

## BIO-ECONOMY: KNOWLEDGE IMPLEMENTATION CREATES ADDED ECONOMIC AND SOCIAL VALUE

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**Abstract:** This research is focused on bio-economic knowledge impact on social and economic added value. The premises of this paper are that habit formation can be used to implement bio-economy knowledge in different age groups in Bulgaria. The implementation of knowledge and good practices will be done on institutional level using the ILAC model. Using the institutional environment as a learning one, we are creating more sustainable population with better understanding of today's problems and coping mechanisms to overcome them. In every aspect of the bio-economy we have gathered good practices as example that can be easily added to the daily life and can be implemented as institutional norm of behavior. A shift in perception and understanding our surrounding environment have undergone the last 30 years, more people, companies and even countries have turn towards more ecological friendly means of production and using policies, financial incentives and new habit formation in schools, work and universities have created a society with better understanding of bio-economy, environment preservation, biodiversity and sustainable practices. In the long term the benefits of implementing better practices that preserve human and animal habitat and mitigate the human destruction, outweigh the struggles of changing the human behavior in the beginning and the starting capital that some policies require.

**Keywords:** bio-economy, knowledge implementation, new value

### 1. INTRODUCTION

Implementing bio-economical norms in everyday life and agriculture as well as spreading knowledge and forming habits that create additional value for society is the focus of this paper. The objective of this research is to calculate and tracing the change of added social and economic value if knowledge about bio-economy is introduced at different ages and habits about good practices are formed. In the last 20 years we are observing a shift in understanding and exploiting the surrounding world, most of the developed nations have shifted towards sustainability and economy that is environmentally friendly. This research tracks what changes have been made around the world and how they can be of value if the same changes are made in Bulgaria.

### 2. METHOD AND METHODOLOGY

Knowledge can be gathered at different ages and is the main force behind crating new social norms, economic value and changing the environment surrounding us. In contemporary developmental psychology, children's learning is seen as being limited only by their lack of experience and accumulated. What develops through the early years of learning is the child's knowledge base, their metacognition (i.e. their awareness of and ability to control their own cognitive activity) and their abilities to self-regulate knowledge (Whitebread and Bingham 2013). This research has gathered information on habit formation in kids and adults so that later one based on statistics for population age groups can implement new knowledge using ILIAC model for institutional learning in Bulgaria. Further down we have tried to measure social and economic value added. We are interested in creating more stable and eco-friendly economy with higher social value by having a deep understanding of habits that can impact the structure of bio-economy and sustainability later in life of the individual.

The research uses ILIAC model to introduce implementation of bio economical knowledge and measure social and economic value. ILAC is a process which can change behavior and improve performance by reflecting on and reframing the lessons learned during the research process. Within the framework of ILAC, a set of interventions is emerging which seeks to strengthen performance and encourage new modes of behavior associated with continuous learning and change. The process is concerned with the rules, norms and conventions in an institution. ILAC is driven by the premise that improved performance requires a spirit of deliberate and self-awareness among professionals and an open culture of reflective learning within organizations (Watss at al. 2003). Originally this model is used in higher learning and organizations but for our research we will implement learning and behavioral change on another level institutions like: schools, kindergartens and universities. A culture that encourages better recycling, maximizing use of renewable and non-renewable sources materials and sustainable practices and ecofriendly habits is created via institutional learning.

This research aims to provide insight and ideas about how to prepare the next generation to manage waste, use of fuels and knowledge of bio-economy that adds social and economic value. In this review, the term 'habit' is widened from the commonplace definition meaning an oft-repeated action or an established practice or custom

requiring little thought (such as brushing one's hair or adding sugar to one's coffee) to mean unconscious mental propensities or processes, revealed as behavioral tendencies and dispositions. The Learning Habit (2014) by Stephanie Donaldson-Pressman, Rebecca Jackson, and Dr. Robert Pressman suggest that "good habit" formation and responsibility should be started as early as pre-school. Early "habit" formation could resolve many issues regarding the Millennium Development Goals and by that add additional economic and social value. the notion of "habit" by reference to relevant studies that cross philosophy and neurobiology, we propose an interpretation of rituals as collective activity, which is based on the same mechanisms of habits formation, but it is expressed in a "We-form", from which it is created and institutionalized (Giovagnoli 2018). In the book *The Habits of Mind* (2008), psychologists Costa and Kallik describe how such habits of mind may be cultivated in children (or 'habits of thought', as John Dewey originally referred to them). They show how children can be taught, at home and at school, how to 'habituate' effective problem-solving strategies and techniques into their mental repertoire so that they develop the propensity for skillful problem-solving in a variety of life settings. The hypothesis we have is that implementation of bio-economy knowledge would be most effective if started at young age and that it should be part of the "habit" of the child and implemented on institutional level. Growing self-awareness in the child leads to self-regulation and problem-solving. The basic cognitive processes include – Imitation – where children learn through their observation and induction - children detecting patterns in their experiences and constructing their conceptual knowledge of the world and should be used in an institutional learning and change environment where a child from early age should be introduced to good practices ( spare use of resources, re-cycling, using bio-degradable products or long lasting products). ILAC is process for introducing children to this kind of knowledge or can help change bad home learned behavior. Learning and change can occur at a level of system, organization, group and even individual. The ability of person to learn and change depends on several factors the external environment, internal environment and the organization he is part of. If we take kindergartens as the organization the subject of research is part of the change should be implemented at this level so the economy and socium can obtain the maximum value added. The institution environment is the main concern of the school of economics known as New Institutional Economics institutions can have arisen of " evolutionary processes, but design opportunities are also posed" (Williamson 2000: 598). This opens up the possibility to shape the rules of the game in the right way, i.e. to get the institutional environment right by 1st order economizing. The instruments employed on this level are "the executive, legislative, judicial, and bureaucratic functions of government as well as the distribution of power across different levels of government (federalism)" (ibid.: 598). By the means of collective action, the institutional environment can be a driving force of change in social behavior. In contemporary developmental psychology, children's learning is seen as being limited only by their lack of experience and accumulated knowledge, however, children's potential for learning is extraordinary. Developmental cognitive neuroscience experiments have established that many fundamental processes which underpin thinking, reasoning and learning are present and fully functioning at birth or become available within the first 4-5 years of life (Goswami, 2008). As the child interacts within their environment in their daily lives, they observe dynamic interactions between people and objects and their brains attempt to make meaning of it all. They do this by constructing a series of cause-and-effect explanations about the structure and functions of the things they perceive, attempting either to assimilate or accommodate the new experiences into their existing 'categorical framework' or making new categories in their search for further features that make category members similar or different. Young children's fundamental assumptions about the structure of their world and about the underlying nature of its categories crucially depend on their experiences – thus we can conclude that a child that is by young age introduced to bio-economy knowledge, methods of preserving the land, ecosystems, re-using resources and recycling will assume their world should function in such way and as they grow use this knowledge - this will add social and economic value. The way a child learn is through imitation. Furthermore, humans are able not only to imitate current observed behaviors, but also to defer reproducing the behavior until a later point in time since we are able to mentally represent objects and events in our memory. This ability again appears to be present from an early age, and to develop rapidly in very young children (eg. Meltzoff, 1988). It might therefore be fruitful to specify the level at which the behavior is habitual and is targeted by separating action-selection from action-execution conditions (Marien et al., 2018). As a consequence, as we review in a later section, modelling of behaviors by adults is a powerful means of supporting learning in children. By modeling behavior from early age, the economic and social benefits will grow as the child grows, there won't be any loss of value since every age group will contribute to add economic and social value/benefit. Another way a child learn is by inductive learning. A second learning process which is in place from birth is statistical or inductive learning, namely the process by which patterns and regularities in the stream of experience are identified. If a child recognizes recycling or spare use of resources from the intuitional environment it will mimic the process and later easily learn and be open about learning more about circular economy and sustainable use of resources. Inductive learning underpins the ways in which the human visual and auditory systems develop (Kirkham, Siemmer and Johnson, 2002) and so

clearly forms the foundation of a very large part of human learning. The general propensity for inductive learning also explains why learning from experience, particularly for young children, is always more powerful than learning through instruction and why we suggest children should start learning about bio-economy – or reusing, recycling and protecting the eco-systems from young age. Within the last decade, there has been much developmental research into young children’s executive functioning and how these basic processes enable flexible learning (Kochanska, Barry, Jiminez, Hollatz and Woodard, 2008; Zelazo Muller, Frye and Marcovitch, 2003). Inhibitory control is defined as the increasingly habituated capacity to plan, to purposefully control impulses and to suppress inappropriate behaviours (Rothbart, Ahadi and Hardy, 1994). Cross-sectional studies have found age differences in the number of children who choose to delay for a larger reward from 3 to 5 years (Lemmon and Moore, 2001; Lemmon and Moore, 2007). Not only do 4-year-olds choose the delayed, larger option more often, but their choices also reflect a consideration of size differences between the immediate and delayed options (Lemmon and Moore, 2007).

### 3. MOTIVATION

However, importantly, underpinning the employment of both cognitive and metacognitive processes within any learning context are the child’s motivation and levels of self-confidence. The child’s beliefs about the intrinsic value of any learning activities they undertake, their emotional responses to the activities (i.e. feelings of competency as they approach the learning), their level of interest and the activity’s relevance to them on a personal level, will all be factors influencing their motivation.

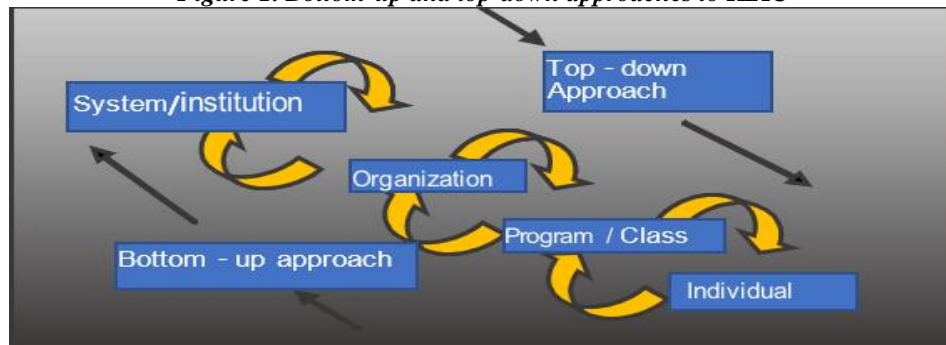
A range of empirical studies have confirmed the relationships between cognitive and motivational aspects of self-regulation. Schunk and Zimmerman’s (2008) edited collection contains reviews of much of the significant work in this area. This includes work related to:

- ‘self-efficacy’ (Bandura, 2001); children’s belief that they can improve their abilities through effort, leading to a ‘mastery’ frame-of-mind
- interest (Dweck, 2000); leading to engagement and involvement frames-of-mind
- ‘self-determination’ (Ryan and Deci 2000); the satisfaction of children’s needs for feelings of competence, autonomy and ‘relatedness’ (positive social relationships).

A further psychological process, which is a facet of self-regulation related to children’s awareness and control of their emotions, is behavioral appraisal, a mental practice that enables the analysis and re-organization of their behavior at will. The controlling of excitement, the appropriate expression of emotion and the assessment of related behaviors constitute an important part of self-regulated functioning by young children and a large body of research has related emotion regulation to social competence (e.g. Eisenberg, Spinrad and Morris, 2002).

These developments in metacognition, language and motivational awareness and control in the first 7 years enable children to start to learn deliberately, as they are required to do in formal education. However, it would be a mistake to delay introducing children to important ideas until this stage is reached. As we have seen, important learning can take place through experience and in playful contexts in younger children, both in their own independent activity and through interaction with adults. Although the focus of ILAC is on changing institutions, much of the operational effort occurs at the level of the organization. Here the organizations we are implementing new approaches towards environment and bioeconomy are schools, universities and workplace.

*Figure 1. Bottom-up and top-down approaches to ILAC*



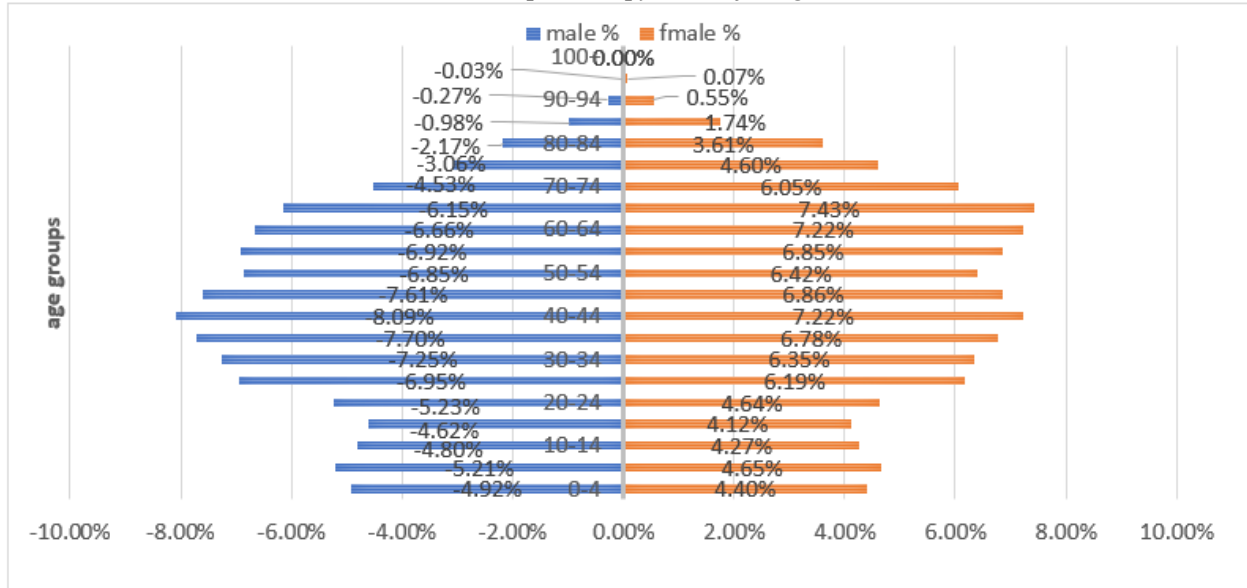
Source: J. Watss at al. 2003

At the individual level, the central importance to ILAC of the orientation and commitment of all participants is so self-evident that it is easy to overlook. Processes of institutional learning and change can only occur through changes in the behavior, attitudes, relationships and activities of individuals. This applies both to those directly involved in learning and providing knowledge (bottom-up), and to those able to provide them with legitimacy, incentives, support and space (top-down).

**4. ECONOMIC AND SOCIAL VALUE ADDED**

The population pyramid suggests that 4,92% male and 4,40% roughly 10% of the population is in the age group from 0-4 old. These children, if object of institutional change and influenced by better learning and “habit” formation will later in life be part of generation that contributes to higher economic and social value.

*Chart 1. Population pyramid of Bulgaria*



Source: Created by author with data from National statistics

The people that would be easily influenced by ILACE are those that are part of institutional environment. That are people in kindergarten, school and university where there are institutional norms that need to be abided and where knowledge obtained. The percent of people that are under this definition is 24,78% male and 22,08% or 46,86% of the population. This part of Bulgarian population can be part of the change of “habits” and move the socium in the direction of sustainable economy with higher added economic and social value. The Children’s Museum of Indianapolis has used a mission-aligned learning framework for more than a decade. Designed to foster and support adult-child interaction in exhibitions and programs, the central tool of the family learning framework is the Assessment of Learning Families in Exhibits (ALFIE) Inventory (Foutz and Thoma,2017). This study shows us that institutional learning is possible from early age and can be implemented at any stage that is part of the institutional learning environment.

*Table 1. Shift in perception and understanding our surrounding environment*

	From old understanding	To new understanding
Recycling	Only certain products and materials can be recycled	New methods and habits of recycling (ex. Japan recycles 99% of used materials and products)
Renewable energy sources	From being expensive and mainly a small % of all energy consumption.	A main source of energy with some of European countries have turn the economy in renewable energy sufficient ones. (Iceland is now derives all of its energy for electricity and home heating from

		geothermal and hydroelectric power plants). Solar panel cooperation in flats and creating our renewable grid.
Innovations	Using innovations only for main problems of the economy and ignoring smaller problems like plastic use and so on.	New smaller innovations that change the habit of users. (Long lasting straws and one time use items of degradable and eco-friendly materials). Innovative seed cocoons help trees grow in the harshest environment.
Circular material use	Linear model of material and product use	Circular material use, were the product has a new life cycle. (ex. Papers in Japan have seeds in them and after they are used, they are left in the nature to grow new vegetation).
Environment preservation	Preserving the environment that is surrounding the cities, or is reservation.	Creating mini environments in the cities for different species. Creating pocket forests (tiny urban forest created by Akira Miyawaki <sup>85</sup> ). Creating 1700 pocket forests in the world project (World economy forum).
Greener cities and city planning	City planning is mostly for better mobility.	City planning is for less mobility and using less resources. “The 15-minute city”, an approach to urban design that aims to improve quality of life by creating cities where everything a resident needs can be reached within 15 minutes by foot or bike. More urban forests and parks with higher tree density are emerging as well as vertical gardens and rooftop green spaces.
Biodiversity and protection of the habitat	Biodiversity preservation in natural habitat. Creating reservations.	Generating biodiversity (Pocket forest create 100 times bigger biodiversity). New practices are introduced and the idea of making space for nature in the cities. Barcelona created urban gardens that hep. In Chez republic they have launched a series of public tree planting events, which everyone can join.
Ecofriendly design	Design was human oriented.	Design is human and nature oriented. Amsterdam introduced bus stops with bee gardens on top to help biodiversity.

Source: Created by the author

<sup>85</sup> The Miyawaki method

The method is based on the work of Japanese botanist Akira Miyawaki. He found that protected areas around temples, shrines and cemeteries in Japan contained a huge variety of native vegetation that co-existed to produce resilient and diverse ecosystems. This contrasted with the conifer forests – non-indigenous trees grown for timber – that dominated the landscape.



The shift in perception of how humans impact the surrounding world have turned all towards more sustainable future, with better understanding of the bio world and how to make our economic cycles a part of it, with technology, policies and new attitude towards design, nature, cities architecture, biodiversity and green economy.

## 5. CONCLUSIONS

As the world continues its shift toward increased urbanization, serious challenges to sustainability and resilience remain. New solutions are needed—many of which lie in creating new ways to understand life. Change is gradually happening around the world, and we can see the impact on human life and nature around it. Bulgaria can implement good practices and help create a better habitat for both humans and animals via habit formation on institutional level that will create new jobs, have health benefits and help us achieve a more symbiotic way of life with nature.

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