THE HUMAN SIDE OF LIFE-CYCLES

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Introduction

Most things and ideas can be thought of as dynamic systems – that is, as groups of related elements that are purposeful and appear to change over time in a fairly orderly way. The broad features of this evolutionary change can be compared with the growth stages of living systems. That is, new systems are initially created from existing systems and sub-systems, and then they emerge from a formative stage to undergo rapid growth, stabilise, mature and become very complex, and eventually decline, sometimes after undergoing a brief stage of revitalisation.

Business management gurus and technological change analysts have used life-cycle models to a limited extent for many years and although they usually point to the broad similarities between the way that products, organisations and living things change, very few have ever tried to develop the model in any detail. They often claim that the model lacks sufficient predictive capacity to be useful. I would argue that this is not the case, having personally found how useful this model can be when it is fully developed. I now think that the reason for this omission might lie in the widespread belief that the similarities are coincidental and that testing the boundaries of the model might be too incredible for respectable academics and highly paid management consultants to contemplate. After all, why *should* widgets and companies (and even civilisations) conform to the same patterns of change as humans and hamsters?

Nobody knows the full answer to that question, although it seems that the further we explore the science and mathematics of *complex systems*, the more like living systems they become. For now, let's say that at least it is a very complete, and useful analogy. To see the extent of these similarities, we need to first look more closely at living systems. In the following section we will review the idea of a life-cycle as we experience it, first without recourse to the language of systems.

Life-cycle – Be In It!

The cyclical nature of life has been recognised by all cultures and has been embodied in all religions for all of recorded history, and undoubtedly earlier. For example, in Christianity, life is, in summary, ashes-to-ashes and dust-to-dust; in Hinduism it is Brahma, Vishnu and Shiva (birth, continuance and destruction); and in Buddhism, it is Mahayana, the wheel of life. In France (if the French way of life could be called a

religion) one is an entrepreneur, a bricoleur, or a demolisseur. And so on. And out of the ashes and contradictions of the last life rises the new life.

Analysing the life-cycle is a common habit in our society. Artists, writers and technologists often use the idea of 'the seven ages of man' for convenient categorisation. Photographers and demographers, educators, medical practitioners and specialists of all kinds dissect our life span into similar temporal segments. We usually agree with the common categories as they applied to others, although we often object to being so categorised ourselves (having found the elixir of youth in a health club or jar of face cream).

However, I have found that most of these analyses somewhat incomplete, particularly as too little attention is given to 'life before life' and to mid-life, when rejuvenation is attempted. The following eight-segment life-cycle, which I have developed, appears to address the whole cycle quite comprehensively. Each stage is given a name.

Stage 1 – Information: Life, in its seminal form, can be thought of as a lot of free – floating packages of information. It is pre-life. That is, the life whose cycle we are talking about does not yet exist as in independent, or identifiable life form – it is just genetic information (DNA) in the bodies of its prospective parents, or information and ideas in the wider environment in which it will live. Despite its non-existence, most of the basic building blocks for the new life are already in place, with only a few minor combinations of blocks yet to be determined. As well as the seed in their loins, the *idea* an independent life may already exist in the minds of the parents. They have *pre-conceptions* about how the child will be raised and what it will become – some of these ideas are instinctive, and some are the attitudes that they have formed from their own life-experiences. Beyond the parents, there are siblings, extended family, neighbourhood and city, as well as the rest of the world – and some say even the stars – already waiting to influence this new entrant to the life-cycle.

Although this is obviously a particularly important stage of development of life, life-cycle theorists, who usually start their analysis from the moment of birth, often overlook it. They ignore what most people know – *that the quality of the vessel depends on more than the clay from which it is made*. The potter, the kiln, the clay and the fire are all important.

Stage 2 – Invention: At some mystical moment, beyond the understanding of many, sperm and ova fuse, and a new life is conceived. At about the same time, the essential *idea* of the person is also conceived. As well as expectations about the shape, size and colour of the child based on genetic attributes, parents usually have some vision of the kind of *person* that their child will be. That is, they posit with the yet-to-be-born child a sense of yet-to-be fulfilled *purpose*. Interestingly, the Chinese consider that people are one year old when they are delivered into the world – which is technically closer to reality than the Western custom of dating the child from birth. From the moment of conception, the new life-form is subject to many influences, both physical and psychological, both deliberate and accidental, which will shape and modify its basic being. By the time of parturition (physical birth), *nature* and *nurture* have been interacting with the foetus for almost a year, and thus setting the foundations for the

lifetime to come. The birth certificate is an explicit statement of the *existence*, but not the *autonomy*, of the person.

Stage 3 – Innovation: After birth, the child is subject to the rigours of life in the open world. In the early stages after birth, the child is hardly identifiable as separate from the mother, relating to her almost continuously – either feeding at her breast, being cleaned, cared for, cuddled and played with, or sleeping in her arms. With time, the father, and perhaps siblings are included in the interactions. These relationships guide and form infants into functioning humans, eventually capable of physically independent existence, and, perhaps intellectual, spiritual and moral autonomy as well. Building relationships with the parents is a slow process, and along the way the parent's hopes, aspirations and values are imparted to the child. The process of parenthood is facilitated by formal and informal information from the wider environment, as well as the parents' own innate knowledge, instincts and prejudices. With time the child's environment includes more and more influences, and the parents' actions and opinions matter less and less. What starts out as the parent's vision of their child slowly transforms into the child's own feeling or vision of what and who they are, and what their purpose is in the world. The child's sense of purpose is an amalgalm of both these external influences and its own personal, internal interpretation of the meaning of life.

Stage 4 – Take-Off (or Diffusion): Adolescence is the period of extraordinarily rapid development where both the physical and mental capabilities of the youth are tested to the full in the wider world. It is a time of total turmoil, conflict, competition, and sometimes delight. The role of parents shift from central to marginal, as more and more information is gained from elsewhere and decisions are made without direct reference to them. Important, however, are the parents' influences on the youth from the preceding years. Although essentially alone in the world, the youth is guided, for good or evil, by his or her upbringing. A personal sense of purpose begins to emerge, and is tested and contested. Numerous independent experiments with the environment are performed, sometimes successfully, encouraging wider exploration of ideas and relationships, and other times with embarrassment or failure, forcing the youth to narrow his or her horizons. Unexpected talents emerge, and promising potential may fizzle. Progressively, the youth becomes identified as an independent being, responsible for his or her own actions, and recognised for their abilities, strengths and weaknesses, and potential value of their contribution to the community. As the youth steps out into the world he or she is either embraced by it and flourishes with many and varied relationships, or is rejected and becomes introverted and wimpish.

Stage 4 – Shake-out: The halcyon teenage years of infinite exploration and seemingly endless energy and personal growth ultimately begin to slow with the sober realisation of adulthood. There is often a crisis of identity, where the young adult reacts to the values of his or her parents and finds that they are now essentially alone in the world. Their physical and mental foundations are now in a recognizably final form, and a crystallization of purpose occurs. Further growth will usually be on these foundations, rather than changes to the foundations themselves. The bewildering array of possibilities for self-expression narrows, as mutually exclusive relationships are chosen, leading to dominant themes in life. One field of study crowds out others, schoolyard friendships and whirlwind romances give way to a range of steady partnerships, and spiritual paths diverge too far to be bridged or held simultaneously. Despite

estrangement from parents, and although independent in the legal, social and perhaps financial sense, their is still strong echo of the parent in the child. The child's parents' basic task is now essentially completed.

Stage 6 – Maturity: Chosen options now become commitments and responsibilities. The journey down the long and winding road of adulthood begins and dominant themes reach full expression. This, our parents inform us, is the *true* reality, although doubt may linger. To career, are added marriage, children, possessions large and small, a core of firm friendships, and an ever-growing number of acquaintances of all kinds. Some degree of success is attained in one's professional and social role. Passion for one's partner gradually subsides into care and comfort. The children start growing up and the parents are obviously growing old. Golf or tennis on the weekend, annual holidays (by the sea). As the temples begin to grey, there seems to be a place for everything, and most things in their place. The patterns and cycles of life begin to emerge. At first this brings confidence and the fruits of early training and experience. However, as the seasons continue to go 'round and 'round, confidence gives way to the boredom of routine. Possessions, both physical and mental begin to accumulate beyond our capacity to use them. Some are given away, but attachment to many possessions is too great, and they are sent to the attic of our house or mind. Personal performance now fluctuates within a narrow range. Some friends die prematurely, as do some friendships, as personal differences become irreconcilable. Life is essentially orderly, but increasing effort is required to maintain that order. More and more matters defy practical solutions. Parents die, leaving no spiritual buffer between one's self and the grave. At last the youth has 'grown up', and despite the rather grey view painted here, most people can usually manage a burst of adrenalin and a bit of fun when the occasion warrants it. It's a long haul through the years of responsibility. However, most people, once they 'settle down' want to be as vigorous as possible for long as possible. Change is now relatively slow and subtle. We still annually resolve to get fitter, while watching our waistlines bulge and a new generation emerge.

Stage 7 – Revitalisation: Although for many, life creeps at a petty pace towards a dusty death, modern health and welfare and social norms have brought opportunities for some to recapture their lost youth, or some sense, to start over. There is an opportunity to be parent, adult or child again and get back on track. Mid-life crises and menopause have been the traditional instigators of fundamental changes in late-maturity. Now, early retirement of some kind from 'the firm' is increasingly common, and a new career, starting in one's fifties is possible, rather than just going fishing or watching TV from the rocking chair. It is an opportunity to slough off the unwanted accumulation of professional, social, physical and spiritual baggage, and start anew, this time with the benefit of hindsight and experience. The life-long laundry-list of possibilities is critically reviewed, and attention is focused on a few activities that will bear the most fruit for self-actualization; others are scrubbed off forever. Professional time is invested in the antique store or consultancy; fitness is regained at the club and the pharmacy; there is time for one's partner and the theatre and one's grandchildren at the fair. And those great books! Ah! At last time to actually come to grips with this or that important author. However, this process of rediscovery and redefinition of self often requires more energy and resources than were anticipated. The hidden momentum of a lifetime of habits is hard to change. The world in which these dreams and prejudices were formed is not the one that is outside now. And often there is

competition against one's own children for a place in the sun. A few people succeed at this second chance to get it right; for most, however, the large investment in re-birth bears a poor dividend.

Stage 8 – Decline: Literature is rich with metaphor, trying to come to terms with the finiteness of life. Whether the candle burns slow or fast, it is brief. We slide with grace or folly into our dotage, our accumulated wisdom decaying and ignored, our great-grandchildren around our knees and relatives eyeing our assets. Our senses slowly lose their acuity, sight becomes dim and sounds become muffled. Other organs begin to malfunction. Digestion is difficult and our heartbeat is irregular. We care less and less for the world that we can no longer control, and rely mainly on habit to perform the little that we do. We look inwards to marshal increasingly scattered thoughts on the meaning of life. We stop accumulating and start distributing possessions. Friends have departed, or are equally senile, so we turn to institutional help to survive in the granny-apartment, the retirement village or the nursing home. Increasingly, more energy is taken in to survive, and less is given out. And finally, dusty death. Our possessions are distributed. Our children live on, carrying our seed and perhaps our ideas and values with them. Others who have been influenced by us in turn have influenced others, but like ripples on a pond, this influence subsides with space and time. And then we are heard no more.

Ah! Such is life. Life is indeed much richer and much more subtle than the eight crude paragraphs above. But it is the *essence* of the structure of life that I have tried to portray – the essence of the self as an *embodied idea*, or set of ideas, evolving over time. These ideas are our *physical, intellectual, emotional and spiritual* selves, which grow in complexity and interact with each other as our lives unfold. Each of these ideas of our self can be taken in turn and analysed in terms of its overall form, its constituent parts, and its interactions with the world and other people's lives over time. This is, of course, the work of biographers and novelists, who, implicitly, are searching for the enduring themes in life, and, perhaps, for the exceptions to them. In a literary way, they seek patterns in our existence, to inform us, to reassure us, to alarm us, or maybe just to amuse us. Taken many millions of times over, these emerging patterns become clearer. Literature continues, but is now paralleled by the life sciences, which seek to systematize the wisdom of many observations. By systematize, I mean here, as before, the reduction of a complex whole into *sets of related elements*, from which we try to infer some *purpose*.

To our amazement, as we look at the world around us we seem to see the same patterns repeated time and again. There is nothing new under the sun. It is not as though we are seeing exactly the same event time and time again, it just seems as though the *basic form* of what we are observing seems to be repeated. Furthermore, we feel that we have a great empathy with those patterns. Certainly, the changes in the physical form and function of desktop computers hardly look identical to the changes in the physical form and function of a company that makes computers, or the company that uses them. Neither does the technical evolution of the automobile engine compare physically with the history of the bureaucracy that regulates automobile emissions, and so on. But we get a feeling of *deja vu* when we view these disparate descriptions. They are different,

but they seem to have an underlying similarity, and when we describe them, we somehow seem to be talking about ourselves, and how we have changed over time, just like the above description of the *life-cycle*. Also, although we use the words loosely, we increasingly talk about computers and autos and companies and countries as *systems* . That is, *collections of distinct elements that have relationships between them and are unified for some purpose.*

So, in a plausible way, we have arrived at a view that these different things are systems that change over time in a fashion similar to the cycles of life. But at this stage, we are only at the dawn of recognition, and when these different systems are scrutinized under the light of systems analysis, we can start to see how fundamental these similarities really are. But before we can look at these different systems in detail, we need to recast our description of the life-cycle in the language of systems. Unfortunately, this will entail reducing the rich texture of life to the bare essentials of *general systems theory*. The self becomes a system with purpose, comprising subsystems or elements, and residing in an environment. There are interactions or relationships between the whole self and the environment or super-system, and also between parts of the self and the environment. The purpose of this exercise, like that of all modelling, is to first simplify the system under observations, and after manipulating this abstract simplicity, to transfer back to the complex reality to see whether we can make some new and useful statements that we could not make before. So here goes.

The Life-cycle of an Idea

i) Information: Before a system exists in any discernible form, we can see, at least in retrospect, that many of the elements that will comprise the system, and the relationships between those elements, have existed for some time, albeit in a dispersed form. These elements will become 'sub-systems' in the system that will become a product, a company or other form of organization. In different systems the elements will be different things – people, machines objects and artefacts. The relationships will be the performance characteristics of those subsystems – that is the ways in which those elements respond to communication, and in particular, the energy required to obtain those responses. This information will also include data on the inadequacies of existing systems with respect to achieving the purposes of other systems.

ii) Invention: At this stage, someone, somewhere, will perceive that an existing system will be enhanced (in fulfilling its purpose) by establishing a relationship with a novel configuration of elements. This 'novel configuration', or idea, is the initiation, or invention of a new system with a new purpose. (Fig xxx) At the beginning of this stage, it is no more than a conjecture, or something vague and intuitive; at the end of the stage it is a specification of the essential purpose and relationship between identified elements. In the case of products, these specifications may range from formal, such as patents or other intellectual property rights descriptions, through in-house documentation. In the case of companies and social organizations, it may be the articles and memoranda of association. In the case of inventing a new country, the formal document would be the constitution. In many cases the specification is not visibly recorded: The details of many technical inventions remain in the mind of the inventor as he or she proceeds to build the product. Some organizations seem to just drift together, with the form and function remaining unspoken between the partners.

Nonetheless, there is a point at which the actors would agree that an idea is in motion, and if pressed, could articulate it in system terms of purpose and relationships between certain key elements. Not all of the elements necessary for the new system to work will have been identified, and at this stage there is no guarantee that the inventor has correctly identified either the nature of the environment, the nature of the invention, or the actual relationships that may eventually occur between the two, or that the invention will ever be viable in any practical sense of the word. In fact, many inventions never get past the specification stage (reference Stuart McDonald). And as we shall see later, some people never get past the stage of inventing ideas, and forms institutions around their inventive habits.

iii) Innovation: During this stage the idea of the system will be given a physical form. This is the prototyping or experimental stage, prior to applying the idea to the wider system or market for which it was conceived. Early prototypes are usually comprised of pre-existing elements or components, joined (ie related) in previously known ways, using pre-existing equipment. Later models will are characterised as having more novel components, combined with new relationships with novel equipment. As the idea progresses through this stage we see a more complete and efficient expression of purpose, to the point where the developer has some confidence that the product can successfully express its purpose in the wider environment-ie the market. In this stage the inventor/innovator is still an integral part of the system.

iv) Adoption or Diffusion: In this stage the new system is placed in the market. The main distinction between this stage and the previous one is that the wider system outside the production environment uses its own energy to establish relationships with the new product, ie, they are asked to buy it and use it. If successful, the idea will continue to evolve, with modifications by the developer, the user, or third parties, who imitate the original idea. Modifications to the system essentially aim to give it greater 'fitness for purpose', and at this stage are usually elaborations to the internal elements and relationships of the system. Sometimes the changes are to better meet the initial purpose, but frequently, the changes are to meet newly-found purposes which may not have been envisaged by the inventor. This may be encompassed by a broader definition, or even re-definition of the system's purpose, or the product may branch or evolve into a number of products to meet these other purposes. This phenomenon of 'product innovation' is usually accompanied by changes to the production environment, with the development or adoption of new equipment for more efficient production (ie 'process innovation'). Thus the flow of external energy and information towards the new system is partitioned between internal reconfiguration and development of external relationships. In turn, the establishment of relationships between the new system and existing systems transforms those existing systems, ostensibly towards a more complete expression of their respective purposes. The configuration of elements can be characterised as a mesh. or network, as can the relationships between the system and the wider environment.

v) Shake-out: Internal elaboration or growth of systems appears to be subject to limiting processes. Given that the system is essentially a processor of information and energy, available energy must be partitioned between internal organization and external expression of purpose. With limits to its own intrinsic efficiency, and the reality of other systems competing for the environment's available energy, the new system's size and

purpose start becoming constrained. Internally, the elements or subsystems are clearly becoming more specific to a particular function and the number and type of relationships are more narrowly defined in terms of the system's overall purpose. At this 'shake-out' stage, many optional purposes are rejected, and the likely total impact of the system on the environment begins to emerge. The configuration is of a matrix form.

vi) Maturity: In this stage the relationships between the system and the wider environment become well established and relatively stable, as do the internal relationships. Early in this stage the internal relationships may have a simple hierarchical configuration between specific 'designed for purpose' elements. In a stable environment this configuration maximises the system efficiency, ie minimises the use of available energy allocated to internal transactions or relationships, leaving a maximum for expression of purpose in the wider environment. However, with time, attempts to accommodate to a changing environment sees the addition of more elements to meet these changes, usually with an attendant reduction of system efficiency. The hierarchical configuration means that although the system may be designed for 'vertical' information flows, 'horizontal' information flows are inefficient, and sometimes impossible. Attempts to rectify the reductions in efficiency by adding more elements in this configuration, or strengthening the internal relationships often cause further reductions in efficiency. At the same time, suppliers of subsystems, and other systems producers, may obtain close information regarding the problems that the system is encountering in fulfilling its purpose, and may deliberately try to exacerbate the problems, or commence devising alternative systems to replace the aging system. Amongst all of this activity, the original purpose of the system may become obscured to users and producers of the system.

vii) Revitalization: Although many systems proceed straight from maturity to decline, some may undergo a process of revitalization. Sometimes this process attempts to reconstruct the system as it was in an earlier stage, particularly early maturity or shakeout. More often, however, revitalization will take the form of a redefinition, or at least strong reaffirmation of the system's purpose, together with a stripping out of many of the 'middle levels' of the hierarchical structure, and more direct control of the elements that express the system's purpose to the wider environment. These remaining elements a usually selected on a strict 'fitness for purpose basis', being designed to uniquely serve the purpose of the particular system. These drastic changes are also often accompanied by a change in the internal means of communication, which enables the new structure to operate efficiently. These changes are predicated on an accurate assessment of the way in which the systems relates to the wider environment. The re-definition of purpose and internal changes in elements and relationships usually means an increase in focus, or, in other words, a reduction in scope, of the system's interaction with the wider environment. Although this may give the system an immediate increase in efficiency in achieving its stated purpose, it often means that it is less able to respond to changes in the wider environment. Sooner or later, either by poor design or environmental shift, the system again starts to show signs of failure, and slips into decline.

viii) Decline: As stated above, sooner or later most systems start to lose their capacity to efficiently express their purpose, particularly relative to other systems in the wider

environment with similar purposes. The decline stage is characterised by a breakdown in relationships between elements, and finally a disintegration of the collection of elements as a recognizable system. Sometimes elements from a declining system will be utilized in other systems at earlier stages of the lifecycle.

One Paradigm (Idea) – Eight Sub-Cultures (Mindsets)

Just as toddlers, teenagers, parents and pensioners tend to form their own sub-cultures in our society, so do the people involved in each of the eight stages of the life-cycle of an idea. By culture, I mean a group of people with a shared or common set of beliefs, rituals, taboos, general behavioural patterns and responses to the wider society. By *sub-culture*, I mean a group that co-exists in space and time with other cultural groups. It seems that many – indeed most – people who become involved with processing ideas behave in a fairly fixed form of behaviour that clearly identifies them with one of the eight life-cycle stages. And seeing that most people are involved with processing ideas, you can infer that I am saying that most people seem to belong to one of these sub-cultures. Yes! That's what I am asserting. Most people, I find, object to this assertion, and with good reason. Who wants to be categorized? Pigeon-holes don't give much room for movement, unless you are a pigeon!

We like to think of ourselves as infinitely versatile in the range of our responses, capable of great spontaneity of action or meticulous attention to detail, or whatever is called for at the time. But we know that for the most part it is not so. We even admit or proclaim our fairly fixed personalities to each other, such as: 'I'm the sort of person who prefers x, or: He's nice, but he's not my kind of guy', and so on. Everyone from psychologists to astrologers categorize people by some behavioural trait or aspect of personality as a matter of course. And in recent times, even management analysts have taken to talking about different 'management cultures' For example, Charles Handy has written an insightful and amusing book called *The Gods of Management – The changing work of organisations* (Souvinir Press, 1985). Handy sees four basic personality/ behavioural types, which broadly correspond to several stages in the life-cycle scheme presented here.

Psychologists would see this as individuals seeking an environment that confirms their attitude towards the wider environment, or world-view. The Freudians would call it compulsive repetition of behaviour, which is a fairly strong statement. To be generous, we could say that for some people, this behaviour is simply expressing a good environmental fit, or relationship with their work. They are happy, and thrive, and there is more to their personalities than this life-cycle-related behaviour. They can leave this behaviour at work and be quite different at home or socially. For some others, it might be seen as a fixed 'mind-set' or even a neurosis – a mild level of compulsive behaviour, with which they can probably survive, but aren't entirely happy. They are likely to lapse into this behaviour mode with spouses and friends, or may feel uncomfortable behaving differently. A third group displays what is generally termed 'pathological' or 'psychotic' behaviour. They are fixated on a particular mode of behaviour, it consumes them at all times, and their personality is nought but an expression of this single mode.

Although there are other forms of normal behaviour, neuroses and psychoses than are evident in life-cycle related behaviour, we find that when people are processing ideas, their behaviour falls into one of the eight modes described below.

So this analysis of behaviour according to sub-cultures based on the life-cycle simply contributes to a long tradition, hopefully adding some useful insights. Let's look at these groups or sub-cultures:

Stage 1 – Information Seekers: These people live in a world of loosely coordinated elements of ideas. The archetypes of this group are librarians, filing clerks and data base managers. It seems that the main interests in life of some people are gathering, ordering and dispensing data. People in this sub-culture have two principal motivations: collecting the information together in the first place; and the hunt to find the information again later. Some never progress past the collection stage. They are most happy (in their own way) buried in a nest of raw data, perhaps hoping that it will spontaneously combust, and they will arise, phoenix-like from it, in some transcendent form. More progressive members of this group rise to the challenges of taxonomy – how to classify the information, either to give it some sense of order – through the book-stacks, catalogs and data bases; the challenges of taxonomy – and the joy of providing copious and complete information to others – particularly *inventors*. They are delighted to know that their work has been useful, but generally show little inclination to actually utilize the information they have gathered. To them, *information is information*, and early discrimination between what appears useful and what doesn't may later jeopardize the work of the inventor. They see themselves as the custodians of the cultural DNA. Gather it all, label it and put it on the shelf. Expressions of this behaviour range from stamp collectors to database managers. Pathological types include mail-order catalog junkies, kleptomaniacs and more recently, collectors of collectibles. We have much to thank these people for. Without them, the world would be a messier place, as most members of the other sub-cultures have very little interest in data collection, or knowledge of, the structure of information systems.

Stage 2 – Inventors: Inventors, wherever they may be, find comfort in an environment of paradoxes and unassimilated data, which they can dream of unifying. They need to be in love with new ideas to succeed. Invention is a very abstract process that often leads inventors away from other people, into the solitude and loneliness of laboratories in universities, government research institutions, and large companies: If these venues are not available, inventors will be found in converted garages, or these days, in the spare bedroom where the computer lives, coupled to the internet. Or absent these places of refuge, they will just dream at their desk. Inventors tend to treat other people as life-support systems for a data bank or, at best, sounding boards for their ideas; interpersonal relationships on any other bases are difficult. They find it hard to work in teams, and are reluctant to surrender their 'children' to the care of others – 'invention retention' as it is often called. They are motivated by the prospect of being the first to invent or to publish an idea, and seek public recognition through the kudos associated with originality. The institutionalized group of inventors are usually called scientists, although many inventors of ideas have no scientific training, and work in all sorts of places.

Stage 3 – Innovators: Innovators love making things, and making them work. Basically, they have the characteristics of engineers. For an innovator, being the first to have thought of the idea is not as important as getting the idea to work, or to work better than anyone else's effort. Their challenge is to embody the idea in material form such as steel, plastic, teflon, or on a computer chip, establishing new relationships between these materials. Other innovators make new organizations, rather than objects. To them, whether it is actually useful or has a viable market is quite secondary to making it work. The production engineer will cut-and-try many times, in an effort to get it right, calling on all sorts of novelties to embody in a new gizmo or widget. This person must be distinguished from the consulting engineer, who is essentially a high class assembly line worker, bringing together tried and tested conceptual building blocks into a new, look-alike bridge, road, sewerage pipe, high-rise building, or more recently customized software. The innovator is the 'applied R&Der', as compared with the scientist or inventor doing 'basic or pure research'. Given the basic invention, their chosen environment comprises copious data on relationships between elements-handbooks, codes of practice, design manuals and the like. The innovator will design and re-design interminably, unless pressured by someone to 'get the product out the door'. They are often perfectionists, consigned to work with the imperfect clay of reality. They are driven by their internal demons to make things smaller, or larger, faster, cheaper.

Stage 4 – Take-Off (or Diffusion): The culture of the diffusion stage is shrouded in romance. This person is commonly known as the *entrepreneur*. They are often depicted as being as daring as Indiana Jones, taking great risks in stitching together amazing mega-deals. Certainly, there is a visible sub-culture of 'granola-munching, Porsche-driving post-industrial yuppies' whose exploits are well reported. However, most entrepreneurs are not extraordinary. Their major motivation is to popularise ideas, that is, to produce in quantity, and get the wider environment, or market, to adopt what the innovator has developed for them. They are the producers and sellers of new ideas, who want to enlist everyone onto the sales team. They are the revolutionaries who openly challenge the existing order of society. And, often as not, they have had to wrench the idea away from the innovator who wishes to spend forever perfecting the idea-or sometimes even steal it. (Some innovators, recognizing their own limitations in exploiting their own ideas, deliberately leave their ideas around for entrepreneurs to steal.)

To them, the basic 'idea' is a given – if there are still any imperfections in it they will be worked out by the team as they speed along towards their destiny of fame and fortune. They are generally not so much interested in its internal workings as in how its external functions can be introduced into everyone's lives and daily activities. Entrepreneurs are 'people-people', who try to get everyone to share their beliefs, ideas or dreams of what life would be like when everyone is a true believer. They prefer to work with small, totally dedicated multi-skilled teams who totally share the dream, and will endure all sorts of pain to see it come to fruition. To them, this is true anarchic democracy. By introducing their idea into the wider environment, they are re-creating society in some way, and often the changes come very quickly – too quickly for most people. But the entrepreneur thrives on the chaos of rapid change. They are 'decision freaks' – who

aren't fazed by the occasional error of judgment – if 'errors' occur, they just get in there and make another decision. The entrepreneur, however, does not usually consider this rapid building process risky. It is the norm for them. They are happy so long as everything is moving fast and they can personally control the whole operation. Their difficulty is either coping with inventors, whose ideas are still too underdeveloped to run with, or the management consultants brought in to stabilize the organization when it either gets too large for this style of development, or when the dream begins to fade. Like members of the other sub-cultures, when one idea has passed through the stage that is familiar to them, they will compulsively look for another one to boost.

Stage 5 – Shake-Out: Far less is known about this sub-culture than any other, and they are often mistaken for members of the next (Mature) group.   They often handle the idea, product or company or organization for a fairly brief period, and would seem to be the kill-joys who spoil the fun of the entrepreneurial stage. However, if we wish for an idea to make the transition from early rapid growth to incremental growth with widespread adoption, then the organization must undergo fundamental re-adjustment. This person needs to be tough and unromantic, as often very hard decisions need to be made about the total management system of the company, the people to run it, and the ideas that they produce. Whereas the entrepreneur is personally identified with the idea, the shaker-outer can dissimulate sufficiently to accurately assess the likely future of both the idea and its environment. They come when the product is more like a catalog of options, production-line is bottle-necking, the customers are standing in queues, the accounting is still mainly out of the entrepreneurs cheque book, and the true-believers are suffering burn-out and possibly on the verge of mutiny. They are frequently one of the team, but often as not, someone from outside the original core group, who was brought in after the headiest days of early introduction. Rather than true-believers, they are tough-believers. They know that the idea is a good one, they know that it can make a difference to the world, but they know that it will die with its maker if it isn't given a life of its own. They know that there will be blood spilled in the adjustment, and by the time that they are finished most of the adrenalin will have gone out of the situation. But someone's got to do it and they are the ones. No wonder we avert our eyes from them – this unromantic group who seem to spoil all the fun of the revolution. And with blood on their hands, and perhaps thirty pieces of silver in their pockets, they will find it difficult to really be accepted by the organization that they have helped survive and flourish. That is why they are eventually succeeded in organizations by the next sub-culture. Undoubtedly, we will learn more about these people as more young companies move up through the entrepreneurial phase and meet their day of judgement in the market place.

Stage 5 – Maturity: In the first thirty-five years after World war II we became so familiar with this sub-culture in the Western world that we were in danger of believing that it was 'the one true culture', or even '*the* culture' of our society, rather than one of eight sub-cultures. Relative peace, stable demand for staple products (grains, wool, iron, cars, consumer products etc.) produced by mega-corporations bred a large 'meritocracy'. These were a generation of workers, senior executives and managers who either spent several decades rising from the shop-floor or accounts branch to the board-room, or to their personal level of incompetence (refer to Peter Principle). The

watchwords for this group are 'responsibility' and 'caution'. To them, the purpose for which the organization was established is implicit – 'we're here because we're here', 'we're here because they were here', 'we've always done it this way', 'a place for everyone, and everyone in their place', 'a formal procedure for every action'. Society has accepted them, and their role is to maintain that place in society. Any change is viewed with suspicion and must be evaluated in terms of its potential to perfect the almost perfect organization. Change or innovation, which is not incremental, is eschewed. Reducing company overheads is their mission in life – expenditures are generally seen as costs, rather than investments. Inventors and innovators are alien, or are employed by head office in some other country. And entrepreneurs are considered totally vulgar. These are the true bureaucrats.

A well-ordered life for all, 'the American Dream' to be shared: A Ford, Chrysler or GM in the garage (or maybe several, but of the same brand); Coke or Pepsi in the 'fridge (but never both); Ozzie and Harriet on TV, the kids in bed by eight o'clock, and the wife in the kitchen making apple pie. This group, as a sub-culture, are characterised by the 'sixties and 'seventies melodramas like 'The Onedin Line', 'The Pallisers' and 'Dynasty', 'Happy Days'; 'Family Values', etc. For the bosses, blue pin-striped suits and scotch at seven in the oak-panelled board room with the old boy network. (Yes, old boys – no place for the girls here – the typing pool and the kitchen for them, thank you). For the managers, grey-flannelled suits and martinis at six. For the workers, a blue shirt and a beer with the boys when the whistle blows.

Stage 7 – Revitalization: We witnessed a wide-scale expression of this culture in the nineteen – eighties and -nineties, born out of massive attempts to reform an era from the inside, to stop the ship of state from sinking – the 'barbarian at the gate'. To this person, the *revitalizer*, or *intrapreneur*, the purpose of the idea will decay and be lost unless strong measures are taken, and particularly the measures that they have in mind. They like the romantic and grand aspects of the general cultural milieu, and see that it is frustrated from full expression by the invasion and prevalence of people from the stage 6 sub-culture ('bureaucrats') and stage 2 sub-culture (intellectuals) and assorted miscreants. They tend to be absolutist in their attitudes, and frequently preface their utterances with 'we have examined the other options and see that there is no alternative' (note that Margaret Thatcher was nicknamed TINA by some opponents).

To them, leadership must be strong, and well articulated. (Some call them 'control freaks'). They believe that only a few capable people of the right mindset are really required to oversee getting the job done, and that most people (with the exception of aforementioned groups) are good, intelligent (albeit misguided) share the frustrations and concerns of imminent social or organizational decay and wish to share the re-gained dream. Set them up right, they say, with clear goals, and let them get on with the job, with the aforementioned managers. These people often find a novel, and often seductive/very persuasive way of communicating their ideas to the wider culture – a way that breaks with the prevailing traditions of communication in both form (media) and content (message). Hitler used paranoia and megaphones at huge mass rallies; Roosevelt the radio for his 'fireside chats'; Perot used flipchart visualizations in his 'infomercials' on television, CEOs of business and government organizations use real time data from computerized MIS's (Management Information Systems). Like the

entrepreneur, he or she is motivated by growth and rapid change, but from within the apparent safety of the existing dominant culture. This person likes to be surrounded by a coterie of 'like-minded people', whose totally share their vision.

Despite the plausibility of their visions, which tend to sweep along many adherents for a short period, their period of ascendancy as a dominant sub-culture (mindset) tends to be short. Their simplistic and rigid approach requires enormous investments of energy by all concerned, as they are generally trying to shift large systems in closely specified directions in short periods of time. Their polarizing approach also tends to give energy to their opponents (aided by groups 2 and 6), who ultimately succeed them.

He achieves his task by flattening management structures, breaking the business into team-size chunks, keeping the 'profit centres' and liquidating the slow-moving bits, putting the savings into the fast-moving bits. This culture is only just emerging, but it seems to comprise engineering MBA's, who do not want to miss out on the fun of the entrepreneur. These people are comfortable with new technology, and do not retreat from recapitalising and retraining programs. Because most industry in the Western World was in need of restructuring, they had an awesome task in the face of forces wishing to keep the status quo: Their prime concern, however, which is often denied, is the work of their cousins, the entrepreneurs, which threatens to make their organisations obsolete.

Stage 8 – Decline: There are perhaps two different types in this regime. In the absence of revitalization forces, the distinction between the personalities of late maturity and early decline is blurred. This culture is populated with nostalgic 'horse-collar' manufacturers and global-warming deniers waiting for the boom to come again. Their dimming intellects exchange slogans for reason as they long for the happy days when the family car could be bought for a three-figure sum, everyone knew their place in society, and kept it, and there were clear distinctions between good and evil. Pathetically, they either lounge around the dying embers of oak-log fires in the boardroom, dreaming of empire, or alternatively sit around the waiting rooms of liquidation accountants. They would be funny, or even an object of pity, if there were not so many of them still in the corridors of power.

The second group is perhaps those that prey on the first. They can smell death in the air, and that has the smell of opportunity. These are the *demolliseurs*, the disciples of Shiva – the wreckers, liquidators, undertakers (mortitians), scrap metal merchants and garbage collectors of society. To them, the sum of the parts is much greater than the whole, and if neither is worth anything, then set a match to it all. They can see that there is nothing really new under the sun, as the apparently-new is mostly made of recycled parts. These people are often seen in the company of innovators, who are looking for cheap bits from which to build their new idea.

I repeat that fixation of behaviour and personality is not inevitable or universal – just that it is endemic in our large societies where a significant division of labour is required for the civilization to be viable. (Indeed, division of labour is often used as a definition of civilization). In large and evolving societies, new ideas are always needed, and

generally encouraged, and these ideas have to be processed to fruition. In principle, one person could, and sometimes does, take an idea from inception, through adoption and all its development stages to its ultimate demise. However, in a large society, significant ideas require the participation of many people to make the idea viable. The division of labour is generally along the lines of what people are best at, by aptitude and training: Those that are good at collecting, are given collectors jobs; those who are good at making, maintaining, or demolishing, are given jobs to suit, and so on. Thus we develop mass production with a division of labour. In this situation jobs are then specified in terms of the average requirement for the task, and then the average becomes the norm, and then the norm becomes the exclusive form of behaviour relevant to that task. Task skills narrow, first to suit a particular stage of development, then to a single characterization of that stage. Further, in the name of efficiency, we separate the different functional groups, either into different sections of the factory and office, or into different production sites altogether. With this separation comes *institutionalization* or stylization, or professionalization of behaviour: an inclination towards, or an aptitude for a particular aspect of idea-processing becomes a total way of life. One becomes a librarian, professor, engineer, salesman, bureaucrat, lawyer or accountant, working with others of the same profession, with mainly formal links to other professional groups. It is encouraged, and rewarded by society. Renaissance, multi-faceted personalities and multi-skilled workers are generally discouraged. The next stage becomes an attitude of separateness of each functional group from the others, and hence the emergence of subcultures.

You might notice that what I have just described is the development of a social life-cycle. I stress that we must remain aware that ideas are not separate from us – they are part of us, and as we transform ideas into a practical form, the ideas in turn transform us. Ideas and people are elements on the one big system that we call humanity. Although it is quite likely that the archetypes/stereotypes of the eight mindsets described above are born, and not made, they are undoubtedly encouraged in that behaviour by our society. Further, it seems that each archetype has their period in our history when they are dominant.

Outcomes

An important aspect of these thumb-nail caricatures is that all of these cultures are quite distinct, populated by distinctly different people with differing perceptions of the world, and differing motivations. They form a distinct sequence from the genesis of an idea, through its growth, maturity and to its decline. Any large-scale development must, therefore, pass through these cultures, and thereby, their institutions. To manage the development of an idea, be it a product or a process, one must first understand how to enable it to pass successfully through these cultures.

With this sequence in mind, the objective is to develop the product up to the mature phase, and to make that phase last as long as possible at a high level of activity. But first it must pass through the early stages of development, and withstand the test of their filters and cultural barriers.

In this context, the process of management of the development of ideas is, therefore, *to ensure that the idea is transferred successfully from the preceding culture, is appropriately*

processed, and then passed on successfully to the next culture. Many problems in managing development seem to come from a general confusion of roles of the respective stages of the life-cycle. For example, because of their high public visibility, everyone, these days, seems to want to become an entrepreneur or intrapreneur, irrespective of their own particular skills and abilities, values and reward systems. There is, undoubtedly, an increased need at present for product and social entrepreneurs, but even just as great a need for product innovators and good information specialists. There is little point in trying to make a good researcher – white coated wimp as he or she may be – into a swash-buckling entrepreneur. It is far more appropriate to guide him or her into being a good emerging-industry-oriented researcher, and to guide the new generation of derring-do's into boosting up emerging industries, rather than trading real estate or manipulating futures markets.

There are therefore four goals of the manager for successful ideas development:

• First to ensure that each person in the organization has an *appreciation* of the idea in its full form, the whole lifecycle involved, and the respective roles of each sub-culture in the idea's development. It is the role of the manager to convey this vision.

• Secondly, each person must develop an ability to relate constructively to the *preceding* culture, so that the idea can be passed to them in a form that is satisfactory to both the giving and receiving parties.

• Thirdly, the manager needs to ensure that the members of each culture can competently process the idea in a way that is appropriate to that culture; that is, to give the idea appropriate 'value addition'.

• Fourthly, each person needs to be able to know the processes of passing the idea to the *succeeding* culture. This process, for example, keeps inventors and entrepreneurs apart, separated by innovators. However, with the right management, they will both learn to respect each other's role, as well as being competent and comfortable in their own.

An appreciation of this model will also reduce the problem of mature industry managers – usually accountants and lawyers – criticising the naivety of researchers. They are separated by three cultural groups – like Portugal and Poland.

The Boundary Problem – the role of facilitators

This model has outlined eight stages of development of ideas and the eight respective cultures. However, like countries, there are distinct boundaries between the cultures, and these boundaries can be high barriers. Even if the individual has a deep appreciation of the roles of others in the development, there are limits to the abilities of most individuals to be *tri-cultural*, as the above four requirements might imply. *Interpreters* and *brokers* are therefore often necessary as cultural go-betweens. Most people in most cultures are more interested in becoming good representatives of their culture (often through peer-group pressure) and devote little effort to the boundary-spanning problems. Of course, within organizations, this has traditionally been one of the roles of the manager, although, even here, the role of the informal boundary-

spanner is recognized (reference T.J. Allen). If the idea requires the participation of a number of organizations, this task presents an opportunity for facilitating agencies, which specialise in boundary spanning. Such people are characterized as being comfortable communicating with a wide range of people, and will frequently dress in the costume of the culture that they are with at the time. This need for boundary spanning and brokering has recently given rise to many government-sponsored agencies, as, in the short term, the market-value of this process (and indeed, the precise form of the process) has not been determined. Thus we have seen the emergence of 'Technology Transfer Agencies'. Some of these agencies have an overview or regulatory role, but most importantly, their role is to act as brokers between cultures, particularly between researchers and developers, and developers and manufacturers. Like the confusion that has recently existed between cultures, there has been some confusion and unnecessary overlapping between brokers. There are, however, signs of rationalisation of this situation, and simultaneously, the emergence of private brokers (often grafted onto accountancy firms) whose role is to facilitate. Whether there are seven distinct brokerage cultures or just one, is a matter requiring further research.

7. Conclusion

There are many detailed aspects to management of the product through the life-cycle. This paper has focussed on people's motivations, which must be understood first if one is to manage effectively. Finance, law, training, capital equipment, markets and locations all require detailed treatment, each stage having differing needs. Some of the aspects of these factors are tabulated in figure 2.

This model is not intended to cast people into rigid moulds. However, it does indicate that many people are, by accident or design, deeply entrenched in one activity. Very few people are comfortable and competent in more than one culture, in a similar way to geographic cultural groups. In an analogy to geography, much can be achieved by respecting and understanding other cultures, and working towards making one's own culture excellent.