionary theory 1 (ET1) and an evolutionary theory 2 (ET2), where the former relates to the biological realm and the latter to cultural, economic and technological change. Here systemic endogenous change, driven by self-transforming and self-organizing processes, becomes an important issue and complexity, emergence and novelty is addressed. This heuristic projection was also shared by Schumpeter (1997 [1911]). Nevertheless he made a clear separation between economics and evolution and avoided the word *evolution* in his work and rather used the German word *Entwicklung* (development) to express familiar projections. The neo-Schumpeterian system of thought has followed the Schumpeterian ontological two-tier distinction, but has adopted a Darwinian heuristic.

Neo-Schumpeterian economics involves analogies and correlates from biological evolution. Nelson and Winter (1982) introduced *genotypes* (replicator) and *phenotypes* (interactor) into economics, as analogies for *routines* and *organizations*.

Witt (2008a) follows that a heuristic projection of emergence, novelty and dissemination is a generic concept, because any evolutionary change can be explained through alternate introduction of novelty into a system and its corresponding dissemination. According to this hypothesis the Darwinian heuristic twist is just a biological special case of a generic concept of evolution. Otherwise with respect to the former, the Darwinian projection may postulate the same critique for the generic concept and vice versa, if we consider biological evolution as the most general expression of change. Witt's continuity hypothesis proposes that the evolution of culture follows distinct mechanisms in comparison to genetic evolution, because human cognition allows for relaxation or even evasion of selection pressures through cooperative culture and/or technology. Additionally Witt (2008a) addresses the issue that we have to be very careful in using specific heuristic devices. Significant notice is given to the scientific community, that exclusive use of Darwinian concepts needs substantial explanation. Awareness stems from possible analogies with the theory of *rational choice*, as the dominant heuristic device in neoclassical economics, and the theory of *selection*, now used as a heuristic device in many works in evolutionary economics. However, in general current theories of economic evolution have a tendency towards a monistic ontological position, as Dopfer (2005) also observes. A different opinion is followed by Vromen:

> that 'borrowing from evolutionary biology', in the sense of assuming that the abstract structure of evolutionary theory in biology is a useful starting-point for studying ongoing processes of economic evolution, does neither entail a denial of agency nor a commitment of reductionism.
>
> (Vromen 2004, p. 216)

Vromen (2004) reaches a critical point in the discussion by challenging whether an ontological basis for economics should even be based on evolution at all. Critique of the evolutionary approach comes from post-Keynesian economists for instance, who are rather proposing a *social ontology*, because the naturalistic approach leads either into holism or reductionism, as argued by Lawson (2003). Inasmuch, as already articulated with Tang (2011), an evolutionary ontological claim does not neglect the social dimension of economic operations, rather the opposite. But evolutionary economic programs consider the social dimension in an inclusive way, within co-evolution of genetic and cultural evolution. Of course, an evolutionary ontology has to pay utmost attention to system and complexity theory, in order to understand the relation between economic entities and their coordination. This will be necessary to cover the developmental and systemic aspect of process modularity. As a consequence economics opens itself in a bottom-up, pluralist and interdisciplinary way throughout the sciences and humanities.

> But with what ontology should we start then? What ontology has sufficient credentials to play this role? Lawson's assertion that all methods, frameworks and points of view have ontological presuppositions can also be turned upside down here. Any attempt to formulate an appropriate ontology presupposes a point of view and has epistemic presuppositions.
>
> (Vromen 2004, p. 218)

Ontology does not have to turn into a race for a *prima philosophia* of social reality. However synthesis is always possible, even when we acknowledge that we come from different planets (epistemic presuppositions). Synthesis needs categorization and differentiation in advance, as Vromen proposes:

- The 'biological metaphor' and Universal Darwinism
  There are processes of economic evolution going on that exhibit the same essential abstract features as Darwinian evolutionary processes in biology.
- *The Continuity Hypothesis*
  Prior non-economic evolutionary processes made ongoing economic evolutionary processes possible. Furthermore, outcomes of prior non-economic evolutionary processes and concurrently ongoing non-economic evolutionary processes still affect ongoing economic evolutionary processes.
- *A Layered Ontology*
  There are several related levels of organization in the economic realm that in turn are realized in lower levels of organisation (studied by psychology, biology, chemistry and physics), and at which evolutionary processes may be going on concurrently.

> (Vromen 2004, p. 222)

This categorization suggests three clusters of ontologies, where Vromen puts together the neo-Schumpeterian ontology with generalized Darwinism (biological metaphor) in the first cluster. In the second cluster we find the continuity hypothesis and in the third evolutionary realism with a layered ontology. Albeit Vromen's schema is really instructive, it faces some contradictions with Witt (2008a, 2008b), because it favours heuristic instead of ontological priority. In generic institutionalism we work with an extended version of Witt's schema addressing the ontological significance of a dualistic or monistic view, but also differentiating between continuity hypothesis and evolutionary realism.

In this first part we will follow a major ontological separation between *dualistic* and *naturalistic* approaches. In the dualistic section there will be a distinction between *neo-Schumpeterian* economics – with Darwinian heuristics – and reinterpreted *Schumpeterian* economics – with generic heuristics. In the second ontological block a separation between *Darwinian naturalism or generalized Darwinism* and *generic naturalism* is suggested (*generic naturalism* understood as a superset for *continuity hypothesis* and *evolutionary realism*). Three

ontologically monistic approaches are brought together into one naturalistic ontological superset, which is then distinguished within the different heuristic projections. To conclude, the separated sections on the ontological level are represented and discussed from *dualistic approaches* and *naturalistic approaches.* The second distinctive argument on the level of *heuristics* has obviously a lot of semantic intersections with Part II of the book with regards to the work of Veblen, Hayek, Schumpeter, Bourdieu and proposed synthesis.

2 Dualistic approaches

Neo-Schumpeterian economics

Neo-Schumpeterian economics has to be understood as an evolutionary economic program to fulfil the greater vision of the Schumpeterian economic system. Schumpeterian economics is about the driving forces for economic growth – or more exactly – the driving forces for economic change. Change and development is something different from growth at a deeper perspective, change lies on a lower systematic layer than growth; it needs change for growth, but growth is not needed for change. This is a very crucial point in Schumpeterian analysis, because innovation primarily induces change and development. In orthodox economic terms change is induced via an exogenous shock, changing the equilibrium state of the economy. It is exactly this process that carries the dynamics of an economy in heterodox terms. The Schumpeterian economic system exhibits a progressive analysis of what may change and how it may change; it is about innovation dynamics leading to disequilibria. Orthodox economic theory is inappropriate to describe and explain these specific dynamics.

> As we stressed in Chapter 2, analysis of Schumpeterian competition has proved a difficult task using orthodox theoretical premises.... Although these models [*models with orthodox premises of profit maximization and equilibrium*] have yielded some illuminating insights, they ignore essential aspects of Schumpeterian competition – the fact that there are winners and losers and that the process is one of continuing disequilibrium. An evolutionary analysis seems required if the model is to recognize those facts.
>
> (Nelson and Winter 1982, p. 276)

This is a very crucial notion for a critical development of economic theory in general and especially for the economics of innovation. It is a theory of winning and losing, about a sequence of games as a continuous process of disequilibrium, due to incomplete information. Therefore Nelson and Winter (1982) introduce a very basic evolutionary concept to the game, i.e. imitation. Imitation is one of the most essential ingredients of social life. If there are winners and losers, the losers will keep on imitating the winners to improve their performance. 'But, as

Schumpeter emphasized, a central aspect of dynamic competition is that some firms deliberately strive to be leaders in technological innovations, while others attempt to keep up by imitating the successes of the leaders' (ibid., p. 275). Any economic analysis has to include heterogeneity and diversity within and between groups, classes or populations, compare D'Ippoliti (2011, p. 11) for an analysis of the concept of diversity in economics, in comparison to heterogeneity. Imitation and adaptation are central elements within this competitive logic. Imitating leaders presupposes a concept of selection on the other side, because a follower needs some orientation as to what shall get followed. In evolutionary theory we speak of differential success or fitness in a recursive way in this regard. The composition or heterogeneity within a population of firms follows this imitation and selection process in a first instance. The search process modularizes the alternatives insofar as a specific technique is only imitated if it is selected within the environment as prolific. Firms underlie a selection process then, which brings winners and losers to the front.

> The key development process he [*Schumpeter*] identified as the '*carrying out of new combinations*,' and in the competitive economy '*new combinations mean the competitive elimination of the old*'. It is the entrepreneur who carries out new combinations, who '*leads the means of production into new channels*' and may thereby reap an entrepreneurial profit.
>
> (Nelson and Winter 1982, p. 277, emphasis added)

'If a firm is a successful innovator frequently enough or if one of its innovations is dominant enough, the consequences of successful innovation may be a highly concentrated industry structure' (ibid., p. 308). Innovation frequencies determine the fitness of the firm and new combinations eliminate old ones. Successful entrepreneurs benefit from surpluses in an early monopoly, probably leading to a new industry structure through innovativeness and market power. This process can be interpreted as a selection process in an evolutionary way, where the fittest takes the lead and the others imitating it in a new emerging sector. Innovation itself emerges out of new combinations of either old products, old means of production or old modes of organization, as discussed in detail in Schumpeter's heuristics (Chapter 8, below).

Then the introduction of the Darwinian trajectory of variation, selection and retention represents exactly the so-called neo-Schumpeterian synthesis. Nevertheless Nelson and Winter (1982) establish this very deep innovation by an emphasis on the heterogeneity of firms, which even enables and justifies the usage of evolutionary ideas from a phylogenetic perspective. They distinguish them along the mode of production and the mode of organization. In the orthodox tradition extra profits may only be made by maximizing the modes of production, through more efficient techniques, but Nelson and Winter write about different modes of organization, which leads them to the concept of *organizational routines* and *dynamic capabilities*. These two concepts characterize the heterogeneity among economic entities in neo-Schumpeterian economics, representing the core of the neo-Schumpeterian agenda.