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RESEARCH

Creativity, well-being, and economic development: An evolutionary approach

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Abstract
Economic development requires endogenous novelties, according to evolutionary economics. To find the endogenous source of novelties, we focus on the creativity of ordinary people when they forge their life path. We argue that such 'life creativity' is endogenous to the economic system because it is a typical capability of human beings, because it is intrinsically motivated, thus directly yielding well-being, and because it can be developed with better economic conditions. The paper first introduces the insights of three pioneers of evolutionary economics; it proceeds by showing the key role of creativity in human evolution; then it proposes 'creative activity' as an input-output technology that is both useful for and conditioned by economic development. It concludes by contrasting the Industrial Revolution in Britain with the ICT revolution in the US for their different effects of successful innovations on life creativity and well-being.

Keywords Novelty · Creativity · Well-being · Economic development · Evolutionary economics

JEL Classification B52 · D91 · I31 · O15 · O31

1 Introduction

> "By 'development,' […] we shall understand only such changes in economic life as are not forced upon it from without but arise by its own initiative, *from within*" (Schumpeter 1934, p.63, italics added).

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With this famous statement, Joseph Schumpeter identified the problem of economic development as able to change endogenously, thus differing from "the mere growth of the economy" (Ibid., p.406), and exhibiting self-transformation as a typical requirement for evolutionary dynamics (Witt 2003). This problem implies a question about the source of the novel changes, i.e.: "How does the new thing manifest itself in the economy?" (Schumpeter 1934, p.412). Schumpeter's first answer is well known: "In the psyche of a small group of economic subjects" he called them 'entrepreneurs', or more generally, the "creator[s] of thought" (Ibid., p.29). The problem thus becomes that the psyche of entrepreneurs is exogenous to the economy because it is given as a natural gift, so that economic development cannot be described as self-transforming (Witt 2002; Encinar and Muñoz 2006).

Schumpeter himself indicated in a later work how to solve the problem of endogenizing the source of novelty, by shifting the focus from individual innovators of small enterprises to the research of scientists and technicians of large companies (Schumpeter 1942). This solution was also taken up by Nelson and Winter (1982), and subsequently became very popular in evolutionary economics. In this way, the focus has shifted from a *spontaneous creative* activity to a routine activity requiring the *incentive* of a profits from innovation.

This paper takes up the original focus by pursuing three aims: to characterize creative activity as distinct from innovative activity; to identify in creative activity a solution to the problem of endogenizing the source of novelty; to show that technological progress and economic development do not necessarily favor people's creativity as well as their well-being, thus making a vicious circle in endogenization possible.

As the first aim, we characterize the creative activity by looking at the motivations, which include the 'intrinsic' motivation, and at the outcomes, which include artistic works, thus making evident that the result is not necessarily a market innovation. More generally, we extend the concept of creativity to ordinary people when they forge their life path by conceiving new ideas and pursuing them to form a personal identity as socially embedded. We will call this 'life-creativity', which includes as exceptional the creativity of eminent inventors.

As second aim, we claim that creative activity can be endogenized by observing that this activity is heavily conditioned by the economic, social, and institutional context. Indeed, we will recognize both that creativity is a natural human capability, and that people can develop their creative potential depending on actual conditions.

The third aim closes and extends the circle of endogenization. Specifically, creativity is important for economic development because companies are more innovative if researchers are recruited from a more creative population. But we want to stress another reason. Namely, the success of business innovations depends on the market, and the success in the market, in turn, is eventually due to the behavior of consumers. As societies are differently open to changing norms and beliefs, as argued by North (2005), we expect that the more people can exercise 'life creativity', the more successful innovations are, and also the more satisfied people are, since they can use innovations for their creative purposes. By contrast, consumers may overlook or resist specific innovations. Or they may even appreciate innovations that lead to a harmful addiction, so that innovations are successful on the market, but their capabilities and well-being deteriorate.

The concept of creativity as a typically human capability and enjoyable in itself is not new in economics. We will find it in the writings of Veblen, Marshall, and Schumpeter, considered pioneers of evolutionary economics (Witt 2003). However, their analysis did not go further along this line as they encountered various difficulties.

Studies on human evolution confirm that creativity is a typically human capability. We highlight that creativity emerged in our ancestors as socially embedded, and that it produced not only technological innovations but also artistic expressions, thus revealing motivations not involved in immediate subsistence.

Thus comforted by the early insights of pioneers of evolutionary economics as well as by the evidence on human evolution, we put forward the concept of 'creative activity' as a peculiar technology with well-defined inputs and outputs. Each aspect of our approach will find support in empirical results drawn from the economic literature (e.g., Attanasi et al. 2021; Foster and Metcalfe 2012), and extra-economic studies, especially psychological (e.g., Amabile and Pillemer 2012; Csikszentmihalyi 1990).

The contribution of the paper can be related to other economic approaches to evolution. For example, the approach of Generalized Darwinism considers "variation, selection, and retention" of a population as essential characteristics, while motivation and creativity play no special role (Aldrich et al. 2008). Our approach can thus contribute by clearly characterizing intentional rather than blind "variation" in human evolution and suggesting that also "selection" might be intentional, because people are likely to create intentional changes, albeit minor, when novelty becomes familiar.

The approach of Cultural Evolution recognizes specificity with respect to genetic evolution but concentrates on social learning rather than on creativity. The motivation underlying individual creativity is made implicit in favor of a creativity that emerges as a social product through social interaction (Boyd et al. 2011). Individual well-being thus does not appear in such an approach, except as a side consequence of the evolutionary process (Binder and Witt 2011). Therefore, our approach can contribute by considering individual creative motivation and social interaction as two interacting forces that can lead to both economic development and well-being.

The model of Rayo and Becker (2007) does consider well-being (called 'happiness') in order to explain how modern humans emerged from evolution since hunter–gatherer times. However, such an explanation is not specific but can also be applied to any other successful evolution of animals. Indeed, the model, having adopted the agent–principal framework, shows how humans' intentionality to maximize immediate well-being interacts with nature's selection to maximize their fitness. Intentional novelty is thus completely ignored.

The paper is organized as follows. Section 2 makes evident how Veblen, Marshall and Schumpeter briefly addressed, in their own words, some properties of creative activity. Section 3 identifies creativity as the main distinctive and socially embedded characteristic in human evolution. Section 4 proposes creative activity as an input–output technology, thus helping to explain how economic development transforms itself, and what the final effects on people's well-being are. Section 5 contrasts two cases to show how different the effects of successful innovations can be on people's creativity and well-being (i.e., the Industrial Revolution in Britain versus the ICT revolution in the US). Section 6 concludes with some policy guidelines.

2 Veblen's, Marshall's, and Schumpeter's insights on the source of novelty

Our approach on the source of novelties and on its endogenization within the economic development finds early support in eminent economists of the past. If we read the works of Thorstein Veblen, Alfred Marshall, and Joseph Schumpeter, who are well known for their contributions to the building of an evolutionary theory of economic development (Witt 2003; Metcalfe 2007; Hodgson 2008), we find interesting insights. First, novelties cannot be fully explained in terms of economic rationality, but imagination is necessary. Second, the motivation to create novelties is in itself enjoyable. Third, creative products do not emerge from isolated individuals, but are socially shaped.

In the rest of the section, we take a closer look at these insights of the three economists. Their own words will provide us with further interesting details.

According to Veblen, "in all the received formulations of economic theory, […] the human material with which the inquiry is concerned is conceived in hedonistic terms; […i.e.] man is that of a lightning calculator of pleasures and pain" (Veblen 1898, p.389). However, this is "a faulty conception of human nature", if compared to the view proposed in psychology and anthropology, according to which "man […] is […] a coherent structure of propensities and habits which seeks realization and expression in an unfolding activity" (Ibid., p.390). Therefore, human behavior is not only a passive adaptation to the necessity to satisfy needs; rather "economic action is teleological, in the sense that men always and everywhere seek to do something" (Ibid., p.391).

Typically, "in the more complex and deliberate activities, […] the impulse and sentiment of workmanship comes in for a large share in the outcome. So much so, indeed, that, for instance, in the arts […] the sense of beauty is the prime mover" (Veblen 1914, p.29).

Veblen stressed that "all economic change is a change in the economic community", and that change can be transmitted through the community, so that "the economic life history of the individual is a cumulative process of adaptation of means to ends" (Veblen 1898, p.391). The social dimension is not only important for the cumulative change, but also for the direction of change, which must find a social consensus (Ibid., p.392).

One of Veblen's conclusions is that "evolutionary economics must be the theory of a process of cultural growth as determined by the economic interest, a theory of a cumulative sequence of economic institutions stated in terms of the process itself" (Ibid., p.393).

According to Marshall, the origin of the "improvement[s] in business method" and "advances in industrial technique" lies in the "search of knowledge for its own sake", in the "imagination [that] creates movement", while "caution checks reason by working out parallel but independent trains of thought" (Marshall 1919, pp.139–40). Indeed, Marshall argued that three abilities are necessary for innovation, i.e., "perception, imagination and reason", but imagination "is the greatest of all". In other words, imagination enables individuals to create something useful for innovations that reason alone is unable to do.

When individuals exercise imagination, they perform what Marshall called a "mental activity", which is pursued for its own sake, in contrast to "wants", which

are "desires [for] a greater choice of things" (Marshall 1920[1890], III.II.1), i.e., for something that can be exchanged. "[A]ctivities" refer to both the "desire for excellence", i.e., for self-emulation, and to the "desire for distinction", i.e. for social recognition, and neither of which strictly pertain to economics (Ibid., III.II.4). "[W]ants" refer to the "ordinary business of life" (Ibid., I.I.1), and pertains to economics instead (Ibid., I.III.4, I.IV.1).

Marshall clearly recognized the dual role of "activities", being both pleasurable and useful for economic and social development. "There is intense pleasure in the ardent pursuit of any aim, whether it be success in business, the advancement of art and science" (Ibid., III.VI.6). "The moral, the intellectual and the artistic faculties on which the progress of industry depends, are not acquired solely for the sake of the things that may be got by them; but are developed by exercise for the sake of the pleasure and the happiness which they themselves bring" (Ibid., III.VI.6).

Although performing business, artistic, and scientific activities has become a specialization in modern times, the activity of the imagination was at the origin of human species in ancestral times. "[As…] man rises in civilization, as his mind becomes developed, and even his animal passions begin to associate themselves with mental activities, his wants become rapidly more subtle and more various; and in the minor details of life he begins to desire change for the sake of change" (Ibid., III.II.1).

We can find several of these aspects of Marshall's analysis also in Schumpeter's. However, taking the Walrasian economic system as point of reference makes Schumpeter's analysis not only more rigorous, but also more rigid, such that it cannot account, according to various commentators, for how economic development is self-transforming, and specifically, able to generate novelty (Witt 2002; Becker and Knudsen 2005; Encinar and Muñoz 2006).

According to Schumpeter, the Walrasian system is admirably suited to explain how the equilibrium of the economy is achieved, thus representing the behavior of rational individuals, but it is unable to explain changes. Schumpeter, especially in his early writings, identified entrepreneurs as the driving force of changes and economic development. However, entrepreneurs do not appear to follow the principle of economic rationality in their decisions.

> Only within the given working methods is there completely free and conscious choice and a scope for action that can only be understood by *reason*. […] At the same time, however, we see here immediately that this type of action is real and the rule but is not the only possible one. There is another one, there is also *creative new design*. (Schumpeter 1911, p.125, translation and italics added).

Rather than simply evaluating the perceived options, entrepreneurs create new ones. But to describe the creative process, Schumpeter (1911, ch.2) preferred to make the case of the artist. He observed that the artist exhibits an incessant energy in creating new things, thus appearing to contravene the economic principle of decreasing marginal utility. This energy derives from the "joy in creative design"

(Ibid., p.141), or "joy in the activity itself" (Ibid., p.145).[1] By contrast, satisfying needs is a behavior characterized by the conventional economic properties, according to Schumpeter.

Both entrepreneurs and artists are men of action so determinate that they are not discouraged by others' "active and passive resistance", i.e. by "individuals in whom there is also that certain weakness in decision-making that leads to staying on the old paths" (Ibid., pp.129,132). On the contrary, men of action can be motivated by the "joy in being successful" (Ibid., p.141), by achieving "a position of social power" (Ibid., p.138).

Schumpeter recognized that "nothing else can be created in the future than what the present contains the germ of. Even the most energetic would only draw the conclusions from the given circumstances" (Ibid., p.151). He further observed that "[the man of action] draws other conclusions from the data of the world around him than the mass of static economic subjects, conclusions that are creative from the point of view of static economy" (Ibid., p.152).

Considering the entrepreneurs as the source of novelty, however, weakens Schumpeter's theory of economic development, or at least his early theory, i.e., before conceiving the sources of innovations in the research activities of large companies. The reason for the weakness is that entrepreneurs, or the scientists behind them, are conceived as special individuals because endowed with a natural gift, unaffected by economic development. Consequently, the economic system cannot be said as self-transforming.

Marshall and Schumpeter had very original insights, but they found it difficult to proceed with the elaboration towards a more robust evolutionary economics, where rational optimization does not prevail. Marshall realized that in his analysis the long period proceeds in an irreversible time, which thus would have required a study of 'economic biology'. He accordingly planned such a study, but never completed it (Thomas 1991). Schumpeter's (1908) first provocative book was so coldly received that he then attempted a more reconciliatory analysis with his next book (Schumpeter 1911), further amended in the second edition (Kisch 1979; Witt 2002). He then did not even consider his theory as derived from the biological theory of evolution (Schumpeter 1934). As for Veblen, it has long been debated how successful he was in building an evolutionary theory of socio-economic and institutional development (Peukert 2001).

3 Creative activity in human evolution

Studying creative activity in human evolution when our ancestors were hunter–gatherers helps to better understand the source of novelty, and in particular, how creativity is a human capability that emerges thanks to social interaction, so that it must be conceived as closely connected with sociality. Secondly, creativity emerges as a flexible capability, as evidenced by its products that are

[1] Schumpeter (1911: fn.150) even argued that "effort is not 'pain' for him [energetic men]".

not only technological innovations, but also artistic works. This suggests that the underlying motivation of creativity is not entirely utilitarian.

Let us begin with the very early hominines from 2.5 million years ago. These ancestors of ours were especially vulnerable to the danger of becoming prey to large carnivores, being no longer protected by rainforests, so that they were forced to form groups for defensive purposes (Willems and Schaik 2017). Individual social capabilities were thus required for groups to remain cohesive, and this puts evolutionary pressure on the brain. Such pressure was exerted on a brain that was already bigger than that of great apes, thus triggering an evolutionary virtuous circle in which new solutions for survival emerged. In particular, hominines were able to find and eat meat, which further energized brain growth and the extension of social life with larger groups. An acceleration of this development occurred until 0.7 million years ago, such that the brain volume more than doubled (Gamble et al. 2011; Hublin et al. 2015).

During the same period, crude stone tools with some variation in shapes, expressions of the primitive culture called Oldowan, first appeared. Then, 1.5 million years ago, the Acheulean bifaces hand-axe appeared as a stone worked to be handy, flat and with a symmetrical tip. Its obvious use is for working wood, cutting meat, or for hunting. But recently, several scholars have observed that this hand-axe was not only useful for survival: it was too symmetrical and reproduced with minor modifications through too many generations and in too many world regions. These observations have suggested that early hominines had a sense of aesthetics, which was developed and maintained through intentional manipulation and social interaction (Gowlett 2021; White and Foulds 2018).

After this innovation and for a long time, creative activity was modest, and sociality was mainly instrumental for survival. According to Bowles and Gintis (2013), cooperation was advantageous for pursuing cohesion in foraging, and to this aim defecting group members were punished. Contextual conditions might make hominines' lives rather insecure because of predators and climate changes, thus discouraging the diversion of resources, including time and effort, from activities of uncertain utility such as the creative ones, and instead encouraging the repetition of traditional technologies.

Homo sapiens emerged as taking a distinctive morphology 250,000 years ago. The brain grew further (similarly to *H. neanderthalensis*) and assumed a globular shape (differently from *H. neanderthalensis*) by developing the typical regions of cognition, as well as the interconnections that are typically activated in the exercise of sociality and creativity. The body became slim and with narrow pelvis, being well adapted to the hot African regions and long walks. However, childbirth became difficult because of the relatively great head size of babies. To limit the problem, evolution favored mothers who gave birth to children with still very immature brains (Gamble et al. 2011; Neubauer et al. 2018). This fact had important implications.

The most obvious implication was that children needed nourishment and protection for many years. But since *H. sapiens* already lived in large groups (unlike *H. neanderthalensis*), protection could be effectively provided, and children could enjoy a prolonged period in which imagination and communication with similar

others could develop. Some researchers even argue that large groups allow the age of play to be further extended into adolescence and contributed to the development of complex language (Nowell 2016; Langley et al. 2020).

Towards the end of the Paleolithic era, we can easily observe that both technology and artistic expressions flourished at a rate never seen before. Paintings in Europe, such as in Chauvet and Altamira caves, as well as in other regions of the world, testify to this. The climate was favorable, but when another ice age occurred, *H. sapiens* did not lose his enterprising capability. In fact, we can find traces of him at even colder latitudes than where *H. neanderthalensis* evolved and often used to live (Zolnikov et al. 2021).

Therefore, creativity and sociality played a key role in human evolution, they triggered a cultural evolution which, on the one hand, required a preparatory biological evolution and, on the other, propelled it further. The uniquely human characteristic of cultural evolution is made evident by technological and artistic artefacts, both of which testify to the human capability to imagine something that does not yet exist, and to apply it in different life domains.

4 The 'technology' of creative activity

Some researchers have spoken of creativity as a *product* that should be integrated into the innovation process in organizations (Amabile 1988), while others define creativity as the *ability* to generate novel and useful ideas, which can be implemented as innovations in business production (Anderson et al. 2014; Attanasi et al. 2021). To reduce ambiguity we prefer to use the concept of *creative activity* and consider it as an option that is available for ordinary people, not necessarily specialized or gifted. The product is thus general because it includes ideas and things that have a meaning, as they affect beliefs, preferences, knowledge, or capabilities of the individual and, possibly, of others. Creative activity can be identified in scientific research and artistic works, but also in those aspects of ordinary work and leisure activities that aim to achieve life goals and form personal identity. In this sense, we can talk about 'life creativity'.

Economics can help us to describe the *technology* of creative activity as an option with defined inputs and outputs that individuals can choose over the other options already available. Psychology contributes with insights and evidence in support of such arguments.

The essential input for creative activity arises from the human capability of *imagination*, i.e., mental representation of something that does not exist, is not known or perceived (Foster and Metcalfe 2012; Loasby 1996; Asma 2022). This capability is distinctly human when the imagination arises from the connection of different things across different contexts and/or times.[2] Even if the individual normally imagines the

[2] Although great apes may be able to imagine, they remain attached to the perceived context, e.g. when they anticipate a fact that they are going to realise (Suddendorf and Dong 2013). Analogously, although they are able to transmit knowledge to conspecifics, this remains strictly pertinent to the original purpose (Tennie et al. 2009).

expected consequences of different options in her set of choices, the key input to creative activity is rather to imagine new notions that can change beliefs about existing options or can create new meaningful options.

The individual exercises the human capability of imagination to varying degrees and for different purposes, to anticipate immediate future or for long-term projects. It is not an exercise that can be fully controlled because unconscious processes are involved, as demonstrated by numerous experimental studies (Ritter and Dijksterhuis 2014; Zamani et al. 2023).

While the most frequent images in the human mind are short-lived and inconsequential, only a few of them are selected for creative activity, depending on the individual's interest and talent. Indeed, the *aspiration* is to generate something that can be recognized as original and valuable, even if it is an abstract idea, so long as it can have behavioral consequences. In creative activity, the individual thus uses cognition, first to study and acquire skills in the specific domain in which to exercise creativity, and then to compare the new idea or thing with the existing ones (Witt 2009). The unconscious component in the elaboration makes the outcome uncertain, though not random (Hodgson 1997).

Such process of acquiring knowledge and skills, of imagining and evaluating can be repeated recursively in order to improve outcomes.[3] However, this pursuit is not costless as it requires effort, time, risk-taking, and resources that can otherwise be used for other activities, possibly with more certain and immediate outcomes (Bonetto et al. 2021). To compensate for these costs and undertake the creative activity, knowledge and experience may be insufficient, and specific motivation is thus necessary.

A powerful motivation for undertaking creative activity is *intrinsic motivation*. According to a stream of research in psychology, "intrinsically motivated behaviors are those whose motivation is based in the inherent satisfactions of the behaviors per se, [...] whereas extrinsic motivation is focused toward and dependent on contingent outcomes that are separable from the action per se" (Deci and Ryan 2002, p.10). Similarly, according to a survey on creativity in economics, "intrinsic motivation arises from the individual's perceived value of engaging in the task itself and the desire of being creative (e.g., finding it interesting, enjoyable, satisfying, or positively challenging). Extrinsic motivation comes from outside sources, and it might be the response to an external demand (e.g., the promise of rewards or praise)" (Attanasi et al. 2021, p.286).

A variety of studies confirm that intrinsic motivation is important for creativity (Amabile and Pillemer 2012; de Jesus et al. 2013; Prabhu et al. 2008), and even for business innovation, which typically also leverages on monetary incentives (Sauerman and Cohen 2010; Gibbs et al. 2017). Enjoyment deriving from intrinsic motivation has been studied in psychology with a meta-analysis confirming the positive association between creativity (measured as expert assessment, creativity

[3] In Foster (1987), *Homo creativus* is one of the first attempts to represent how knowledge, skills and aspirations give rise to creativity. Muñoz and Encinar (2014) describe in detail how means (actions) and goals can interact sequentially in the agents' intentional planning activity.

test, or self-report) and well-being, both socio-emotional and cognitive (Acar et al. 2020). Attempts to find causality from creativity to well-being obtain some positive results, justified by a strengthening of inner resources, such as functioning, autonomy, and internal locus of control (Conner et al. 2018; Bujacz et al. 2016; Flor et al. 2013).

Intrinsic motivation as expected enjoyment in performing creative activity is distinct from the satisfaction of having produced novelties. As some psychological studies show, the intrinsic motivation from pursuing a goal could be even more enjoyable than achieving it (Klug and Maier 2015; Kaftan and Freund 2018).[4] Nevertheless, the achievement of expected novelty encourages new intrinsic motivation, so that creative activities are self-reinforcing through the exercise and development of creative capability.

This process can be included in *eudaimonia* as conceived by Aristotle. By drawing from specific research in philosophy, psychology, and recently also in economics, eudaimonia can be defined as an activity in which people exercise their best skills to pursue personal excellence by responding creatively to new challenges, and in so doing, they experience purpose in life and enjoyment (Annas 2011; Nussbaum 2011; Ryan et al. 2008; Sen 1999; Pugno 2021). Such enjoyment is more robust than pleasure due to the need for satisfaction because it derives from an activity that reinforces the *inner resources* of people, so that they become more resilient to adverse experiences. In fact, a lot of evidence shows that people with a strong purpose in life, which is a proxy for eudaimonia, enjoy better objective and subjective health and even lower mortality (Ryff et al. 2021; Bachelet et al. 2020).

Well-being is thus an important output of the individual's creative activity, and emerges jointly with the acquisition of inner resources, in terms of motivations and skills. But it also emerges with novelty, which is the most studied output of creative activity.

Novelty can have a direct social impact, besides having personal value, when it is useful for the advancement of a specific research, the solution of a problem, or the discovery and representation of a latent problem that others find interesting. In this case, the success of a novelty depends not only on the individual's talent, which may account for the 'degree of novelty' (Witt 2009), but also on her/his ability to persuade others and to anticipate their reaction and evaluation, in the face of frequent inertia of habits, norms and traditions. To this end, the individual benefits from knowing past research on how the problem has already been addressed, as well as from engaging with interested others during the creative activity. Therefore, an effective input of creative activity is the individual's *specific social capability* as regarding the specific domain of the activity.

The diffusion of novelty usually takes place in a different way from the simple contagion, precisely because people reinterpret the novelty according to their own knowledge and previous experiences, thus transforming it with a little originality. More generally, experts, the public, and the market guide the direction of overall

[4] These studies confirm Scitovsky's insight that "in man's striving for his various goals in life, being on the way to those goals and struggling to achieve them are more satisfying than is the actual attainment of the goal" (Scitovsky 1992[1976], p.62).

efforts, seeking a balance between innovations and habits, between originality and conformism. (Loasby 1996). In this sense, novelty can be called both an individual and a social product, as argued in psychology surveys (Watson 2007; Glaveanu 2010).

However, not all novelties are beneficial to all others, at least potentially or indirectly. In fact, novelties could benefit only a small group but harm, with or without deliberation, many others (Kapoor and Mange 2023; Gino and Ariely 2012). To minimize this possibility, a further input of creative activity is thus necessary: the capability of *general sociality*, which means being able to understand, empathize, trust, collaborate with others, but also detach from others when necessary to preserve autonomy.[5] An empirical confirmation comes from a psychology study on 'emotional intelligence', which is the ability to understand, use and manage others' emotions, in addition to one's own. This study shows that lack of emotional intelligence is correlated with malevolent novelties, even after controlling for cognitive ability (Harris et al. 2013).

The social context has a key role in developing the general sociality, especially when the individual was in childhood, as argued by educational psychologists. According to Jean Piaget (1896–1980) and Lev S. Vygotsky (1896–1934), for example, play is a creative activity through which the child understands how to relate with others, and this contributes to building her/his personality. Learning does not simply mean memorizing new information, but creating new mental structures based on pre-existing personal knowledge, which then helps the formation of personal goals. Parents and other loved ones are thus very important in this stage of development (Piaget 1973; Moran and John-Steiner 2003).

Education can contribute to developing creativity also after childhood, thus showing that creativity is a plastic rather than immutable and innate capability (Flor et al. 2013; Ritter et al. 2020; Davies et al. 2013). This plasticity is confirmed not only in neuroscience studies (Immordino-Young et al. 2019), but also in social experiments where creativity is encouraged by an incentive (Graff Zivin and Lyons 2018), or by a placebo (Rozenkrantz et al. 2017).

Economic conditions are also important for exercising and developing creativity because of direct and indirect reasons. Economic resources can directly guarantee the means of subsistence, and, conversely, the lack of these may undermine the creative purposes, as Abraham Maslow would suggest when he placed safety needs at the bottom, and self-actualization at the top of the hierarchy of human needs (Maslow 1943).

Economic resources can indirectly support creative activity in various ways. The most effective way is through the funding of education, which is threatened by the Baumol's law of the 'rising cost disease' (Baumol 1967; Wolff et al. 2014). Indeed, education is positively associated with openness to experience, risk tolerance, as well as innovation (Schurer 2017; Biasi et al. 2022). But education is especially important for parenting, since better-educated mothers benefit their children with more verbal skill, more locus of control, and more social skills (De Bono et al. 2016; Cunha et al 2006).

[5] Trust in others fosters creativity in both givers and recipients (Attanasi et al. 2019; Chen et al. 2021).

A richer country can foster creative activity also by providing more engaging, stimulating, and meaningful works, thanks to more advanced technology (Cassar and Meier 2018). On the other hand, monetary incentives do not guarantee an increase in creative performance, because they could interfere with intrinsic motivation. Incentives seem to be effective only at moderate stakes (Ariely et al. 2009); and competition should also be moderated to encourage creativity (Gross 2018).[6]

On top of all this, appropriate institutions are needed, as they play an important contextual role in subjective conditions, without however remaining entirely exogenous. Namely, institutions can reduce uncertainty in impersonal exchanges by providing both constraints and incentives through constitutions, laws, and norms (North 2005). Constitutions may declare values, such as liberty, which may open up opportunities and goals to improve citizens' lives. Laws may institute structures for education to enable people to better exploit those opportunities and pursue those goals. Therefore, institutions can provide not only a stable social environment for economic exchanges through reducing transaction costs, but also favorable conditions for people to imagine new goals, thus implying changes in the economy and, possibly, in the institutions themselves.

Norms and other informal institutions, such as conventions and codes of conduct (North 2005), play a special role in this regard. Even if the structure of formal incentives does not particularly hinder innovations, informal institutions can be a hindrance when intolerance and conservative traditions prevail (Mokyr 1990). Conversely, we can say that informal institutions are all the more favorable to innovations the more individuals are intrinsically motivated to perform creative activities, and not necessarily those aimed at productive innovations. To this end, economic development should provide important conditions for people's life creativity, thus making it evident that creativity is a source of novelty endogenous to the economic system. Furthermore, an economic development able to strengthen well-being becomes more likely, as people improve their capability to determine their own lives in constructive interaction with others.

A different case is also possible, however. Technological advance and economic growth can discourage people from choosing to pursue creative activity, with the result of weakening their well-being. Since this unfortunate case seems to materialize in recent times, the next section will be devoted to contrasting it with the celebrated case of the Industrial Revolution.

5 The contrasting cases of the Industrial Revolution in Britain and the ICT revolution in the US

Technological progress played a key role in the economic success of both the Industrial Revolution of the 17th and 18th centuries and the recent ICT revolution. However, people's conditions to exercise life creativity were positive in the first case,

[6] Although this issue does not attract unanimous consensus (Attanasi et al. 2021), a suggestive argument is that monetary incentives are counterproductive when are perceived as controlling creative activity (Deci and Ryan 2000), whereas they may only be effective in the short-run (Bénabou and Tirole 2003).

especially in Britain, but seem to worsen in the second case, at least in the United States, which is a technological leading country. We can thus observe the contrast in the dynamics of people's well-being, as variously measured.

The Industrial Revolution in Britain took off thanks to a fortunate set of favorable preconditions, although not all of them were special compared to other countries. They were conditions slowly reached in the immediate past, whereas the take-off occurred at high growth rates as an exceptionally prolonged process. In evolutionary terms, the Industrial Revolution emerged from a complex system, and its pattern was of co-evolution of the economy, institutions, demography, technology, as well as creativity (Mokyr 1990; Galor 2022).

All the preconditions of the British Industrial Revolution also led an increasing number of people to think about the future beyond immediate needs, to strengthen their capabilities, to appreciate new opportunities, to form aspirations, and then to imagine new life goals and pursue them. In fact, both the greater productivity in agriculture and the Poor Law improved people's conditions for better nutrition (Kelly et al. 2014); greater tolerance and a religion open to earthly accomplishments improved the conditions for new experiences; the expansion of commercial trade improved the conditions for learning to trust unknown people in exchanges; a more science-friendly cultural environment provided the conditions for acquiring new knowledge; the weakening of the guilds and the renewed local roads improved occupational, social and geographical mobility (Landes 1969; Mokyr 1990, 2010).

People's creative activity also helped the Industrial Revolution to be self-sustaining for at least three reasons. First, a number of artisans (mainly from guilds) spontaneously provided the necessary skills to apply, operate, and even improve the great inventions of that age. New aspirations and intrinsic motivations, no less than economic incentives, contributed to the success of both technicians and great inventors (Mokyr 2010, 2021).[7] Second, the possibility for entire sections of the population to aspire to an important role in the economy and society expanded the demand for new products over and above the increases in their real income (Horrell et al. 2015; McCants 2007). Third, realizing that skills would be increasingly important in the future shifted people's choice of having children from quantity to quality, thus contributing to the overall formation of human capital (Klemp and Weisdorf 2011; Foreman-Peck and Zhou 2018; Galor 2022). We are thus not surprised that both income, measured as wages or GDP, and well-being, measured as mortality or life expectancy, grew a lot from about 1760 to about 1850 (Gallardo-Albarrán and de Jong 2021; Voigtländer and Voth 2006).

The contrast with the case of the ICT revolution in the United States is interesting when it comes to understanding the importance of people's life creativity. The adoption of electronics, telecommunications, and computers since the 1970s, and, more recently, of robots and artificial intelligence has undoubtedly been a success for the development of the productive system, for the quantity and quality of products, and,

[7] The inventive activity also pervaded the arts by breaking with the classical tradition and revising the Enlightenment style (Gombrich 2022)

eventually, for growth of GDP. However, the well-being of people, of some groups in particular, exhibits clear signs of deterioration, especially in more recent years.

Life expectancy ceased to increase in 2010 after decades of continuous improvements. Since 2015, it has deteriorated mainly because of an increase in mortality rates among middle-aged and younger adults, which began in the 1990s (National Academies of Sciences, Engineering, and Medicine 2021). Consistently, the overall suicides rate rose from 2006 to 2018, but of most concern is the steep rise of suicides among 10- to 15-year-olds from 2012 to 2021 (Garnett and Curtin 2023).[8] Surveys on subjective well-being show that the trend has declined since the 1970s (Bartolini et al. 2013; Blanchflower and Oswald 2019), and, at least in the period 2006–2013, for the three richest income quartiles (Graham 2017).

We can link the technological progress to the deterioration of well-being by saying that the "American dream" has been lost (Pugno 2022). Economic mobility, in fact, dropped after the 1980s when economic inequality rose (Davis and Mazumder 2024). This was due to technological progress and the liberalization of markets, including the international ones, as fostered by the US administrations since the 1980s in an attempt to resume economic development (Grullon et al. 2019). But economic inequality interacted with economic fluctuations (Stiglitz 2012), which resulted in increased long-term unemployment (Krueger et al. 2014). The conditions for pursuing personal goals in the hope of leading a happy life have therefore become increasingly frustrating (Knabe and Rätzel 2011; Graham 2017; Pickett and Wilkinson 2015).

Moreover, in the most recent wave of the ICT revolution, advanced IT platforms and miniaturized screen devices have enabled the production of communication services, called social media, which have represented an impressive technological achievement. Big companies arose thanks to government tolerance of industrial concentrations since the 2000s, and these were successful in designing and managing social media to maximize online customer engagement and product purchases (Aral 2020). However, the use of social media emphasized social comparison and hence users' frustration, when linked to the general conditions of low social mobility and economic insecurity. The final effect has thus been of the spread of anhedonia, depression, and suicidal thoughts among young people, according to those studies that carefully take causation and self-report bias into account (Allcott et al. 2022; Braghieri et al. 2022; McDool et al. 2020; Bursztyn et al. 2023).[9]

Social media have also favored online hate crimes and exacerbated polarization on political issues through self-confirming information (Levy 2021; Müller and Schwarz 2023). This has added social insecurity to economic insecurity and has strengthened conservative beliefs and values, as well as conformist behaviors, which are inimical to creative activity.

The contrast between the two technological revolutions highlights the importance of life creativity as a source of novelty. In fact, its endogenization in economic

[8] The American Academy of Pediatrics has even declared a national emergency in child and adolescent mental health in 2021.

[9] The negative effect of social media use on life creativity through frustrated aspirations could be captured by the negative effect on youths' labour supply (Aguiar et al. 2021).

development can have a positive or negative sign, with different consequences on the dynamics of people's well-being and possibly on that of GDP. Not only this, but it becomes clear to what extent institutions, both formal and informal, are responsible for this different outcome.

6 Conclusions with policy considerations

Human creativity is an uncomfortable subject for economists because it refers to a mental process that is not under the complete control of rationality. Neither can such rationality gap be considered as an unfortunate behavioral distortion, because creativity underlies business innovation, which is an engine of economic growth. The subject of creativity has been therefore maintained as under-researched in economics.

In this paper, we focus on human creativity as life creativity, and show how it can be integrated into the process of economic development from an evolutionary perspective. By looking at some insights of the pioneers of evolutionary economics, and at human evolution in ancestral times, we have shown how creativity is a fundamental characteristic of humans, thus making evident the limits of *Homo economicus*. By observing the importance of economic conditions for people to choose creative activities, we have shown that life creativity can be endogenized, thus making economic development self-transforming. By distinguishing the human capabilities of imagination and evaluation as inputs of creative activity so as to produce novelty with both originality and value, we have shown how both unconscious and cognitive components can be integrated, thus encouraging the interdisciplinary approach. By recognizing that intrinsic motivation for creative activity yields a reward, we have shown how it can contribute by compensating for the costs of effort, time, risk-taking, and resources that could otherwise be used for other less future-oriented activities. By further recognizing that such reward consists of enjoyment and greater resources in terms of knowledge and skills, we have shown that novelty is not the only output of creativity. By discussing the importance of sociality in its various dimensions for developing life creativity, we have refined the link between economic development and people's well-being. By contrasting the Industrial Revolution in Britain with the ICT revolution in the US, we have highlighted that life creativity can be endogenized not only with a positive but also with a negative feedback, and that institutions play an important role in this outcome.

Policy implications are straightforward, at least in guidelines. Social mobility should be increased and economic deprivation should be reduced so that people can form aspirations and life goals, cultivate their talents and skills, i.e., develop their life creativity. Education should be organized in such a way as to stimulate individual and collective creativity, especially at an early age. Such education should be universal, inclusive, and personalized to exploit social synergies and to discover potential Einsteins, thus improving both equity and overall efficiency (see, e.g., Bell et al. 2019). Economic development would benefit in quantity and quality, since investment in people as human beings is the most rewarding investment (Heckman and Masterov 2007; Heckman and Corbin 2016), as human evolution and technological revolutions have taught us.

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