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The democratisation of innovation:  
Managing technological innovation as if people matter

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# The democratisation of innovation: Managing technological innovation as if people matter

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## ABSTRACT

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Innovation is the transformation of a new idea or scientific discovery into technology through introducing, applying, and integrating it in common practice. The outcome is that people can progressively do more with the same effort, produce different outcomes with the same artefacts and produce outcomes in new and novel ways. Historically this process favoured the (largely Western-style) industrial world and today some 85 percent of global wealth is owned by just 10 percent of the global population. Empoverished people seem to find themselves in a low level human development trap.

The focus of this working paper is on innovation management in less-developed poor communities. Its central hypothesis is that endemic (human-centred) technological innovation rather than 'technology transfer' (artefact-centred innovation) can help to alleviate this situation. Two concepts from the natural sciences serve as metaphors for the intrinsic systemic and embodied nature of sustainable technological innovation:

- 'Ecosystem' to highlight the determining role of interactivity with the circumstances under which people exist; and
- 'Endemic' to highlight the importance of intrinsic innovativeness as both an outcome and a cause of human development.

The paper postulates that the innovation challenge is perhaps less procedural and more conceptual, namely to discover the recursive link between technological innovation and human development. It approaches technological innovation as a holistic, human-centred, systemic process. It argues that effective application of technological artefacts is only possible with the support of a complex system of socio-economic conditions. An outline for conceptualising, planning and managing innovation for human development is presented in the concluding sections of the paper.

Keywords: Innovation, human development, ecosystem, endemic, competence, motivation

JEL codes: I3, O3

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## INTRODUCTION

*“Problems of under-development, particularly the problems of the lowest income countries in the world, extend far beyond the issues of economic strategy alone. What we find in many parts of the world is a dearth of the needed science and technology to address critical problems of health, food supply, nutrition, environmental management, climate change, that impose enormous barriers to economic development.”* Jeffrey Sachs (2001)<sup>2</sup>

*So much time is spent in worrying about the future that the present is allowed to go to hell. Unless we correct some of the world’s systemic deficiencies now, the future is condemned to be as disappointing as the present.* RL Ackoff (1978)<sup>3</sup>

The focus of this working paper is on innovation management in less-developed, poor communities. Incessant technological innovation and technology-based industrialisation shaped the world institutionally, economically and culturally over 200 years: This process favoured the (largely Western-style) industrial world and today 85 percent of global wealth is owned by just 10 percent of the global population<sup>4</sup>. Empoverished people in less developed communities – and especially so in Sub-Saharan Africa - seem to find themselves in a low level human development trap of little progress pushing birth rates, pushing poverty, pushing death rates. The central hypothesis is that endemic (human-centred) technological innovation rather than ‘technology transfer’ (artefact-centred innovation) can help to alleviate this situation.

There are a number of explanations for the high incidence of failure in ‘technology transfer’ from industrial to developing countries.<sup>5</sup> This paper postulates that the real challenge is perhaps less procedural and more conceptual, namely to discover the recursive link between technological innovation and human development. It approaches technological innovation as a holistic, human-centred, systemic process. It argues that effective application of technological artefacts – for example cell phones and laptops in information technology, and hybrid plant material in agricultural technology – is only possible with the support of a complex system of socio-economic conditions. The ‘whole’ of artefacts plus their supportive socio-economic- and cultural system is perceived to be technology – i.e., not the artefact by itself. Van Wyk (2004:23)<sup>6</sup> defines technology as: “...*competence created by people and expressed in devices, procedures and human skills*”. Such ‘competence’ needs to be standardised in order to make it effectively communicable – this is the role of ‘devices, procedures and skills’ in the definition.

Innovation is the transformation of a new idea or scientific discovery into technology through introducing, applying, and integrating it in common practice. The outcome is that people can progressively do more with the same effort, produce different outcomes with the same

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<sup>2</sup> Sachs, J. (2001) Director of the Earth Institute, Columbia University, USA. *Keynote address to the Scientific Forum, 45th Regular Session, IAEA General Conference, September 2001.*

<sup>3</sup> Ackoff, RL. 1978, *The Art of Problem Solving: accompanied by Ackoff’s Fables*. John Wiley & Sons: New York.

<sup>4</sup> UNU WIDER (2012) *The World Distribution of Household Wealth*. [http://www.wider.unu.edu/events/past-events/2006-events/en\\_GB/05-12-2006](http://www.wider.unu.edu/events/past-events/2006-events/en_GB/05-12-2006)

<sup>5</sup> See for example: Tidd, J. (2006). *A review of innovation models*. London. Imperial College, Tanaka Business School. Discussion Paper 1/1, and

Haug, DM. (1992) The international transfer of technology: Lessons that East Europe can learn from the failed Third World experience. *Harvard Journal of Law and Technology*, Volume 5, Spring Issue 1992: 209-240.

<sup>6</sup> Van Wyk, RJ, (2004). *Technology: A unifying code*. Cape Town. Stage Media Group

artefacts and produce outcomes in new and novel ways. Two concepts from the natural sciences serve as metaphors for the intrinsic systemic and embodied nature of sustainable technological innovation:

- 'Ecosystem' to highlight the determining role of interactivity with the circumstances under which people exist; and
- 'Endemic' to highlight the importance of intrinsic innovativeness as both an outcome and a cause of human development.

## **TO BE SUSTAINABLE, INNOVATION NEEDS A SUPPORTIVE 'ECOSYSTEM' AND AN 'ENDEMIC' INNOVATION PROCESS**

### **The 'ecosystem' of technological innovation**

Some 27 years ago this author was walking next to a modern Caterpillar D9 on his farm in Agter-Paarl in the Western Cape, South Africa. The D9 pulled a one meter root-ripper, bringing stone and chunks of rock-hard soil to the surface. He observed regularity in the shape of some of the stones and took a closer look. They were excellent examples of stone-age tools of pre-historic South Africans who lived there some 300 000 years ago. The contrast between the two artefacts symbolised 'appropriate' technology under different technology 'ecosystems'.



**Figure 1: Caterpillar D9 with root ripper 1986 and a Stone tool from ca. 300 000 ago**

The concept 'ecosystem' is used here in preference to 'operational conditions' that imply hierarchical (top-down) dominance. 'Ecosystem', in contrast, emphasises interaction between the 'whole' and the elements (such as people) contained in the 'whole'. The prefix 'eco' refers to the containing (or 'meta') domain that defines the boundary of a relevant system, such as the technology system of a society. According to Ackoff (1981:15)<sup>7</sup>: "A system is a whole that consists of two or more elements (or parts) where the behaviour of each element has an effect on the behaviour of the whole, where the behaviour of the elements and their effect on the whole are interdependent, and where, however subgroups of elements are formed, each has an effect on the behaviour of the whole and non an independent effect on it."

History has shown technological innovation to be a complex, multi-faceted and interactive process which transforms the world of the innovator and invention alike. It is difficult to foresee the long term implications of an invention without developing a coherent understanding of the multi-dimensional systemic nature of the processes driving technological change. The well-known pronouncement of Thomas Watson, chairman of IBM in 1943 comes to mind: "*I think there is a world market for maybe five computers*".<sup>8</sup> In sharp contradiction the computer transformed the world into a so-called 'information society' – or information technology 'ecosystem' - by the 1980's. Technology foresight can easily

<sup>7</sup> Ackoff, RL (1981) *Creating the corporate future*. New York, USA. John Wiley & Sons.

<sup>8</sup> <http://wilk4.com/humor/humore10.htm>



order)<sup>12</sup>". Of course it also destroyed the hope for a better future for the largest share of the global population.

Another example, with a different approach to the innovation ecosystem, is EF Schumacher who published 21 years later, in 1973, his seminal work "*Small is beautiful: Economics as if people mattered*"<sup>13</sup> in which he argued the case for 'people-centred' technology that can interact with the cultural and socio-economic ecology of the society within which it exists. He called it 'appropriate technology'. However, Schumacher and (later) his followers within the 'intermediate' or 'appropriate' technology movement during the 1970's and 1980's then missed an important point: Their argument was based on the false premise that artefacts - such as tractors, fertilizer hybrid seed, etc., - are *per se* technology, which they are not. Their idea that 'small' technology, or 'intermediate' technology, is more 'appropriate' for developing societies may make sense for some developing situations but not for all developing situations. To put it differently, the design and management of technological innovation is first and foremost the design of a 'techno-ecosystem' which makes innovation not only possible but highly desirable.

### 'Endemic' innovation

*"Every society in the world has a culture which is transmitted from generation to generation through education. Education is the humanisation of people in society. Whether it is referred to as socialisation or enculturation, indigenous education or traditional, education is education. And as a human process, it is part and parcel of every human society."*

**Kedravate (2004)<sup>14</sup>**

Endemic innovativeness is a dynamic quality that emerges over time when a supportive technology ecosystem is maintained through social learning and social-clustering<sup>15</sup>. Its ultimate product is sustained innovativeness through human development.

The concept 'endemic' refers to a condition that is peculiar to and prevalent in a community. It is derived from the prefix *en-*, in or "within," and the Greek word *demos*, "people," thus meaning "within the people (of a community)". Social learning means that people are not impelled to act instinctively against changing circumstances, because they are able to develop insight into its nature and adapt to it, or influence it. Social learning is therefore essential for the sustainability of communities because traditional competencies and knowledge can vanish in the absence of learning traditions that transfer them from one generation to the next. Moreover, in the absence of appropriate traditions to manage renewal, people can become marginalised and alienated when they enter new situations – such as migrants from traditional rural communities moving to an urban-industrial environment.

Innovation is therefore only sustainable if it is endemic – i.e., if it is the product of the inherent 'innovativeness' of a community. If innovation persists on the back of an ever-improving McElroy-type SIC it could push the process towards a tipping point - creating new patterns of innovation and new inventions, 'infecting' ever more people with innovativeness – also in new regions<sup>16</sup>. Well-known biological examples of this expansive ('epidemiological') process are influenza and cholera epidemics. Influenza has been the cause of many

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<sup>12</sup> Schumpeter, Joseph A. (1942). *Capitalism, Socialism, and Democracy*. New York: Harper and Brothers, 3d Ed... 1950.

<sup>13</sup> Schumacher, EF. 1973. *Small is beautiful: Economics as if people mattered*. Random House. E-Books

<sup>14</sup> Kedravate, Akanisi (2004). Learning in Traditional Societies in the South Pacific. *Adult Education and Development* 61/2004. [http://www.iiz-dvv.de/index.php?article\\_id=345&clang=1](http://www.iiz-dvv.de/index.php?article_id=345&clang=1)

<sup>15</sup> See for example: Plewczynski, D.(1998). Landau theory of social clustering. *Physica .A* 261 (1998) 608- 617.

<sup>16</sup> Rogers, EM. (2003 ).*Diffusion of Innovations*, 5th Edition. New York. Free Press.

seasonal epidemics throughout history with cold temperatures and supportive human behaviour (e.g., indoor living in close proximity of others) creating an ideal 'ecosystem' for infection. Epidemics of waterborne diseases such as cholera often occur after natural disasters such as severe storms that disrupt or destroy sanitation systems and supplies of fresh water.

Endemic technological innovativeness also implies uniqueness, - i.e., the kind and style of technological innovation and application that are distinctive to the traditions of a country, region or community - being an emergence of local conditions, competencies and culture. The antipode of endemic technological innovativeness is so-called 'technology transfer' with its dominant focus on procedures and systems that are necessary for the introduction of global-standard applications of a technology into local conditions. Blakeney (1987: 697)<sup>17</sup>. expresses it as follows: "*The technology available to developing countries has largely been produced for markets in industrialized countries. This technology reflects not only the effective demands, and relative prices, but also the physical, economic, and social environments of those countries. Consequently, the technology that is accessible 'off the shelf' to developing countries is likely not to be well suited to their needs*". This accounts also for the circumstances in impoverished, less-developed communities

Unmitigated transfer of new technology may disrupt (even obstruct) rather than strengthen the receiving community's potential for 'endemic' innovation and human development. However, if sufficient care is taken to assess local conditions and to introduce the transfer process into a supportive, systemic, human development strategy, the outcome could be sustainable, constructive and beneficial for the receiving community<sup>18</sup>.

## **ENDEMIC INNOVATION IMPLIES HUMAN DEVELOPMENT, AND VISE VERSA**

### **Development**

The concept 'development' is often used as substitute for 'improvement' - for example, housing development, educational development, economic development, regional development, etc. - generally perceived as an activity to expand and promote growth. However, to grow something does not necessarily mean that you have also developed it. Uninhibited growth often ends in failure when imbalances are created between elements of a society or organisation, causing some functions or structures to become overheated in the process<sup>19</sup>. The potentially destructive global impact of rampant growth in population and industrial activity was the subject of the systems dynamics study in the First Club of Rome Report in 1972: *Limits to Growth*<sup>20</sup>

Amartya Sen, 1998 Nobel Prize winner in economics, defines development as a process that removes obstructions to human freedom in various dimensions of life, including political participation, economic facility and social opportunity (including employment). He stresses the need to abolish "unfreedoms" (or obstructions) such as poverty, famine, starvation, undernourishment, tyranny, poor economic opportunities, systematic social deprivation, the neglect of public services, intolerance, and repression. Poverty is described as "capability deprivation" that constraints an individual's realm of achievable functioning in society. Economic poverty (lack of means) and capability poverty (lack of skills) are closely linked, as seen in South Asia and Sub-Saharan Africa where people suffer from both dire economic

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<sup>17</sup> Blakeney, M (1987). Transfer of technology and developing nations. *Fordham International Law Journal* Volume 11, Issue 4 1987 Article 1

<sup>18</sup> Robinson, L (2009). A summary of diffusion of innovations.

[http://www.enablingchange.com.au/Summary\\_Diffusion\\_Theory.pdf](http://www.enablingchange.com.au/Summary_Diffusion_Theory.pdf)

<sup>19</sup> A typical example in the corporate world is when the sales department outperforms logistics and production.

<sup>20</sup> Meadows, Donella H, Meadows, Dennis, Jorgen Randers L, and Behrens III, William W.. (1972). *The Limits to Growth*. New York: Universe Books.

poverty in the form of below subsistence earnings and capability poverty in the form of high unemployment rates<sup>21</sup>. Sen's 'abolishment of unfreedoms' (or obstructions) will form one basis of discussion on the role of technological innovation in socio-economic development (see Figure 4).

The Ackoff-Gharajedaghi school of systems thinkers proposes a somewhat similar but more systemic definition of development: '*Development is what happens when there is an increase in the **desire** (motivation) and **competence** (ability) of the members of a society (or organisation) to satisfy their own legitimate needs and aspirations as well as the needs and aspirations of others*<sup>22</sup>. This definition emphasises the importance of '**desire**' (motivation) and '**competence**' (ability). Also that an improvement in the competence of the individual needs to be counter-balanced with improvement in the status of the community and quality of life in general – lest the ecosystem of society becomes an obstruction to the motivation, drive and competence of people.

### **Motivation and competence: Key drivers of human development**

Are the personal qualities of motivation and competence unique to only a few outstanding individuals, or are they universal human qualities – indicating that human beings are inherently innovative and motivated?

The very fact that sustained dismal poverty continues to exist next to sustained opulence in the world (and in South Africa) suggests that motivation and competence are indeed inherently human – and perhaps even more so when your survival is under threat. 'Being alive' means that people tend to be motivated and competent to survive under their challenging circumstances – even if it means to trek thousands of kilometres towards hope. Therefore, at the lower end of the wealth spectrum motivation and competence may have an almost mechanistic characteristic: People are motivated by averting pain and pursuing pleasure. At the higher end people may pursue self-determination, status, fulfilment and recognition with Max Weber's deontological ethics (actions from duty and conviction) an earlier example, and Maslow's needs for esteem and self-actualisation a later example of this kind of perspective. There are obviously differences in nature between the motivation and competencies of, say, car guards, beggars, squatters living in slums and that of wealthy professionals in mansions. At each end of the wealth spectrum people become used to a particular way of looking at life and doing things, .i.e., they become enculturated. This creates resistance to renewal, and thus it becomes necessary to look at creative strategies that will motivate people to act and think differently.

Because motivation and competence are key drivers of human development, they are also key drivers of endemic innovativeness. Motivation is the human quality of having a sense of meaning and purpose and the drive to do something instinctively or objectively desirable. It guides personal and social choice and initiates, directs and maintains personal and communal goal-directed behaviour under varied circumstances. Competence emerges from a combination of related personal qualities - specifically skills, knowledge, insight, foresight, understanding, wisdom and a sense of meaning - that enable a person (or organisation) to act purposefully when facing real world challenges.

A facilitating symbiosis between improvement in individual competence and a supportive 'ecosystem' is obviously crucial for endemic technological innovation. The challenge is therefore to design and manage such an ecosystem. As a first step in this design it would be necessary to review the obstructions to human development and their impact on:

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<sup>21</sup> Terjesen, Siri (2004) Amartya Sen's development as freedom. *Graduate Journal of Social Sciences* 1(2);pp. 344-347.

<sup>22</sup> Gharajedaghi, J (1999). *Systems thinking: Managing chaos and complexity*. Woburn, MA. Butterworth-Heinemann: 92-95.

- personal motivation;
- personal competence in general; and the
- ecosystem of innovation.

## WHAT MOTIVATES PEOPLE?

### Theories of human motivation

Theories of human motivation have a long history, starting with classical Greek 'teleology' – i.e., the theory of purposiveness. Motivational theories in organisation management followed broadly three lines of logic during the 20<sup>th</sup> Century:

1. The first followed a mechanistic-structural logic which sees people as 'cogs' in the organizational machine. People are driven by Freudian-like (Eros-Thanatos) instincts which should be managed by formal controls and structures - including supportive designs for rewards and penalties. Writers and thinkers of this tradition include Henry Ford<sup>23</sup>, FW Taylor<sup>24</sup> and A Sloan<sup>25</sup>; Technological innovation is therefore dependent on designs for technology-transfer, installing application systems and teaching and training people the correct application for specific tasks.
2. The second is an organismic logic where human relations and motivation are 'managed' (from the top) by managers under the assumption that workers are not only interested in rewards and penalties, their psychological needs are also important. It emphasizes greater management awareness of the intrinsic needs of a worker and also good communication and consultation with workers in the setting of objectives, performance measures and line functions (management by objectives). It therefore generally promotes team work wherever possible. E. Mayo followed this line.<sup>26</sup>
3. The third is a human systems logic where people are perceived to be purposeful, where human organizations are perceived to be 'multi-minded' institutions with self-organizing capabilities, and where management's main concern should be to manage the supportive ecology for social learning and innovation that will facilitate alignment of action around mutually agreed objectives. The work of Abraham Maslow<sup>27</sup> and Frederick Herzberg<sup>28</sup> (see Figure 3) did not consider self-organization, *per se*, but they emphasized an internal locus of control in people. The focus of the RL Ackoff and J. Gharajedaghi normative motivational theory is more specifically on human systems as interactive, self-governing learning systems.

Maslow's theory suggests a hierarchy of human needs. He identifies five sets of human needs (on priority basis) that can motivate employees. Any need may become a motivator as long as it is not satisfied or it is comparatively less satisfied. Herzberg refers to hygiene factors and motivating factors in his theory. Hygiene factors are dissatisfiers which can be described as the general conditions ('ecology') that can facilitate or obstruct people in their activities. Motivational factors are those conditions that facilitate the pursuits of people. If one compare the Maslow-Herzberg structure then it seems that Herzberg's 'motivational factors' relate largely to Maslow's esteem and self-actualisation needs. The 'hygiene factors' seem to focus on physiological and safety needs, and to some extent on social needs.

<sup>23</sup> See for example: <http://www.employeeevolution.com/archives/2008/05/01/henry-ford-didnt-need-to-manage-but-you-do/>

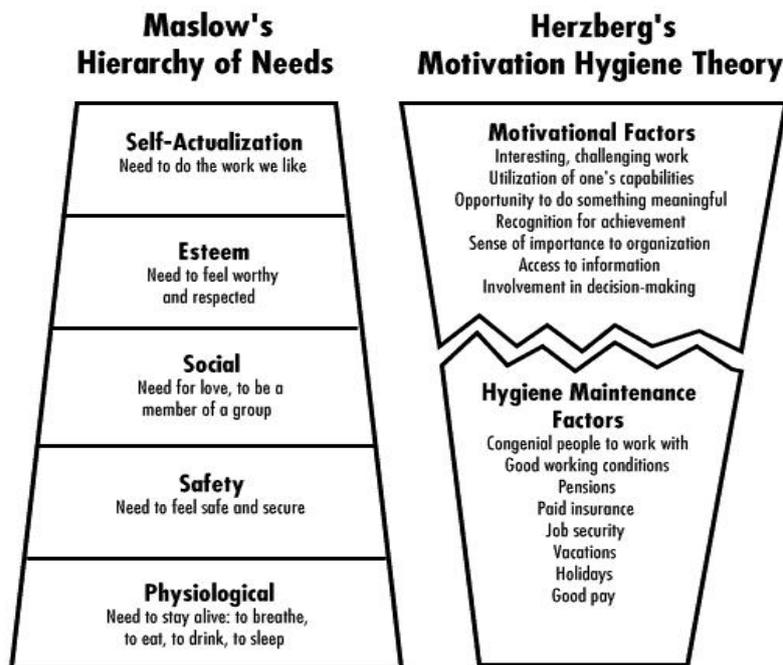
<sup>24</sup> See for example: <http://www.netmba.com/mgmt/scientific/>

<sup>25</sup> See for example: <http://www.melodiesinmarketing.com/2008/01/28/alfred-sloan-and-organizational-management/>

<sup>26</sup> See for example: <http://encyclopedia2.thefreedictionary.com/Human+Relations+Theory>

<sup>27</sup> Maslow, AH (1943). A theory of human motivation. *Psychological Review*, 50, 370-396.

<sup>28</sup> Herzberg, F. (1987). One more time: How do you motivate employees? HBR, 1987, September-October:



**Figure 3: A comparison of Maslow's hierarchy of needs with Herzberg motivation-hygiene theory**

Source: The Agile Complexification Converter

<http://agilecomplexificationinverter.blogspot.com/2009/09/motivation-herzberg-two-factor-theory.html>

The human systems approach to organisation management is most relevant for managing endemic innovation and it therefore requires some further discussion

The Ackoff-Gharajedaghi approach to human motivation is normative, systemic, non-hierarchical and dynamically interactive (mutually re-enforcing). In his 1981 book on corporate strategy RL Ackoff applied the normative taxonomy of the early 20<sup>th</sup> Century American philosopher EA Singer<sup>29</sup> to the ancient Greek teleology of 'universal' human pursuits<sup>30</sup> and proposes a four-dimensional, interactive set of ideal human 'pursuits' (or ideal motivational drivers) namely the pursuit of 'truth', 'plenty', 'good' and 'beauty' - which he considered individually necessary and collectively sufficient for sustainable human development. However, a few years later, and after some serious discourse, Ackoff and Gharajedaghi<sup>31</sup> agreed to add a fifth normative 'pursuit', namely 'freedom and ability to choose'<sup>32</sup> - which, of course, links with Amartya Sen's view that development is a process that enhances human freedom.

They argued that the five pursuits define a framework for a comprehensive, interactive, interdependent and balanced system of human endeavor that are separately essential and collectively sufficient for sustainable human development, namely<sup>3334</sup>:

1. The pursuit of 'truth', (the technological dimension) governing all aspects of improving and distributing general competence such as improving skills, access to information, knowledge, insight, understanding and wisdom;

<sup>29</sup> Singer, EA (1923). *On the contented life*. New York. Henry Holt

<sup>30</sup> Ackoff, RL (1981) *Creating the corporate future*. New York, USA. John Wiley & Sons, pp. 37-43.

<sup>31</sup> See Gharajedaghi (1999). Op' Cit: 57.

<sup>32</sup> Gharajedaghi, J. (1985). *Towards a systems theory of organisation*. Seaside, CA, Intersystems Publications.

<sup>33</sup> Gharajedaghi, J., (1985), *Ibid*.

<sup>34</sup> Gharajedaghi, J. (1999). *Op.Cit.*, pp.56-59.

2. The pursuit of 'plenty' (the economic dimension), governing all aspects of generating and distributing wealth, goods and services;
3. The pursuit of 'good' (the values dimension), governing all aspects of the promotion, formation and institutionalization of those beliefs, moral virtues, values, ethical and cultural practices that are essential for the promotion and maintenance of good interpersonal and community relationships - of love and a sense of belonging;
4. The pursuit of 'beauty' (the aesthetics dimension), governing the promotion and diffusion of aesthetics as a generally desirable personal need for upliftment and quality of life for individuals, for communities and for society generally;
5. The pursuit of 'freedom and ability to choose' (the governance dimension),, which refers to advancing the quality of societal governance, specifically in terms of individual rights such as having the freedom and power to choose your government, and to take all the actions required for the support, the furtherance, the fulfillment and the enjoyment of your life as long as this does not obstruct or damage the rights of others.

Ackoff and Gharajedaghi argue that sustainable development (and thus endemic innovativeness) is obstructed when sections of a population feel frustrated in their pursuits through a lack of access ('state of scarcity'), or inequity in access ('state of mal-distribution') or insecurity in access ('state of insecurity') in any or a combination of these five pursuits. Moreover, obstructions in any one of the dimensions will resonate with the other dimensions, causing instability despite apparent normality in a particular dimension. This they call 'first-order' (or 'linear') obstructions. If such a situation persists – which is quite common in marginalised communities - second-order (or 'non-linear') obstructions such as alienation, polarisation and corruption may emerge. Second order obstructions will make endemic innovativeness impossible. They are indicators of a deep social pathology - of a failed, brittle, disorganised community.

There is nevertheless also an important similarity between the Maslow-Herzberg logic of motivation and that of Ackoff-Gharajedaghi in that they seem to agree on the subject of physiological (externally-driven) and psychological (internally-driven) motivators. Maslow-Herzberg's lower hierarchies focus on the physiological dimensions and the higher hierarchies on the psychological dimensions of human motivation. The Ackoff-Gharajedaghi model is systemic, balanced and interactive - accentuating interdependency between physiological motivators (the technological and economic dimensions) and psychological motivators (the values, aesthetic and governance dimensions). This suggests that the ecosystem for innovation includes both internal and external motivators that should be considered in innovation management.

### **The internal and external dimensions of human motivation**

In recent years the issue of internal and external motivators of human behaviour received considerable attention in re-creative futures studies. Inayatullah<sup>35</sup> places the spotlight on the need for much deeper inquiry into the inner dimensions of human behaviour in his 'causal layered analysis' (CLA):

1. The first level of CLA inquiry focuses on containing limits, trends, stress points, issues, threats and opportunities (the "litany").
2. In order to discover the underlying reasons for the factors in the 'litany' one must dig deeper into (CLA's) second layer (the 'systems'), covering the impact of interactions between social, economic, technological, political, and ecological factors.
3. Even deeper inquiry enters a third layer of world views, assumptions, meanings and beliefs which are mostly culturally determined.

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<sup>35</sup> Inayatullah, S, (1998). Causal Layered Analysis, *Futures*, 30:815-819.

4. The deepest inquiry covers a fourth layer of the myths, metaphors and 'images' that can explain certain kinds of human behaviour.

Assumptions of causality between these four CLA layers may serve as a working hypothesis for an inquiry into the processes driving change<sup>36</sup> - thus accommodating the need for testing recursive causality between the layers, such as the long term impact of shifts in myths and world views on the litany and systems, and *vice versa*.

The integral framework of Slaughter<sup>3738</sup> and Wilber<sup>39</sup> is more systemic in nature. Slaughter proposes a heuristic procedure to discover the drivers of human behaviour. He calls it the 'Transformative Cycle', or T-Cycle, which in its general logic is somewhat similar to McElroy's reinforcing cycle of SIC (see Figure 2). The Wilber-Slaughter integral methodology is based on Koestler's idea of 'holons', i.e., entities that are simultaneously a whole and a part<sup>40</sup>. It consists of four quadrants of inner-outer drivers of human behaviour (see Figure 4).

The classification in Figure 4 is purely functional – in this case also, no hierarchy is implied although it would be possible to rank the items in terms of *a priori* agreed progressions, say from a Higgs-Boson to the human body as a rule. The argument is that transformative interventions should also be seen as explorative acts which can be initiated at any 'layer'. For example:

- The context (the 'outer') within which such intervention is initiated can facilitate or obstruct endemic innovation (e.g., hunger and poverty affects the body and through this ultimately the mind, values, social innovation capital, etc.), and
- Interventions that are well designed can develop recursive qualities – i.e. they can be the cause and the effect of innovative actions, in fact creating a 'snowball' effect or an 'innovation-epidemic'.

#### **A few pointers for inquiry into the motivation-drivers of endemic innovation**

- Slaughter's T-Cycle and McElroy's reinforcing SIC cycle emphasise the need for a heuristic (search, discovery, review) approach to motivation inquiry. This should include scoping, scanning and open dialogue processes. The search for motivational drivers must be an open-ended process and it is to be expected that results may differ from situation to situation and from community to community. Community involvement in the inquiry will be essential to gain objective insight and understanding of what really motivates the people. Moreover, participative planning processes support good implementation design<sup>41</sup>.
- The Ackoff-Gharajedaghi interactive multi-dimensional design of human pursuits emphasises the importance of social balance for developing an ecology for endemic innovativeness: A balance between the pursuit of welfare, the pursuit of community understanding and human competence, the pursuit of moral-ethical virtues, aesthetics and the pursuit of good governance. Moreover, within each of these pursuits there must also be a balance between sufficiency, equity and security. Any persistent imbalances may initiate a destructive resonance, ending in the social pathologies of alienation, polarisation and corruption. The presence of these pathologies will make endemic innovativeness impossible.

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<sup>36</sup> Inayatullah, S. (2002). Layered methodology: Meaning, epistemes and the politics of knowledge, *Futures*, 34: 478-891.

<sup>37</sup> Slaughter, RA. (1999). A new framework for environmental scanning, *Foresight*, 1(5): 441-451.

<sup>38</sup> Slaughter, RA. (2008). What differences does 'integral' make? *Futures*, 40:120--137.

<sup>39</sup> Wilber, K. (2010). *Integral world*. <http://www.integralworld.net>

<sup>40</sup> Koestler, A. (1967). *Ghost in the machine*. London. Penguin Group reprint: 140,247.

<sup>41</sup> See for example: Suchman, L. (2007). *Human-Machine Reconfigurations: Plans and Situated Actions*, 2nd Edition. Cambridge, UK: Cambridge University press;

- The 'inner-outer' dichotomy of the Maslow-Herzberg, Inayatullah and Slaughter-Wilber models emphasises the need for intrinsic and extrinsic review of human motivation, relating to the psychological and physiological dimensions of influences affecting human behaviour. The Slaughter analysis moreover emphasises the dynamic-systemic and recursive nature of these influences



**Figure 4: An adapted integral behavioral framework for scanning motivation-drivers (Slaughter 2008)**

### PROMOTING COMPETENCE IN LESS DEVELOPED COMMUNITIES

Some 35 years ago this author was a guest of one of the large sugar plantations in Natal/KwaZulu. At the end of the tour he was invited to attend a training session at the company's human relations offices. Twenty workers attended the class which covered basic skills such as how to use a spade correctly and how to behave around machinery in order to prevent accidents. At the end of the lecture the room was darkened for a 35 mm. slide presentation which explained the daily routine on the farm and some of the task sequences that were expected of them. It was obvious that the workers had their fill of this process and some of them almost immediately started to doze off. But suddenly there was a vibrant commotion in the class and a lot of comments, indicating great interest in the content of the

slides. The clever lecturer inserted a sequence of naked lady slides which obviously had the desired effect.

The greatest challenge in competence development is not to teach particular skills and knowledge, but to develop excitement, passion and curiosity in people not only to acquire needed skills and knowledge but to continuously move beyond the boundaries of their current competencies. This challenge requires action on three fronts:

- Creating an inviting ecosystem for innovative actions;
- Designing small steps with big results; and
- Creating multi-dimensional focused successes that can cascade into broader successes.

### **Creating an inviting ecosystem for competence development**

*“What if you are volunteering in a soup kitchen and a homeless woman who hasn't eaten in days approaches you desperately needing something to eat and drink -- would you hand her a Bible and tell her, "Jesus loves you?"”<sup>42</sup>.*

If abrasive ‘hygienic conditions’ dominate in a community innovative actions in support of social development are near impossible.

Maslow’s hierarchy of needs indicates that human behaviour will then display survivalist motives, while the Ackoff-Gharajedaghi model indicates a total breakdown of social cohesion if such conditions persist. Abrasive living conditions will not kill the innovative and entrepreneurial spirit of people but it will make it self-centred and survivalist in orientation. Baumol points out that innovativeness and entrepreneurship can be productive, unproductive or even destructive<sup>43</sup>. Systemic corruption and organised crime fall under the last mentioned category. The challenge is to build social innovation capital (SIC, see Figure 2) in a community, but when a self-centred, free-for-all attitude is dominant in a community there can be little hope to achieve that.

The birth of an innovative society is therefore not with the development of skills and new competencies through better education and research, the building of schools, handing-out of text books, teaching maths and science, developing computer literacy and pushing more students through tertiary education, etc. The starting point is to build better communities and this does not necessarily imply housing construction by the state, infrastructure and electricity provision by the state and an increase of government social grants through the ‘All Pay’ system. All of these actions may be needed - and may even be essential - for the desperately poor. But in the longer term these kinds of programmes may worsen conditions in a community if the desire and competence of people to serve themselves and their community are not enhanced by them. More specifically, such programmes may in the longer term only fuel a dependency culture and increase unfulfilled social need by creating a ‘home’ and relative security for everyone from everywhere who cannot cope with life.

How can one transform social despondency into hope without also placing society on a route towards entitled dependency – and thereby changing a state of social instability into a state

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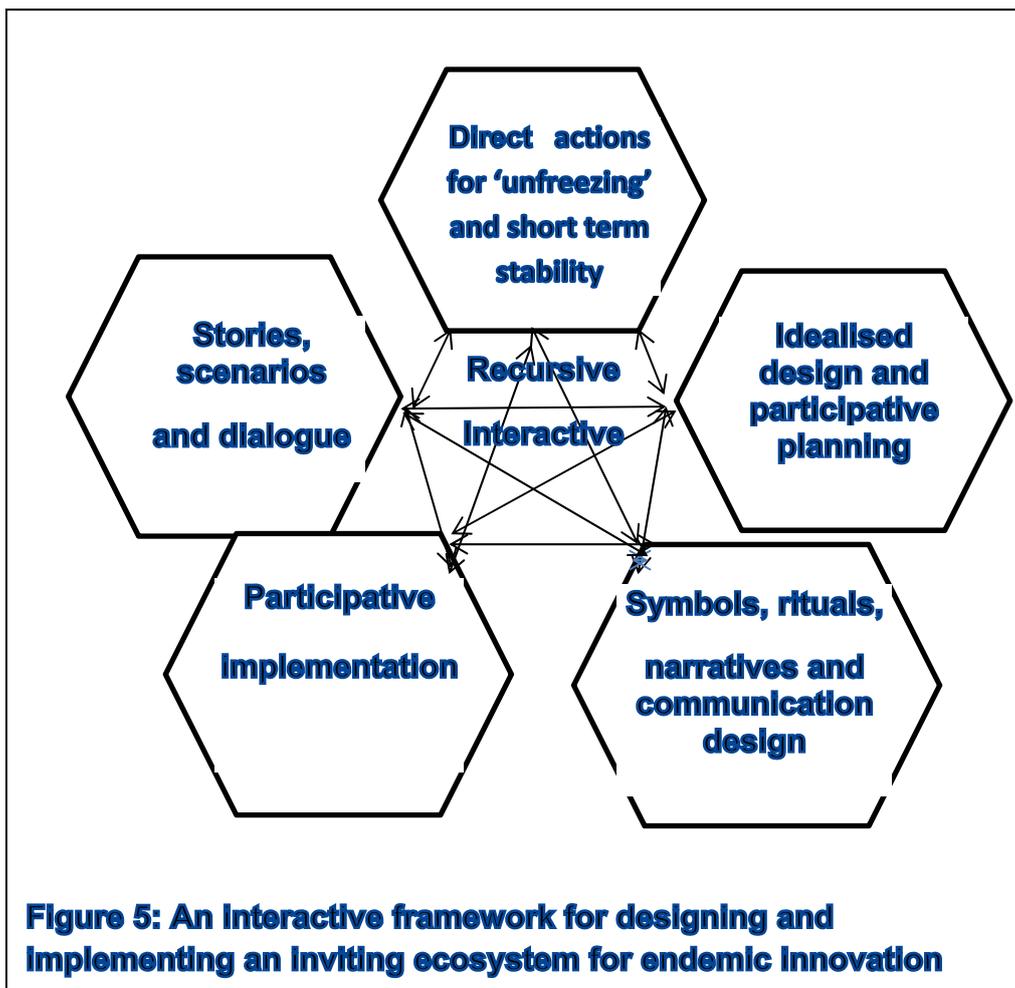
<sup>42</sup> Zach Hunter (2011) *A Christian Ethic of Social Justice*. [http://www.huffingtonpost.com/zach-hunter/christian-ethic-of-social-justice\\_b\\_945615.html](http://www.huffingtonpost.com/zach-hunter/christian-ethic-of-social-justice_b_945615.html)

<sup>40</sup>Baumol, WJ (1990). Entrepreneurship: Productive, unproductive and destructive. *Journal of Political Economy*, 1990, vol. 98; 893-921

of political instability? Clearly, such a transformation requires strong moral leadership supported by re-creative actions that involve the communities in their selection, design and execution. But how is it possible for communities to make wise decisions with positive long term outcomes when their world views are conditioned to think short term due to a survivalist culture? The most obvious, and perhaps most difficult, route is through a carefully structured design for social learning by means of stories, scenarios and community dialogue. And this is an all-inclusive participative process with as its ultimate objective changed mind-sets, changed priorities, changed ideals and transformed systems and competencies.

Figure 5 presents an outline of five interdependent activities that summarises a transformation process for creating and kick-starting social innovation capital in despondent communities that live in a state of entitled dependency. It consists of five interactive (non-hierarchical) activities, viz.:

- Direct or 'linear' actions to contain and stabilise the situation;
- Social learning through stories, scenarios and dialogue;
- Idealised design and participative planning;
- Participative implementation of the design; and
- Participative design of symbols, rituals and communication practice.



**Direct, or 'linear', actions** are the typical activities that authorities will implement to remedy situations of poor living conditions, poverty and deprivation. These are actions that confront a difficult situation head-on. In terms of standard political considerations this will be the right

way to go to serve a constituency – being necessary and sufficient to solve the social and economic problems of deprivation and sending signals of responsive and responsible governance. In the proposed design these actions are also identified as necessary but only in as far they can help to unfreeze the mould of despondency, giving such communities some hope for a better future and creating an inviting environment for initiatives that are aimed at developing greater social competence and self-determination. Direct actions are therefore considered to be necessary for the short term but not sufficient in the long term.

**Stories, scenarios and dialogue** aim to use an appropriate<sup>44</sup> process to build the awareness, knowledge, world views, virtues, insight and understanding within a community about:

- The underlying factors supporting their current predicament;
- What the likely consequences will be if the current situation is allowed to continue;
- The broader trends that may impact on the unfolding events; and
- What the alternatives for action are.

**Idealised design** - after agreeing on the alternatives for action the community should be ready to consider the best, or 'ideal', outcomes that are possible and achievable in the short, term and long term, and the programmes and projects that are necessary to achieve them. The process should be participative and aimed at constructing a precise design for all the initiatives and actions that are required to produce social innovation capital – including resources and finances required, and where and how it should be sourced.<sup>45</sup>

**The implementation process** should also be participative but now all the relevant stakeholders – the community, non-governmental organisations, private sector organisations, local government, provincial government and national government should come on board. With the full participation of the stakeholders, the planning design should be under continuous review in order to fine tune and adapt the focus, design and procedures (see SIC process in Figure 2).

**Communication design** should aim to align and re-enforce the transformation process as it progresses. It should be multi-faceted, including actions such as developing new symbols, relevant narratives, role models, multi-media initiatives and the kind of rituals that can re-enforce the core values, meaning and role of specific actions and projects in the community. The selection and design of symbols such as flags, logos, names for specific actions should be a participative effort. A sound communications design is a powerful instrument for re-enforcing a social movement and it is only necessary to reflect on its role in the development of the world's major religions to understand why.

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<sup>44</sup> 'Appropriate' because it takes current world views, perceptions, perspectives, insights and understanding of the community as the point of departure in the dialogue. The process should be aimed at social learning, which is a process in which individuals observe the perspectives and behaviour of others, the implications of such perspectives and behaviour, and then modify their own perspectives and behaviour accordingly.

<sup>45</sup> See for example: Ackoff, RL. (2001). *A brief guide to interactive planning and idealised design*. <http://www.ida.liu.se/~steho/und/htdd01/AckoffGuidetoIdealizedRedesign.pdf>

## Small steps for big gains in competence

*"Give me a lever long enough and a fulcrum on which to place it,  
and I shall move the world".*

**Archimedes, 400 BC**

Archimedes' metaphor on moving the world also applies to the problem of social transformation where the planner is faced with complex systemic inertia - and where interventions may have uncertain outcomes over the longer term. Two categories of leverage points are proposed:

- Leverage points for complex social systems; and
- Leveraging potential 'infection carriers' of innovation;

### Leverage points for complex systems:

Donella Meadows, senior author of the first Club of Rome Report in 1972, poses the question: "How do we change the structure of complex systems (such as communities) to produce more of what they want and less of what they do not want?"<sup>46</sup> And she answered: By finding the leverage points – the places in a system where a small change could lead to a large shift in behaviour.

- According to Meadows the most significant leverage points centre on changing world views, goals and rules – this should be the target of social learning through dialogue and scenario development.
- The second category of leverage points focuses on building an understanding of how a community (as a social system) functions – i.e., understanding the reasons for its ability to self-organise: Penalty and reward processes, information flows, self-reinforcing and balancing feedback loops.
- The third category of leverage points covers the description of the sustaining inputs into the community: How is income generated and distributed, how are the interdependencies within the community structured, what attitudes, skills and practices are required to earn such income, how is 'wealth' stored and controlled, what is the role of subsidies and how is access to subsidies gained, etc.?

In other words, a first essential step in preparing a dialogue (see Figure 5) is to do a thorough systems analysis and systems description of the structure and functioning of a community.

### Leveraging potential 'carriers' of innovation:

Metaphorically speaking, the challenge for development planners is to discover those individuals who are most prone to become 'infected' with an innovative spirit, and then to create the appropriate ecosystem for 'innovation infection' – as discussed previously. These people will be the 'carriers' to kick-start an innovation 'epidemic'.

Everett Rogers, who passed away in 2004, was perhaps one of the most prolific researchers and writers on innovation diffusion in the recent history of the subject. His book on the subject became a standard reference for researchers in this field and its last edition – the 5<sup>th</sup> edition – was published in 2003<sup>47</sup>. Rogers argues that successful diffusion of innovations requires a balance between knowledge and direct experience and between informal personal networking and more formal processes. The following is a brief overview of the Rogers innovation diffusion framework.

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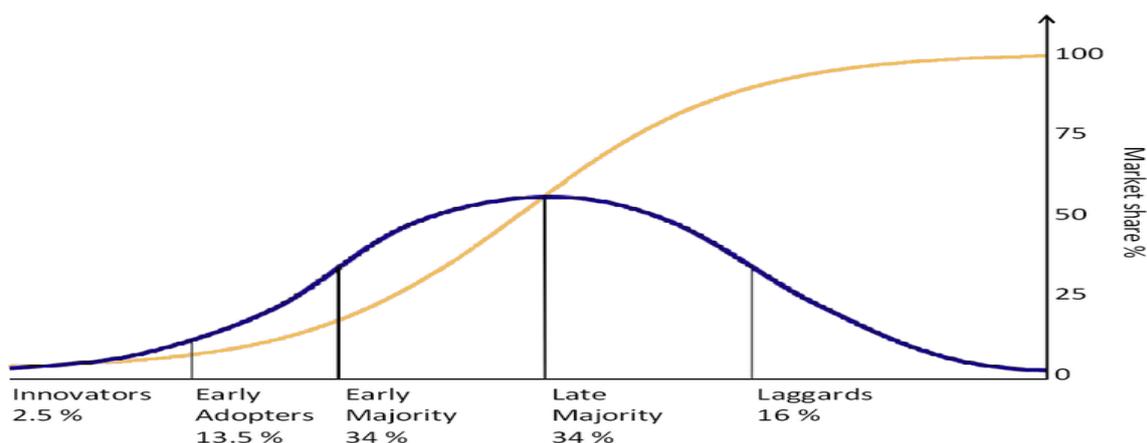
<sup>46</sup> Meadows, D. (2009) Leverage Points: Places to intervene in a system. *Solutions for a Sustainable and Desirable Future*. Volume 1, Issue 1: 41-49.

<sup>47</sup> Rogers, EM. (2003) *Op. Cit.*

According to Rogers' innovation diffusion practitioners should accommodate five qualities that together will determine the success of a particular innovation process;

- **Relative advantage:** The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption is likely to be. This implies that the degree to which an innovation is perceived to be better than existing practices – i.e., judged in terms of factors that matter to the community - the higher the likelihood that they will consider implementing it.
- **Compatibility:** The degree to which an innovation is perceived to be consistent with the culture, values, past experience, skills and needs of the community the more rapid its rate of adoption is likely to be. This implies that small steps are better than giant leaps – innovations that appear to be way-off the beaten track are unlikely to be recognised or accepted.
- **Simplicity:** The degree to which an innovation is perceived as difficult or easy to understand and use will determine its rate of acceptance. Innovations that are simpler to understand are adopted more rapidly than innovations that require the adopter to develop 'difficult' new skills, attitudes and understanding.
- **Testability:** The degree to which it is possible for a community to first 'try-out' and test an innovation will impact on its acceptability. An innovation that is perceived to be testable offers less uncertainty to the community.
- **Clear results:** The easier it is for the community to see the benefits of an innovation, the more likely it will be adopted. Visible results lower uncertainty and also stimulate peer discussion of a new idea when the friends and neighbours of an innovator request information about it.

It should be obvious that heuristic social learning - i.e., the design of an interactive and balanced social learning and implementation process (see Figures 2, 5) - could play a key role in the acceptance of innovations and in the preparation of innovators in, especially, developing communities. The other aspect of Rogers' framework is that it emphasises the need for incrementalism. This incorporates, as a first step, the discovery and activation of innovators and their followers, and secondly the design and implementation of cascading programmes (Figure 6).



**Figure 6: The Rogers Adoption Curve – A classification of innovators and their proportional positions on the adoption curve.** (Source: Rogers, EM. (2003). *Diffusion of Innovations* 5th Edition. New York. Free Press.)

Rogers' research of 40 years on innovation diffusion, covering a number of industries and countries, indicates that on average a very small proportion of the people in any community – some 2,5% - are innovators, and some 13,5% more early adopters. Therefore, at the early

stages of innovation the initiating target group of innovators constitutes no more than some 16% of a community.

The adoption process begins with a tiny number of imaginative and courageous entrepreneurs. One can surmise that social entrepreneurs who started on their own initiative soup kitchens, schools and day-care services could be part of this group. Also young people who enjoy playing with computers, surfing the net, building web sites and playing 'cool' games. These are possibly people with the spirit and intend to think and act outside the mold of a poverty-dependency or dependency-entitlement culture. They should be tracked down, they should receive recognition and they should be invited to take part in a design for community renewal.

Once the benefits of the new initiatives start to become apparent, early adopters will come into the fray. These are the kind of people who are continuously on the lookout for new opportunities. They are profit motivated and are quick to make a connection between new innovations or initiatives and their personal interests. In poor communities these are possibly the people who are active in the informal sector – those with loan businesses, street vendors, spaza shops, backyard mechanics, skilled handymen, 'respectable' shebeen owners – and perhaps, perversely, some leaders in various forms of organised crime. Early adopters must be supported to join in, and their participation in such innovation should receive acclaim and media coverage. They are also the likely candidates to become involved in peer-based education, training and social development programmes.

Early majorities are risk-averse and cost-sensitive. They worry about their daily responsibilities, their children going to school, their job-security, etc. Their joining in with new ventures will be motivated by the expected cost - benefit ratio – and especially the perceived risk associated with it. Therefore, and especially for subsistence communities<sup>48</sup>, it would be necessary to follow the dual strategy of supporting their roles and activities in new ventures (increasing the potential benefits) while simultaneously providing some kind of default social security support (decreasing the potential risks).

The late majority and laggards in subsistence communities are likely persons who are immersed in a subsistence existence, feeling hopeless and useless. But they can also feel relatively comfortable living of social benefits. Having a dependency-entitlement culture their innovativeness is evident in their ability to gain more from the state and society without having to pay or work for it. Their joining of new developmental ventures is most unlikely unless the social safety-net is significantly lowered and the opportunities from the new venture significantly more lucrative than what they can gain from social support. One of the most disruptive examples of community destabilisation in South Africa seems to be the so-called 'child support programme' which often is a subsidy for teenage pregnancy, increased birth rates and substance abuse.<sup>49</sup>

But human systems are information bonded, and through social learning the 'ecology' for innovativeness and human development in communities can be transformed – even in the case of the late majority and laggards. While it is not possible to transform the whole community with one single all-encompassing initiative, it could be possible through leveraging a focused strategy for social learning. One example is the pre-revolutionary Iranian initiatives for health services and educational development in rural communities.

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<sup>48</sup> These are people who live near to the 'bread-line' but yet not captives of a poverty culture.

<sup>49</sup> This is an untested observation of this author, derived from his experiences as part-time farmer in the Western Cape Province. It could serve as a useful working hypothesis for a post graduate study in social psychology.

## Cascading social learning systems

A procedure for cascading learning systems was developed by Jamshid Gharajedaghi in pre-revolutionary Iran to improve education and health care services in rural communities. The design was based on an incremental social learning process, both in the selection of the curriculum content and in the structure and process of the learning system. The selection of the content of the curriculum was a communal effort with the facilitator and community choosing and prioritising the desired outcomes and learning content together. The rules for choice and prioritising implicitly resembled Rogers' five desirable qualities for the diffusion of innovations.

Practitioner tutors were appointed for each learning module to guide and help a few learner practitioners up and until they passed an examination that was set by a standards oversight institution such as a builders' guild or medical council. The practitioner tutors will only be rewarded for those candidates who passed their exams. Following-on this process, tutors can become learners in more advanced learner programmes, and after passing their exam learners can become tutors for a more learners on the subject they have passed – thus cascading knowledge, insight and understanding throughout their community.

This is in sharp contrast to current practice of 'developing' such services through growing institutional-based education and health services. It is believed that teaching institutions are there to provide learning to so-called 'learners'. RL Ackoff pointed out that the modern educational system is not dedicated to produce learning by students, but teaching by teachers, and according to him teaching is a major obstruction to learning: "*Witness the difference between the ease with which we learned our first language without having it taught to us, and the difficulty with which we tried to learn a second language in school. Most of what we use as adults we learned once we got out of school, not while we were in it and what we learned in school we forgot rapidly—fortunately. Most of it is either wrong or obsolete within a short time. Although we learn little of use by having it taught to us, we can learn a great deal by teaching others*"<sup>50</sup>.

Cascading learning systems can save on education and development costs while improving competence. Moreover, they may lift the confidence and status of all participating community members who pass their new competencies on to others. This is an infectious process that contributes to the state of communal knowledge and increases social innovation capital'. In the specific case of pre-revolutionary Iran there were other important by-products in that students were producing much needed income for their families while they learned more by teaching others and used what they had learned. They did not forget what they have learned because they had the opportunity to apply their new competencies directly in the community. In other words, these competencies became endemic<sup>51</sup>.

## CONCLUSION

Communities need not to be a serf of (assumed to be) 'given' oppressive circumstances – to an oppressive innovation ecosystem. However, while technological innovation liberated a minor section of the global society from the scourge of poverty, hunger and disease, for the vast majority of people in the world and in South Africa nothing meaningful happened to redeem them from this entrapment. A concentric trend of growing wealth and power in the hands of the few is counterbalanced by a growing marginalisation of a growing number of poor people in the world. This is a threat to the sustainability of humanity as a whole –

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<sup>50</sup> Ackoff, RL (2006). *A lifetime of systems thinking. Leverage Points* Issue 115.

[http://www.pegasus.com/levpoints/ackoff\\_a-lifetime-of-systems-thinking.html](http://www.pegasus.com/levpoints/ackoff_a-lifetime-of-systems-thinking.html)

<sup>51</sup> Personal communication with Jamshid Gharajedaghi, August 2012.

economically, politically and ecologically. Throughout human history social inequity provided fuel for instability and violent revolution. It is therefore understandable why global social inequity is such a burning political issue. In South Africa it is rapidly becoming, at the very least, a threat to the cohesion of the nation, and most probably a threat to the sustainability of the current dispensation. Apart from the need for strong moral and visionary leadership, better governance and more compassion in society, it would be necessary to take a whole systems approach to find practical solutions for the vexed problem of endemic poverty. This paper proposed a strategy to transform endemic poverty into endemic innovativeness by means of a facilitating an improved 'ecosystem' for endemic innovation in communities, described by McElroy as 'social innovation capital'.

**Table 1: Facilitating the development of social innovation capital**

<u>AIM</u>	<u>INNER</u> <b>ENDEMIC ELEMENTS</b>	<u>OUTER</u> <b>THE ECOSYSTEM</b>
<b>Develop world views</b>  Focus on the context of the mind, world views, paradigms and governing perspectives	<b><u>Individual/Intentional</u></b>  Building insight regarding how the world functions, building understanding of interrelationships with others and the main drivers of personal and collective 'success':	<b><u>Collective/Socio-cultural and Collective/Structural</u></b>  The culture, social networks, relationships and physical living conditions, which affect the capacity of people to develop, and their attitude to, and perspective on, life
<b>Programmes:</b>	Social learning and communication design	Participative programmes to improve living environment. Self-help housing improvement. Cascading social learning. Civil society development
<b>Motivational development</b>  Focus on the values, motives and personal drivers that move people from being what they are towards what they could become	<b><u>Individual/Intentional</u></b>  Personal perspectives regarding what should be valued, what is really worthwhile to aspire towards, and what is really deeply desired (internal locus of control and a feeling of personal responsibility towards improving own conditions as well as those of others)	<b><u>Collective/Socio-cultural</u></b>  Developing the leaders, peers and role models that will reinforce appropriate personal aspirations in a community, and create the supportive conditions and opportunities that will 'reveal' the practical value of these aspirations
<b>Programmes:</b>	Participative community development programmes, Programmes aimed at spiritual improvement	Social Innovation Capital strategy. Leadership development. Peer support programmes
<b>Competence development</b>  Focus on training and developing ethical, competent and active people	<b><u>Individual/Behavioural</u></b>  Developing the life skills, attitudes and professional competencies that will support the personal aspirations of individuals. Design social learning and training programmes that will produce these outcomes.	<b><u>Collective/Structural</u></b>  Creating the opportunities for people to apply their personal competencies to fulfil their legitimate aspirations at the community level. (Job creation should be a very small part of these programmes)
<b>Programmes:</b>	Community social learning designs	Cooperative total systems design with focus on community socio-economic development

Some of the key criteria for the approach outlined in Table 1 are:

- That it should be based on an holistic process of participative idealised design and implementation (for example the process described in Figure 5);
- That all actions should be focused on finding levers and processes where small changes can cascade into large outcomes – i.e., choose the initiatives carefully in order to maximise benefits over costs;
- That the first objective should be to serve current needs through endemic innovation so that people progressively improve by doing more with the same effort, produce different outcomes with the same artefacts and produce desired outcomes in new and novel ways;
- That a complete systems analysis should be a key component of any planning process which should cover both the internal (endemic) and external (ecology) dimensions of the problem situation (see Figure 5);
- That the transformation process should be fuelled by an incremental community-based social learning design which should transfer skills and professional knowledge as well as some insight and understanding of underlying forces and factors that shape conditions in the community;
- That the design should cover and evaluate the whole value chain from the personal actions of individuals in the community to their impact and outcomes in the market and in services to the community;
- That whatever the communal (aggregate) impact of actions, if the improved competence of an individual is not matched by improved scope for the application of the individual's acquired competence then it will be like pouring water on a stone.

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