

Creativity and its importance in business

Aircraft pollution

With the advent of the jet engine and advanced navigational instrumentation the airline industry was born. The death knell was sounded for the transatlantic passenger liners, and as one product life-cycle drew to a close a new one began. The jet engine heralded a paradigm shift in civil aviation, and creativity was needed to harness, to exploit and to market the applications of the newfound technology. Some fifty years on, important questions are now being raised about the viability of air travel in the long term. High levels of environmental pollution from aircraft emissions during flight and the environmental impact of the growth of airports in densely populated areas are only two of the issues that are becoming a cause for concern. Creative thinking is required to find ways of dealing with both of these issues.

INTRODUCTION

In this chapter we shall review some definitions of creativity and highlight the importance of creative problem solving in enabling business executives to cope with novel or new problems. We give some consideration first to defining creativity and then to distinguishing between creativity and innovation. Various notions exist on how ideas arise in our mind. These are introduced in this chapter and developed further in Chapter 3. Creativity in business is important, and managers need to possess the ability to gain creative insights. We look at the importance of creativity to business and managers, picking out those instances where it is most needed and relating it in particular to the notion of paradigm shift. In the later sections of the chapter we look at characteristics of creative thinking and creative thinkers, highlighting the qualities of a creative person and pointing to how creative skills can be achieved through training.

SOME DEFINITIONS OF CREATIVITY



Creativity involves an ability to come up with new and different viewpoints on a subject. It involves breaking down and restructuring our knowledge about the subject in order to gain new insights into its nature. However, any definition of creativity is complicated because the concept has many dimensions.

What is creative thinking?

Creativity is a concept which we often come across in our everyday conversation. We hear of creative people, admire creative objects of art or read creative books. Yet despite our almost innate understanding of what it means to be creative there is much confusion about the nature of creativity.

Wertheimer ([1945] 1959) suggested that creative thinking involved breaking down and restructuring our knowledge about something in order to gain new insights into its nature. Understanding our own cognitive model of reality may therefore be an important determinant of our ability to think creatively. Kelly (1955) and Rogers (1954) both supported this argument by maintaining that we can be creative by gaining an understanding of how we think about a subject. Creativity is something which occurs when we are able to organise our thoughts in such a way that readily leads to a different and even better understanding of the subject or situation we are considering.

Maslow (1954) thought of creativity as having two levels. He envisaged primary creativity as the source of new discovery, real novelty, or ideas which depart from what exists at a given point in time. He saw secondary creativity as a characteristic possessed by many scientists in their collective search for discovery achieved by working alongside other people, extending the work of previous researchers, and exercising prudence and caution in their claims about new insights or ideas. He envisaged creativity as an aspect of human nature that was to be found universally in all human beings. In children he felt it to be an easily observable phenomenon but suggested that it seemed to become lost in adults, surfacing mainly in dreams with the relaxation of repressions and defences. It was a view that was echoed subsequently by Stein (1974), who argued that without such an assumption the techniques for stimulating creativity would have no application.

Torrance (1965) defined creativity as:

The process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses or formulating hypotheses about the deficiencies; testing and retesting them; and finally communicating the results.

This contrasts with that of Newell *et al.* (1962). They adopted a criterion-based approach, which suggests that any problem solving may be creative. Indeed, Haeefele (1962) argues that every one

of us must be creative to some degree because we have to find new solutions to newly presented problems.

Rickards (1985: 5) defines creativity as ‘the personal discovery process, partially unconscious, which leads to new and relevant insights’. Rickards (1988: 225) also advocates a view of creativity as a universal human process resulting in the escape from assumptions and the discovery of new and meaningful perspectives, or as an ‘escape from mental stuckness’. In broad terms he believes creativity is to do with personal, internal restructuring.

Creativity is very much concerned with how we imagine things. Although language is a medium of expressing our creative feelings, our creativity is often gained through images and sensations which are difficult to express in words. As Koestler (1964) said: ‘True creativity often starts where language ends.’

Weinman (1991) considered that creativity is the ability to go beyond the mundane and obvious and reject the traps of repetition and pre-set categories. Similarly, Gilliam (1993) defined creativity as a process of discovering what has not been considered – the act of making new connections.

More simply, creativity can be thought of as ‘the production of novel and useful ideas in any domain’ (Amabile *et al.*, 1996: 1155).

Yet one more approach, along with many others, is offered on the Internet: ‘Being creative is seeing the same thing as everyone else but thinking of something different’ (<http://www.ozemail.com.au/~caveman/basics/definitions.htm>).

These various definitions seem to agree that creativity involves an in-depth thought of a subject and an ability to come up with new and different viewpoints. However, any definition of creativity is complicated because the concept is multi-faceted.

INVENTION AND CREATIVITY



Invention is an act of creativity that results in a device, process, or technique novel enough to produce a significant change in the application of technology.

Invention is an act of creativity that results in a device, process, or technique novel enough to produce a significant change in the application of technology. The application is fundamental to invention. The element of novelty has various forms; it may be a new device or process, or even material, but it may also consist of a combination of existing knowledge in a manner not previously considered. For example, James Watt added a separate condensing chamber – a new device – to Thomas Newcomen’s atmospheric engine and created the steam engine.

INVENTIONS, INNOVATIONS OR JUST CREATIVE RESEARCH?

Gene research

In 1988, Rudolf Jaenisch and co-workers succeeded in implanting in mice the gene for a hereditary disease of humans. It was thought that it would open the way to the study of such diseases and to improved treatment.

Superconductors

In 1911, Heike Onnes discovered that electrical resistance in mercury disappears when the mercury is cooled to absolute zero. This phenomenon is known as superconductivity. It was found subsequently that other metals and alloys also become superconducting at very low temperatures. Today superconductors are used in large and powerful magnets, mainly in particle accelerators and the magnetic-resonance imaging machines used in medicine. There are other potential applications.

Infinity of non-smooth four-dimensional spaces

In 1987, Clifford Taubes discovered that the infinity of non-smooth four-dimensional spaces is uncountable (an infinity is countable if each element in it can be matched to one of the counting numbers).

Quarks

When physicists first began to think deeply about quarks they were puzzled because isolated quarks had not been observed. One idea was that quarks might be the ends of strings. Assuming that a particle was a string and that quarks were just the ends of the string, then it was plausible why one never found a quark without the other. A string is essentially a one-dimensional object in a space of four dimensions (counting time as a dimension). Physicists turned to topology, the mathematics of knots and surfaces, to find out what the implications might be of using strings instead of particles in their calculations. To their surprise, they discovered that strings simplified the calculations.

Question

How would you classify each of the above four illustrations in terms of inventions, innovations or just creative research?

The two general theories of invention are the *deterministic* and the *individualistic*. The deterministic theory holds that when economic, technical and cultural conditions are ripe an invention will be made by one inventor or another; who does it is just historical accident. This theory has some support in the numerous instances of simultaneous and independent invention. It also helps to explain the competing claims that emerged over the invention of the steamboat, the electric telegraph, the incandescent lamp and the aeroplane. The theory is also plausible because timing is unquestionably important in invention. Also, inventors are likely to focus on projects that are reasonably attainable and for which there is a recognisable need or demand.

IDEAS AND HOW THEY ARISE



Generating ideas is not just a chance process. Ideas appear to arise by chance only when people are actually looking for them. It does not happen to people who are not curious or enquiring or who are not engaged in a hard search for opportunities, possibilities, answers or inventions.

One might, indeed, think of ideas as ‘the sentences of thought’. Ideas are mental phenomena which somehow drift into the mind, wander through and often vanish into obscurity, never to be recalled again. Making notes on ideas as they arise is extremely important. Graham Wallas (1926) tells the story of a man ‘who had so brilliant an idea that he went into his garden to thank God for it, and found on rising from his knees that he had forgotten it, and never recalled it’.

In terms of problem solving we might prefer to think of ‘insights’ rather than ideas. The gaining of insights into a problem can lead to a restructuring of that problem and the development of further insights into the solution of the problem. There may not be a perfect solution to a problem which requires creative thought but only different solutions, more acceptable solutions and, often, only further insights into a problem.

Many ideas seem to occur by chance. Fleming discovered the effects of penicillin quite by accident – it was blown in from an open window and killed bacteria in a saucer which contained a strain he was investigating. While searching for a way to hear the sounds of the heart, Laennec found his answer when he noticed two boys playing in an unusual way with a see-saw. The one was hitting one end of the wooden see-saw with a stone while the other listened with his ear pressed close to the other end. The idea of the stethoscope leaped to Laennec’s mind. Westinghouse discovered the idea of the air-brake when he casually read in a journal that compressed air power was being used by Swiss engineers in tunnel building. Kekule gained his clue to the nature of the benzene ring from his dream of a snake swallowing its own tail. Rutherford used the solar system to understand the structure of the atom. He viewed the electrons as revolving around the nucleus in the same way that the planets revolve around the sun. Einstein’s theories came from analogies about riding on light beams and travelling in lifts.

However, generating ideas is not just a chance process. Ideas appear to arise by chance only when people are actually looking for ideas. It does not happen to people who are not curious or enquiring or who are not engaged in a hard search for opportunities, possibilities, answers or inventions.

It is also widely recognised that immersion in one's subject matter can be an important factor in gaining creative insights. Newton, for example, arrived at the law of gravitation by being preoccupied with the problem all the time. It is also known that Einstein tried for years to clarify the problem of the relation of mechanical movement to electromagnetic phenomena. Creative insights appear to be easiest to gain in fields where we have considerable prior knowledge and experience. Nevertheless, there is a paradox here, for we tend not to think about what we think we know already. Existing ideas tend to make us myopic about new possibilities. The paradox reveals itself in that it appears that creative ideas do not come to us unless we spend much effort engaged in just the activity which makes their emergence most difficult.

Motivation also plays an important role in our ability to be creative. Again there is a paradox, for creative work demands both a passionate interest on the part of the thinker and a certain degree of detachment from the work and ideas. Creative thinking, however, does not appear to occur where the individual's interest in the subject matter is relatively low. There seems to be a delicate balance whereby the creative thinker has to remain sufficiently detached from the work.

CREATIVITY AND INVENTIONS

Christian Doppler gave his name to a well-known principle which he discovered in the nineteenth century (the Doppler effect). We can observe it any time a motorist sounds his or her horn while passing us by. As long as the source of the sound approaches us the pitch seems higher than when it moves away from us. Sound-waves are just one form of wave subject to this effect.

Can you think of how twentieth-century inventors might have made use of this principle to come up with commercially applicable inventions?

See <http://www.routledge.com/textbooks/0415345421> for solution.

THE IMPORTANCE GIVEN TO CREATIVITY IN BUSINESS



Logical thinking progresses in a series of steps, each one dependent on the last. This new knowledge is merely an extension of what we know already, rather than being truly new. The need for creative problem solving has arisen as a result of the inadequacies of logical thinking. It is a method of using imagination along with techniques which use analogies, associations and other mechanisms to help produce insights into problems which might not otherwise be obtained through conventional, traditional methods of problem solving.

In management, problems arise as different or new situations present themselves and they often require novel solutions. Frequently, it is difficult to see solutions to problems by thinking in a conventional fashion. Logical thinking takes our existing knowledge and uses rules of inference to

produce new knowledge. However, because logical thinking progresses in a series of steps, each one dependent on the last, this new knowledge is merely an extension of what we know already, rather than being truly new. It would seem, therefore, that logical thinking has only a limited role to play in helping managers to be creative. The need for creative problem solving has arisen as a result of the inadequacies of logical thinking. It is a method of using imagination along with techniques which use analogies, associations and other mechanisms to help produce insights into problems.

Over the past few decades creativity has become a highly fashionable topic in both the academic and business worlds. That is not to say that creativity did not exist before, but its importance to the continued success of an organisation had yet to be recognised. Many management problems require creative insights in order to find satisfactory solutions. Nowadays, the majority of organisations are fully aware of just how vital creativity is to their prosperity. Over time, considerable research has been undertaken which enables us to obtain a better understanding of creativity and become more innovative ourselves.

AN ECONOMIC CLEANING JOB: FINDING A LESS COSTLY WAY OF PERFORMING A TASK

Tank Refurbishers clean out and reline industrial storage tanks. In an increasingly competitive market, margins are becoming tighter and profitable business ventures more difficult to find. Nearly all the tanks the firm refurbishes are cylindrical and vary considerably in terms of the volume of liquid they contain. The procedure is to remove the ends, clean and repaint the inside of the cylinder, clean and repaint the end sections and re-weld the pieces after completion of the repainting.

How might the firm seek to be more competitive in the pricing of its jobs?

See <http://www.routledge.com/textbooks/0415345421> for possible solutions.

Even thirty years ago it was reported that the ‘accelerating pace of change is now widely accepted . . . Alvin Toffler found evidence that the pace of change was causing “Future shock” and social disorientation’ (Rickards, 1985: 186), and this change is an ever-present phenomenon to which businesses of all kinds are forced to respond if they want to stand the best chance of survival and prosperity. But how should they respond? An increasing number of problems have no precedents, and there are fewer tested ways of approaching them. This poses problems for organisations. Many suggest that creativity is indeed the answer; and, as Majaro (1991: 1) suggests, ‘It is universally assumed that enhanced creativity can provide a company with a competitive edge’. A survey sponsored by Porter/Novelli among 100 executive readers of *Fortune 500* in 1993 found that people thought creativity was essential to ensure success in business.

A plethora of literature emphasises the need for creativity in business. Indeed, Oldman and Cummings (1996: 609) note that ‘numerous commentators have argued that enhancing the creative performance of employees is a necessary step if organisations are able to achieve competitive advantage’.




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Why is creativity in management important? The main problem in management, according to James March (1988), is that: 'Organisations face a large number of problems of about equal importance, but only a few solutions. Thus the chance of finding a solution to a particular problem is small.'

In order to identify and so solve many of the problems that arise in business it is necessary to challenge the problem solving capabilities of those in charge. In many cases the creative process which is used to approach problems has to be restructured and redeveloped in order to produce new ideas and perspectives.

Change is an intrinsic necessity for a company that wishes to perform well in the long term. As Sir John Harvey Jones stated: 'Unless a company is progressing all the time, it is in fact moving backwards. It is quite impossible to maintain the *status quo*' (Rogers, 1996). Attempting to do things in the same way as they have always been done in the past can lead to difficulties in a business environment which is experiencing rapid cultural, economic or technological change. Change is an ever-present phenomenon to which businesses of all kinds are forced to respond if they wish to stand the best chance of survival and prosperity.

The rapid growth of competition in business and industry is often quoted as a reason for wanting to understand more about the creative process (see for example Van Gundy, 1987; Rickards, 1990). Many firms are continually experiencing pressure to enhance old systems and products. Growth and survival can be related directly to an organisation's ability to produce (or adopt) and implement new products or services, and processes (Van Gundy, 1987). One of the key aspects of any organisation's success or failure is its ability to stay ahead of the competition in a rapidly changing environment. The modern business, with its emphasis on competition, building larger markets, strategic planning, team working, etc., has created the need for new problem solving and decision making strategies.



An increasing number of problems have few or no precedents, hence there are fewer tried and tested ways of approaching them with the anticipation of reaching a successful outcome.

Another reason is that managers need to discover new and better ways to solve problems (Ackoff and Vegara, 1988). In particular, an increasing number of problems have few or no precedents, hence there are fewer tried and tested ways of approaching them with the anticipation of reaching a successful outcome. To stay in business a company has to respond creatively to the problems it

faces. Problems may exist in both the external and internal environments. The former poses problems such as how to cope with slow economic growth, how to deal with new entrants to an industry, how to grow sales at the pace of competition in high-growth markets, how to deal with new technological developments and how to cope with shorter product life-cycles. The latter poses problems to do with poor internal communications, financial problems, alienated or poorly motivated staff and inadequate planning.



Creativity is considered to be a vital asset for any person who is in a leadership role.

Changes within a company, forced by either internal or external factors, create an unhappy climate for the company and its workers. Management needs to respond positively to such situations. Creativity is considered to be a vital asset for any person who is in a leadership role (see for example Bennis and Nanus, 1985, and empirical evidence provided by Ekvall, 1988). Creative leaders actively hunt for new problems and are especially successful in handling new challenges which demand solutions outside the routine of orthodox strategies. They often possess significant vision and are able to inspire others by their creative talents.

It is argued that creativity is an important human resource (Barron, 1988) which exists in all organisations. Organisations have to try to make use of this resource by devising settings which permit creative talents to thrive.

How creative thinking may be used in management

ILLUSTRATIONS OF HOW CREATIVITY MAY BE USED IN MANAGEMENT

- To make more effective use of a manager's time
- To improve a product's appeal to customers
- To improve motivation amongst staff
- To appeal to customers' wants and needs
- To cut costs through more efficient/effective production methods
- To identify new and profitable product-market opportunities

Creative thinking benefits all areas and activities of management. It is required to dream up better ways of marketing goods, to devise new production methods, to find new ways to motivate people, and so on. Creativity turns up in every business situation where there is a chance that things can be done in a more businesslike, more profitable or more satisfying way.

The following are typical of the kinds of problem which require creative thinking:

- How to make more effective use of a manager's time
- How to improve a product's appeal to customers
- How to improve motivation amongst staff
- How to appeal to customers' wants and needs
- How to cut costs through more efficient/effective production methods
- How to identify new and profitable product-market opportunities
- How to get skilled and experience staff to stay with the company without paying them excessively high salaries

Problems which require creative thinking are 'open-ended' problems: that is, problems for which there is more than one solution. Executives have to make decisions which require creative problem solving in planning, organising, leading and controlling their organisations:

Planning

Determining the mission of the organisation

Determining the organisational objectives

Identifying strengths, weaknesses, opportunities and threats

Adjusting the organisation behaviour and strategies to competitors' strategies

Deciding how to implement competitive strategies

Organising

Deciding what jobs need to be done within an organisational unit

Deciding how various jobs within an organisational unit can be grouped together, etc.

Deciding how much authority should be delegated to various organisational positions

Determining how best to train people for their jobs

Leading

Finding ways of increasing productivity in the workplace

Controlling

Deciding what systems of control are needed

Setting standards

Identifying why standards/objectives have not been achieved

CONDITIONS IN WHICH CREATIVE THINKING IS REQUIRED MOST



The need for creative thinking often becomes paramount when *paradigm shift* occurs or is likely to occur soon.

It is argued that in an organisational sense creative thinking is required most when there is a lack of consensus regarding goals and also a lack of understanding about cause–effect relationships (Thompson, 1967). Disagreement often occurs when problems arise which have not been previously encountered and when outcomes and goals are uncertain. The need for creative thinking often becomes paramount when *paradigm shift* occurs or is likely to occur soon.

CREATIVITY IN ACTION

Who could have envisaged fifty years ago the retail development complexity of travel agents or the shopping complexes at airports such as London Heathrow, London Gatwick, Manchester International, Amsterdam, Kuala Lumpur, Munich, Madrid and Barcelona – to mention just a few. Indeed, some of the major airport complexes have developed almost into miniature shopping centres in their own right. The planners of such development complexes continue to exercise their creative problem solving skills in order to find more ways of satisfying their customer *en route* to various destinations.

The airlines themselves have become more creative in their thinking and in the way in which they approach problems. Not everyone, however, is always happy with the outcome of such creativity, as was evidenced in the reaction of some distinguished members of the public to the novel tailfin logo adopted by British Airways in 1998. In recent years airlines have come to pay more attention to the logo on their aircraft, seeing it as an important way of portraying their brand image.

Traditionally, Air Canada planes were white with bright red lettering and a big red maple leaf on the tail. However, research showed that the strong image was a real problem with Canadian users because of its association with government bureaucracy. Apparently, Canadians adore Canada but are much less favourably disposed to its government. Canadians tend to attribute a host of hearth-and-home values to themselves and their country: compassion, friendliness, a progressive outlook and a law-abiding nature. It was decided to emphasise these associations while de-emphasising the government part. The maple leaf was kept but it was rendered in a more natural earthy red on a new evergreen tail – the reasoning being that the stark red-on-white contrast was too much associated with the government image. The overall effect makes the new planes look a lot less like flying Mounties.

British Airways, too, has had its dose of creative thinking. It was revitalised by Sir Colin Marshall in the 1980s with a particular directive to focus on the customer. An effective internal marketing programme was based on the notion that employees would not treat customers better until they themselves were treated better. Marshall established profit sharing and a two-day seminar at which attendance was compulsory for all employees. The seminar focused on all relationships employees might have with other employees, bosses, customers or even family members. It was felt that the programme contributed significantly to raising staff morale and to better customer relations. Among the creative ideas to emerge was the installation of TV cameras in passenger disembarking areas enabling them to register complaints immediately on landing. These are then dealt with in a timely manner, and the customer is informed of what action is taken. Changing the image of British Airways was also something to which attention was given. New

uniforms for staff, new exterior paint on planes, new interiors for planes, new passenger lounges and an expensive advertising campaign were employed to promote the new image of British Airways. The airline business is immensely competitive, and all companies have to strive to find ways of identifying means of establishing a competitive advantage for themselves. This is often sought by trying to improve the quality of service offered in relationship to the price charged or through the nature of the *augmented service* offered.

Service quality includes such things as:

- 1 Tangibles. Do the physical facilities, equipment and appearance of personnel associated with the service promote confidence in the quality of the service?
- 2 Reliability. Is there evidence of an ability to perform the promised service properly the first time?
- 3 Responsiveness. Is there a willingness to help customers and provide prompt service?
- 4 Competence. Do the personnel possess knowledge and skill, and have they an ability to convey trust and confidence?
- 5 Credibility/trustworthiness. Is the organisation trustworthy and does it always deliver what it promises to deliver?
- 6 Empathy. Does the provider of the service provide its customers with individual attention?
- 7 Courtesy. Do customers perceive the service provided to be a friendly one?
- 8 Communication. Are customers kept informed about the service offered in the language they can understand? Do the providers of the service listen to what the customers have to say?

The *augmented service* refers to activities or additional services that are tangential to the physical transportation of customers from the point of departure to their destination.

Question

In what ways might airlines offer an augmented service to customers? Can you think of any which are not currently offered?

PARADIGM SHIFT

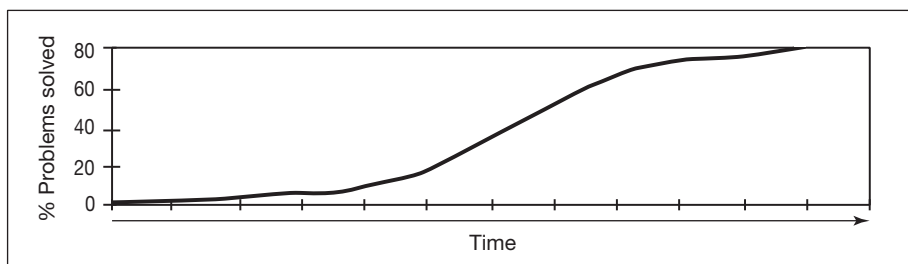


A paradigm is a set of rules and regulations that guide our actions when solving problems.

A paradigm is a set of rules and regulations that define boundaries and help us to be successful within those boundaries, where success is measured by the problems solved using these rules and

regulations. Paradigm shifts are different from continuous improvement. Examples include: going from donkey cart or horse-drawn carriage to car or travelling long distances by aeroplane instead of by bus or ocean liner. Paradigm shifts have made it possible to send complex, accurate messages over great distances: they have facilitated moving from primitive methods such as shouting, smoke, fire, drum, flag signals to highly sophisticated mechanisms such as telegraph, telephone, fax, live video by wire, optical fibre, and communications satellite.

Paradigms have life-cycles, and towards the end of the life-cycle problem solving becomes more costly, more time-consuming and less satisfactory (Figure 1.1). Solutions no longer fit the larger context because of changes that have occurred elsewhere. Nowhere is this better illustrated than in the case of needing to improve parts of the UK motorway network. The problems associated with the M6–M53 intersection, the Thelwall Viaduct connection and the M6–M62 intersection in the north-west of England illustrate the point. Widening the M6 over the sections involved not only cost millions of pounds of taxpayers' money but also placed an additional unestimated burden on motorists in terms of long delays, excessive fuel consumption while negotiating the sections involved and psychological stress which is difficult even to estimate. The paradigm of widening busy stretches of motorways must surely be in the decline stages of its life-cycle. A paradigm shift is required urgently.



- Towards the end of the life-cycle, problem solving becomes more costly, more time-consuming and less satisfactory. Solutions no longer fit the larger context because of changes that have occurred elsewhere.

Figure 1.1 Paradigm life-cycle curve

Paradigm shifts require a change in perspective on the subject. Blinkered thinking associated with holding too rigorously to a paradigm can lead to missing opportunities and overlooking threats which may have a critical impact on a business. Two competitors may see the same opportunity or threat in different ways, and the one that is able to make the best response can gain a sustainable competitive advantage over its rival.

The process of paradigm shift can be encouraged and effected early through the use of creative thinking. Creative thinking brings into place notions and ideas that would not normally be contemplated in problem solving. Creative problem solving methods make extensive use of techniques and approaches that help to find solutions to recalcitrant open-ended problems.

FROM STEAM-DRIVEN TO PETROL-DRIVEN CARS

The steam car was a failure as a road vehicle, for it proved too heavy and its control too difficult for this purpose. The electric motor seemed to offer one possible solution, while other would-be inventors saw the gas-powered engine as providing a possible solution. In 1863, Etienne Lenoir built an engine which used ordinary coal gas and even made a car which he drove using his invented engine as the power source. Siegfried Marcus is credited with using petrol vapour for the first time in an engine to drive a car through the streets of Vienna in 1875. However, it was considered to be such a noisy vehicle that the police banned its further use on the public highways. Very much ahead of his time, Edward Butler produced a petrol-driven tricycle, with a two-cylinder motor, a carburettor and ignition through a spark plug produced by a dynamo, in London in 1884. The 'Red Flags Laws' operated at that time in England restricting speed to 4 m.p.h. on the open road and 2 m.p.h. in built-up areas. The laws laid down that a vehicle should be accompanied by a man walking before it carrying a red flag and warning people of the oncoming vehicle. They were a death sentence for all such inventions. In Germany, however, August Nikolaus Otto did much to advance the development of the gas engine in the 1870s – although it was powered from a mains supply.

Karl Benz gained acquaintance with the *boneshaker* bicycle at an early age, and this prompted him to think of ways of mechanising road transport. He became interested in Lenoir's gas engine, made himself aware of recent developments in the field, and concluded that some petroleum derivative might be suitable as fuel. He also felt that this would be comparatively cheap since extensive oil reserves had been discovered in Pennsylvania in the 1850s.

In 1885, Benz produced his first car. It was a tricycle with a four-stroke engine using the Otto principle. He invented his own electrical ignition system and surrounded the engine with a mantle containing cold water for cooling. Transmission of the drive to the rear wheels was accomplished with chains and incorporated a primitive clutch.

Questions

- 1 In the light of the above, consider just how the paradigm shift (from horse-driven vehicle to mechanised road vehicle) occurred in this instance.
- 2 What lessons are to be drawn from this account?

CHARACTERISTICS OF CREATIVE THINKING AND CREATIVE THINKERS



Measures of intelligence do not explain creative ability. Highly productive creative thinkers form more novel combinations than the merely talented. If one particular style of thought stands out about highly productive creative thinking, it is the ability to make juxtapositions between dissimilar subjects. It is a facility to see things to which others are blind.

It would be useful to understand the thinking processes which were involved in producing the *Mona Lisa*, as well as the ones that produced the theory of relativity. It would be more than useful to appreciate what characterises the thinking strategies of people such as Einstein, Edison, Leonardo da Vinci and Mozart.

Efforts have been made to establish the links between measures of intelligence and highly productive creative thinking, but measures of intelligence themselves are insufficient to explain it. Psychologists reached the conclusion that creativity is not the same as intelligence. A person can be far more creative than he or she is intelligent, or far more intelligent than creative.

Most people, given data or some problem, can work out the conventional response. Typically, people think *reproductively*: that is, on the basis of similar problems encountered in the past (see Chapter 3 for the development of this notion). When confronted with problems, we make use of previous experiences and apply a method or approach that has worked before. If there is more than one such approach, we select the most promising and work within a clearly defined direction towards the solution of the problem. This can lead us to become too certain of the correctness of our conclusion and to develop mindsets (see Chapter 2).

Experience indicates that highly productive creative thinking is generated by thinking *productively*, not *reproductively*. When confronted with a problem, people thinking in this fashion look at a problem from many perspectives and search for many different ways of solving the problem. They come up with many different ideas, some of which are quite unconventional and often unique.

With *productive* thinking, the aim is to generate many different approaches. The least obvious must be considered as well as the most likely approaches. It is the willingness to explore different approaches that is important, even after a promising one is discovered. *Reproductive* thinking, on the other hand, can produce too rigid thinking. This can produce an inability to solve a problem that resembles past experiences only in superficial ways. Interpreting such a problem through past experience will, by definition, not be productive. *Reproductive* thinking produces solutions which we have employed before and not original ones.

It is important to appreciate how highly productive creative thinkers generate so many alternatives and conjectures, and why many of their ideas are so rich and varied. Highly productive creative thinking is often generated by finding a new perspective that no one else has taken. The first step is to restructure a problem in many different ways. The first way one looks at a problem may be too biased by the way in which one usually views matters. Restructuring takes place by looking at a problem from one perspective and then moving on to another perspective and then

still another. With each move, understanding deepens and one begins to understand the essence of the problem. In order to find creative solutions, one may have to abandon the initial approach that stems from past experience and reconceptualise the problem. By adopting more than one perspective, highly productive creative thinkers solve existing problems and even identify new ones.

It is possible that highly productive creative thinkers form more novel combinations than merely talented individuals. If one particular style of thought stands out about highly productive creative thinking, it is the ability to make connections or associations between dissimilar subjects. It is a facility to see things to which others are blind. Leonardo da Vinci forced a relationship between the sound of a bell and a stone hitting water, enabling him to make the connection that sound travels in waves. Samuel Morse was trying to work out how to produce a telegraphic signal strong enough to be received coast to coast. One day he saw tied horses being exchanged at a relay station and forced a connection between relay stations for horses and strong signals. The solution involved giving the travelling signal periodic boosts of power. Nikola Tesla forced a connection between the setting sun and a motor that made the AC motor possible by having the motor's magnetic field rotate inside the motor just as the sun (from our perspective) rotates.

The ability to tolerate ambivalence between opposites or two incompatible subjects is thought to characterise highly productive creative thinking. Edison's invention of a practical system of lighting involved combining wiring in parallel circuits with high-resistance filaments in his bulbs, two things that were not considered possible by conventional thinkers at the time. Because Edison could tolerate the ambivalence between two incompatible things, he could see the relationship that led to the breakthrough.

Qualities of a creative person

Creativity is a quality which exhibits itself in the way in which people conduct their lives. People who exhibit creative behaviour:

- challenge the *status quo*
- confront assumptions
- exhibit curiosity
- like to investigate new possibilities
- tend to take the initiative in most matters
- are highly imaginative
- are future-orientated
- tend to think visually
- see possibilities within the seemingly impossible
- are not afraid of taking risks
- are prepared to make mistakes
- are adaptable to different work environments
- are adaptable to changing circumstances
- see relationships between seemingly disconnected elements
- distil unusual ideas down to their underlying principles
- synthesise diverse elements

- are able to spot underlying patterns in events
- are able to cope with paradoxes
- look beyond the first 'right idea'

Acquiring creative problem solving skills

Research has shown continuously over the past fifty years that people can be taught, encouraged and coached or counselled to be more creative. Four basic creative strengths and skills can be easily taught:

- 1 Fluency – ability to produce many ideas (many of which may be fairly similar or have the same kind of theme)
- 2 Flexibility – ability to produce a varied mix of ideas (none or few of which are similar or share the same kind of underlying theme)
- 3 Elaboration – ability to add detail, depth, mixtures of viewpoints or perspectives
- 4 Originality – uniqueness, novelty, newness, creativeness (new) or innovativeness (improvement of existing)

Fluency can be developed by holding creative thinking sessions at which ideas for a hundred different uses for everyday objects (sponge, toothpick, eraser, brick, paper-clip, etc.) should be generated. After reaching this number, move on to work-related objects.

Flexibility can be improved by listing fifty different kinds of uses for everyday objects and then moving on to work on related challenges.

Elaboration can be developed by describing something (hobby, TV show, tree, cat, athletic event, etc.) in considerable detail, using all the physical senses.

Originality can be learned by picking one common object and listing many new uses for it.

Regular practice in each of the above activities can lead to the acquisition of improved creative skills.



EXERCISE **FLUENCY AND FLEXIBILITY AND ORIGINALITY**

Think of a hundred uses, new uses or types of uses for the following:

- 1 Scrubbing brush
- 2 Empty jam-jar
- 3 Waste-paper basket
- 4 Disused railway-track sleepers
- 5 Blunderbuss
- 6 Bottle-tops off empties
- 7 Wooden pencil
- 8 Old hats (male and female)

- 9 Obsolete desktop computers
- 10 Worn-out carpets
- 11 Dead lightbulbs
- 12 Sweatshirts

Elaboration

Describe each one of the above twelve items in considerable detail, using all the physical senses.

Creativity skills include:

Imagination (visual, auditory and kinesthetic creativity allows you to express ideas and feelings by applying your imagination to produce unique creations)

Literary (writing a poem, a short story or a play)

Social (imagining a new way to have a group process go better or improve a programme that provides services to others)

Innovation (using information from a variety of different sources to create unique solutions to a problem)

Aesthetics (using sense of beauty to judge something)

Visualising (creating a mental image of an object or idea)

Designing (creating plans for a new project or product)

Judgement (using discrimination skills in sound, colour and shape to determine differences)

Energetic, persistent work-style

Orientation towards risk-taking and independence

Creative problem solving is needed to make up for the shortcomings in our basic education where there has been an emphasis on the use of our mind for storing information instead of developing its power for producing new ideas and turning these into reality. Our productivity will be enhanced when we use our brain to question, explore, invent, discover and create – in other words, employ creative thinking. Through creative problem solving, we generate new ideas and innovative solutions for a given need or problem. These ideas will be more efficient and often of much higher quality. Creative problem solving gives balance to our thinking since it integrates analytical and imaginative thinking. Intuitive and interpersonal thinking are as important as critical and structured thinking for achieving the best results. Thus, creative thinking skills are needed to help people accept and cope with change.

QUESTIONS

- 1 Why should the modern-day manager need to know about creative problem solving?
- 2 Why is creative problem solving expertise an important asset for any business executive? How might executives improve their creative problem solving skills?
- 3 What is paradigm shift? How does it relate to creative problem solving?
- 4 What kinds of 'future shock' do you think the twenty-first century might have in store for us as: (a) workers, (b) consumers, (c) producers, (d) managers?
- 5 Koestler said: 'True creativity often starts where language ends.' How would you interpret this statement in the context of business?
- 6 If we tend not to think about what we think we know already, and existing ideas tend to make us myopic about new possibilities, how can we hope to get new insights into existing problems?
- 7 James March argues that 'Organisations face a large number of problems of about equal importance, but only a few solutions. Thus the chance of finding a solution to a particular problem is small.' Does this mean that organisations must spend most of the time 'muddling through'? Why or why not?
- 8 John Harvey Jones said: 'Unless a company is progressing all the time, it is in fact moving backwards. It is quite impossible to maintain the *status quo*.' Can you account for John Harvey Jones's conclusion? Explain.
- 9 Growth and survival can be related directly to an organisation's ability to produce (or adopt) and implement new products or services, and processes (Van Gundy, 1987). How does one reconcile this suggestion with the fact that many products appear to have been around for many years (e.g. Mars bars) while others enjoy a revival (e.g. the Volkswagen Beetle car)?
- 10 Why should lack of agreement regarding goals and a lack of understanding of cause-effect relationships give rise to a need for creative thinking?
- 11 *Fluency* (ability to produce many ideas); *flexibility* (ability to produce a varied mix of ideas); *elaboration* (ability to add detail, depth, mixtures of viewpoints or perspectives); and *originality* – uniqueness, novelty, newness, creativeness (new) or innovativeness (improvement of existing) – are considered important creative skills. How might one introduce these skills into the management of meetings?
- 12 Differentiate innovation from creativity and invention.
- 13 Discuss how one might make use of creativity skills in the following situations:
 - (a) dreaming up ideas for a new product
 - (b) solving traffic congestion problems
 - (c) fundraising for a charity

CASES

Keeping prices competitive

John Holmes operates a clothes wholesale distribution business. Competition is strong, and pricing is keen. Rising costs of distribution, however, are a constant problem, and all rival distributors compete strongly on price. John is looking for ways of keeping prices competitive.

Question

How can John try to minimise price rises in the face of strong competition and at the same time still maintain profitability? (See <http://www.routledge.com/textbooks/0415345421> for some suggestions.)

Price and innovation

Sally Major owns a hi-tech company which produces assembled and part-assembled components for a variety of industrial and consumer goods. Recently the technical department has achieved a major breakthrough in the production process which enables the firm to reduce the cost of producing all component assemblies and sub-assemblies by at least 50 per cent. As a general guideline to setting prices the firm usually adopts around a 100 per cent mark-up on the costings subject to this making the product competitive in the marketplace. Occasionally, where demand is high and there is no price consciousness, mark-up can be at least 150 per cent and still be in line with what competitors are charging for similar products. There are only a handful of products where mark-up is less than 100 per cent and none where it is less than 80 per cent. In all cases, the firm makes sure that its pricing is in line with that of competitors. The firm adopts the role of market-challenger in all market segments. Market share varies from between 25 per cent and 40 per cent of the market segment.

Question

What action do you think Sally should now adopt with respect to pricing? (See <http://www.routledge.com/textbooks/0415345421> for comments.)

Anti-bacterium gel

Barbarossa Dental Research has invented a gel that, when rubbed gently into the gums, gives adequate protection from tooth decay and gum disorders for a period of about six months. The firm is pondering how best to market the product or even whether to market it at all. If the product is marketed, it is likely that dentists will no longer need to repair tooth decay in users of the gel, and this will have a major impact on their business. Barbarossa relies on the dental trade for many

of its other products, and the prospect of dentists losing many customers means that Barbarossa, too, could also lose many of its customers (i.e. the dentists).

Question

How would you advise Barbarossa to proceed?

Paradigm shift

Paradigm shift in business strategy

In the new world of business, instead of long-term prediction, the emphasis is on understanding the multiple future world-views by using techniques such as scenario planning. In this view, the organisation plans for its futures, but does not rely on its plans.

Paradigm shift in design and use of technology

This involves the shift from the traditional emphasis on transaction processing, integrated logistics, and workflows to systems that support competencies for communication building, people networks, and on-the-job learning.

Paradigm shift in the role of senior management

It has been suggested that the role of senior management needs to change from *command and control* to *sense and respond*. The new emphasis should be on building *commitment* to organisational vision rather than *compliance* to rules and pre-specified best practices. Senior managers need to view the organisation as a human community capable of providing diverse meanings to information outputs generated by the technological systems. They also need to make the organisational information base accessible to organisation members. This is important given the increasingly fast-paced and dynamic business environment that creates disconnects between the process of decision making at the top and implementation of such decisions at the grass-roots.

Paradigm shift in organisational knowledge processes

Institutionalisation of 'best practices' by embedding them in information technology might facilitate efficient handling of routine and predictable situations. However, greater proactive involvement of human imagination and creativity is needed to facilitate greater internal diversity to match the variety and complexity of the changing environment. Often, effective knowledge management in such an environment may need imaginative suggestions.

Paradigm shift in organisation design

While the traditional business logic was based on a high level of structure and control, the dynamics of the new business environment demands a different model of organisation design. This model is

characterised by relative lack of structure and lack of external controls. Differences in perspective may have a very positive role in innovation that feeds new product and service definitions and business models. This view encourages promotion of individual autonomy in experimentation and learning. Instead of emphasising 'best practices' archived in databases, it encourages continuous pursuit of *better* practices that are aligned with a dynamically changing business environment.

Question

Examine the implications of paradigm shift in the above contexts from the point of view of creative problem solving. What kinds of problem might they raise for managers in the twenty-first century?
