Review

The impact of technology on social change: a sociological perspective

Edmore Mutekwe

University of Johannesburg, Department of Education and Curriculum studies, Auckland Park Kingsway campus, Republic of South Africa
E-mail: edmorem@uj.ac.za/emutekwe@yahoo.com

Abstract

This conceptual paper presents the position that the primary changes in human history are the four social revolutions (domestication, agriculture, industrialization, and information), the change from Gemeinschaft to Gesellschaft types of societies, capitalism and industrialization, modernization and global stratification. Ethnic conflicts and social movements indicate cutting edges of social change. Sociological approaches such as William Ogburn's theory of social change, which asserts that technology is the basic cause of social change are fully explored and applied in this discourse. A great deal of effort is made in this paper to identify the many and varied existing forms of technology and the effects changed technology has on society and culture. The major characteristic of traditional and modern societies are also brought to the lime light in a bid to show the major cultural changes that have occurred or are occurring in society. It is these socio-cultural changes from traditional to modern types of society that Ferdinand Tonnies (1988) refers to as changes from Gemeinschaft to Gesellschaft respectively. In discussing how technology changes society, the major thesis is that because technology is the organizing force for social life, when it changes, its effects can be profound. The computer, for example is changing the way people practise medicine, learn, work and how they relate or even think. The information superhighway is likely to perpetuate social inequalities at both national and global levels. The article also avers that besides technology, capitalism and modernization, theories such as the conflict and evolutionary help sociologists to account for the phenomena of social change- a shift in the characteristics of culture and Society. It is important to point out that this paper is embedded in a Western understanding of technologies and its impact on society.

Keywords: Industrialisation, social revolution, domestication, economic determinism, inevitability of conflict, technological shifts, global map.

INTRODUCTION

Conceptualizations of social change

Discussions of social change among sociologists often begin with complaints or accusations about the lack of uniformity concerning its definition. The point is well taken, for practically every book on social change has a section on definitions conditioned by the author's theoretical orientation, in an attempt to narrow the concept down. There is a multiplicity of such ventures with few features in common. Perhaps Thurman Arnold was correct, four decades ago, in suggesting that a definition is ordinarily supposed to produce clarity in thinking. It is not generally recognized that the more people define their terms, the less descriptive they become and the more difficulty they have in using them

(1937:180). His admonition is well taken and will be illustrated by a brief overview of an assortment of social change definitions in the ensuing paragraphs. The examination of the different conceptualization's undertaken in the light of Karl Popper's caution that "definitions are dogmas, only the conclusions drawn from them can afford us any new insight" (1959:53).

In its most concrete sense, social change means that large numbers of persons are engaging in group activities and relationships that are different from those in which they or their parents engaged in some time before (Vago, 1992). Hans Gerth and Wright Mills (1953) define social change as whatever may happen in the cause of time to the roles the institutions or the orders comprising a social structure, their emergence, growth and decline. Society is

a complex network of patterns of relationships in which all the members participate in varying degrees. These relationships change, and behavior changes at the same time. Individuals are faced with new situations to which they must respond. These situations reflect such factors as the introduction of new techniques, new ways of making a living, changes in place of residence and new innovations, ideas and social values. Thus social change means modifications of the way people work, rear a family, educate their children, govern them, and seek ultimate meaning in life. But the conceptualization of social change can be approached from a number of directions. It must be underscored that there are as many definitions on the subject as there are authors on it. Numerous sociologists view social change as a change in the structure of society or alteration of the social structure. For instance, Morris Ginsberg (1958) views it as a change in the social structure, for example, the size of a society, the composition or balance of its parts or the type of its organizations. Examples of such changes are the contraction in the size of the family, the breaking up of the domainal economy with the rise of the cities, the transition from estates to social classes. Viewed from a somewhat different perspective, social change is the significant alteration of social structures (that is, of patterns of social action and interaction), including consequences and manifestations of such structures embodied in norms (rules of conduct), values and cultural products and symbols (Moore, 1968). It is understandable why social structure (the web of organized relationships among individuals and groups that defines the mutual rights and responsibilities) is being emphasized in change. Social structures are not stable, tightly integrated or harmonious but are unstable, loosely put together and not torn by dissension. To ignore this profound phenomenon and process is to miss a central fact about societies. Increasingly, people accept a heraclitean view of the world as flux rather than as composed of solid building blocks. Others stress that social change is not only a change in the structure, but also in the functioning of society. Social changes comprise modifications in social systems or subsystems in structure, functioning, or process over some period of time (Allen, 1971). Similarly, "by social change is meant only such alterations as occur in social organization – that is the structure and functions of society (Davis, 1959:622). Johnson (1960: 626) goes into some detail in observing that "social change is change in the structure of a social system; what have been stable or relatively unchanging changes. Some authors consider social change principally in terms of a specific change in social relationships. MacIver and Page (1949) argue that social change implies changes in social relationships, the changing ways in which human beings relate to one another. A generation later, in the same vein, Tudson Lundis (1974:229) writes; "Social change refers to change in the structure and functioning of the social relationships of a society". Ronald Edari (1976:2) combines elements, social structure and social relationships in his definition. He argues that when people talk of social change they imply two things; the change in the constitution of social entities over time and the change in the relationships among and within entities over time. Taking a somewhat broader and more inclusive view, Nisbet (1969) views social change as a succession of differences in time within a persisting identity. Robert Laver (1977) considers social change as an inclusive concept that refers to alterations in social phenomena at various levels of human life from the individual to the global.

A common difficulty with the above definitions of social change is the problem of reification, the tendency to equate conceptual abstractions of reality with an actual piece of reality. The elements emphasized in the definitions, which include the social structure, the functioning of society, social relationships, forms of social processes and time can be isolated but there are difficulties in understanding what is changing. The term change is often used loosely, and as it has been illustrated, attempts at definitions are numerous and conflicting. Vago's (1992) proposal for a different approach towards a workable definition of social change seems to hold water. He proposes that social change must be conceptualized as the process of planned or unplanned qualitative or quantitative alterations in social phenomena, which can be depicted on a six-part continuum, composed of interrelated analytic components namely identity, level, duration, direction, magnitude and rate of change.

Identity of change refers to a specific social phenomenon undergoing transformation such as a definite practice, behavior, attitude, interaction pattern, authority structure, and productivity rate, voting pattern, prestige and stratification system. The concept level of change delineates the location in a social system where a particular change takes place. Several levels maybe designated such as individual, group, organization, institution and society. The term duration means the time span over which a change form remains in its initially institutionalized state. It may refer to long – term or short – term (transitory change phenomena. The idea of direction of change may indicate development, progress or decline. The pattern can also be linear or evolutionary, occur in cycles or stages or correspond to some other pattern. It may also be a simple fluctuation or variation on a particular theme. The magnitude may be based on the three-part schema of incremental or marginal comprehensive and revolutionary changes as discussed in the preceding section. The rate of change may be based on arbitrary scale such as fast or slow, continuous or spasmodic, orderly or erratic. Figure 1 below depicts the elements of this conceptualization of social change.
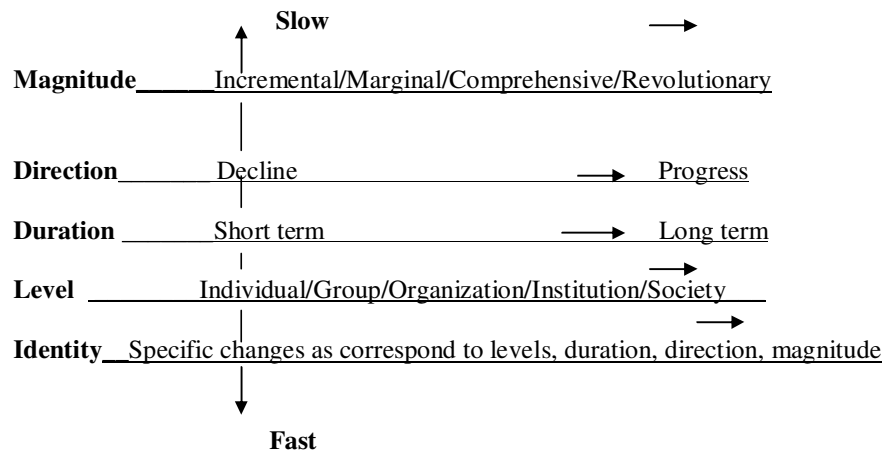
Figure 1. Graphic illustration of elements of the social change

The genesis and development of social change: the four social revolutions

The rapid far-reaching social change that the world is currently experiencing did not just happen. Rather it is the result of fundamental forces set in motion thousands of years ago, beginning with the gradual domestication of plants and animals. This first social revolution allowed hunting and gathering societies to develop into horticultural and pastoral societies. The plow brought about the second social revolution, from which agricultural societies emerged. Then the invention of the steam engine ushered in the industrial revolution. And now we are witnessing the fourth social revolution, stimulated by the invention of the microchip. The thrust of this article is that our lives are being vitally affected by this fourth revolution and so far we have seen only the tip of the iceberg. By the time this social revolution is full blown, little of our way of life will be left untouched. We can assume this because this is how it was with the first three revolutions. For example, the change from agricultural to industrial society meant not only that people moved from villages to cities, but also impersonal, short-term associations replaced those intimate, lifelong relationships. Paid work contracts, and especially money replaced the reciprocal obligations required by kinship, social position and friendship. Sociologists Ferdinand Tonnies (1988) uses the terms Gemeinschaft and Gesellschaft to indicate this fundamental shift in society form traditional to modernity.

The inevitability of social change

Some theorists argue that change in society proceeds according to blind forces over which man has no control. Such arguments center around the determining force of culture itself or on some one aspect of culture and social structure such as technology, the stratification system or the economic system. Others see man as the active agent who according to Moore (1974) is a problem-solving animal, who sees the normal adjustments of his culture and social structure as challenges and works to invent new ways and to get them adopted, new gadgets, new techniques, new laws, new values and new patterns of social relationships. It must be noted that the process of social change is certainly inevitable owing to the following factors; discovery, the inevitability of conflict in society, technological determinism, technological inventions (discussed above), the role of knowledge, beliefs and values, culture contact, cultural diffusion and the occurrence of social movements.

Social change is necessitated by such factors as the view that man must continually cope with the challenges of his physical environment and biological nature, with the nature of natural disasters, floods, droughts, earthquakes and storms as well as with diseases and accidents. Man's intelligence and curiosity, his restlessness and dissatisfaction also leads to discovery of new continents and to the desire to explore the moon, to learn through accident and experiment, to notice, for example, that the mold he names penicillin inhibits the growth of bacteria (Vago 1992; Liu 1967). People unwittingly play a role in social change in other ways. In every society the succession of personal is a built in source of change. Fertility and mortality rates vary from one generation to another, so the number of a people in a society and their distribution in various categories, such as social class, may vary significantly from one generation to another. Related to this point is the notion of circulation of elites, where for example, those in control of society maybe replaced by other groups from within through peaceful or violent means as illustrated by the recent events in Iraq. It is a truism in the social sciences that conflict is inevitable in any society because of opposed interests or incompatible claims to scarce

values such as money or power. Whether or not conflict is destructive or constructive, it can be seen as an ever present, creative source of change – a way of possibly renaming, revitalizing, or destroying society. Closely intertwined with this idea is the inevitability of conflict in society is the Marxian notion of economic determinism. Karl Marx began with an assumption: economic organization especially the ownership of the means of production, determines the organization of the rest of the society. The class structure and institutional arrangements, as well as cultural values, beliefs, religious dogmas, and other idea systems, are ultimately a reflection of the economic base of a society (Abraham and Morgan, 2001). He then added an additional assumption. Inherent in the economic organization of any society (with the exception of communist societies) are forces inevitably generating revolutionary class conflict. Such revolutionary class conflict is seen as dialectical and is conceptualized as occurring in epochs with successive bases of economic organization sowing the seeds of their own destruction through the pluralization of their own classes and subsequent overthrow of the dominant by the subjugated class. Hence a third assumption: conflict is bipolar with exploited classes on the conditions created by the economy becoming aware of their true interests and eventually forming a revolutionary political organization that stands against the dominant property holding class. Thus change is built in to the nature of the social structure in the tension and conflict between classes, and it is directed toward a vague, wonderful and presumably ideal utopia (Shills, 1972).

Many social theories argue, rather convincingly, that technology is a prime mover of society and it makes social change inevitable. For example, sociologist William Ogburn (1922) traced direct connections between such development as the inventors of the automobile self-starter and the emancipation of women. When it became easy for them to drive cars, they entered the business world and thus changed their role and the nature of their family relationships. If we accept the assumption that Homo sapiens are fundamentally rational beings, then we can argue that human decisions, rather than blind forces, provide the essential dynamics of social change. In that case we must point to the role of knowledge, beliefs and attitudes in bringing about social change. Boulding (1964) sees learning as the primary source of a great transition from an agricultural to industrial – urban and now post-industrial civilization. The value judgments that change (in a desired direction) is progress has given momentum to Western societies, not unlike the idea that man is in charge of his own destiny, which accompanied the Reformation and the secularization of culture. For example, Chinese leaders deeply believe that the moving force lies in the motivations and attitudes of man and that external persuasion must be supported by the fate of man (Liu, 1967). Certain theorists consider a gap

between society's ideals or basic values and real patterns as an ever-present condition for social change. When there is a sizeable discrepancy between what is and what people think ought to be (Merton's 1976), strain appears. And when it becomes especially disruptive, members of society feel a sense of moral crisis, identify the strain as a social problem and seek to bring the real pattern into correspondence with the ideal. This may be done through dissent, resistance, protest, legislation, planning, reform or revolution. In every society, there are writers, teachers and thinkers who are the keepers of the myths and as such, help support the legitimacy of the social system in the minds of its members. By the same token, when they withdraw their support, the system is due for a change. For example, Crane Brinton (1959) sees the desertion of the intellectuals as the most reliable symptom of imminent revolution. Others argue that since the French Revolution, the acceptance of the legitimacy of the revolution and of the iniquity of tradition has become one of the strongest traditions of intellectuals (Shils, 1972).

Most historians would agree that the intelligentsia paved way for the Russian revolution by seriously questioning the legitimacy of the Czarist regime. And it was not the rank and file, American colonists or Frenchmen who first questioned absolute monarchy, but the philosophers of the enlightenment, such as Rousseau, Locke and Montesquieu. As a result of advances in transportation and communication, contact among societies and among groups within societies became an essential part of everyday life. Diffusion occurs through contact, whether face to face or not, between the members of different societies and groups. The list of reasons concerning the inevitability of social change is indeed incomplete. We could further talk about man's innate curiosity, his eternal untemperable desire for new experience, his willingness to explore new territories, his desire to overcome the problems he created for himself, his willingness to create the realm of the unknown. All these conditions make change a ubiquitous feature of human society. Thus mankind seems to be under the spell of the old Chinese curse, "May your life be an interesting one." And as the rest of the discussion attempts to document, it is.

Perspectives on social change

Discussing why societies changed from Gemeinschaft to Gesellschaft, Karl Marx pointed to a social invention called capitalism. He analyzed how the break up on the feudal society threw people off the land creating a surplus of labour. Moving to cities, these masses were exploited by the owners of the means of production (factories, machines, tools) setting in motion antagonistic relationships between capitalists and workers that remain to this day. Max Weber agreed that capitalism was changing the world, but he traced (it) capitalism to the

Table 1. A Typology of traditional and modern societies

Characteristics Traditional Societies		Modern Societies
Social Change	Slow	Rapid
Size of Group	Small	Large
Religious Orientation	More	Less
Formal Education	No	Yes
Place Of Resistance	Rural	Urban
Demographic Transition	First stage	Third stage
Family Size	Larger	Smaller
Infant Mortality Rate	High	Low
Life Expectancy	Short	Long
Health Care	Home	Hospital
Temporal orientation	Past	Future
Material Relations		
Industrialized	No	Yes
Technology	Simple	Complex
Division of Labour	Simple	Complex
Income	Low	High
Material possessions	Few	Many
Social Relationships		
Basic Organization	Gemeinschaft	Gesellschaft
Families	Extended	Nuclear
Respect for Elders	More	Less
Social Stratification	Close	Open
Gender Equality	Less	More
Norms		
View of reality, life and morals	Absolute	Relativistic
Social control	Informal	Formal
Tolerance of differences	Less	More

Protestant Reformation. He noted that the Reformation stripped from Protestants the assurance that church membership saved them. As they agonized over heaven and hell they concluded that God did not intend to leave the elect in uncertainty, that God would provide visible evidence for peace predestined to heaven. That sign, they decided, was prosperity. An unexpected consequence of the Reformation, then, was to make Protestants work harder and be thrifty. The result was a surplus and capitalism, which laid groundwork for the Industrial Revolution and transformed the world (Vago 1992; Henslin 1998; Webster 1990).

The modernization process and its impact on social change

Modernization is a term that is given to the sweeping changes ushered in by the Industrial Revolution. The modernization theory as expressed by Rostow, (1976), Webster (1990), Bryant (1994), Amin (1974) equates development of societies with westernization. Berger (1985) defines it (modernization) as the process by which poorer nations of the global south are to reach the level of development attained by the rich nations of the west, core or center of the globe. Seen in this light, modernization then implies a state of affairs where traditional African Societies are made to follow patterns of development adopted by the developed or modern countries of the west. Table 1 illustrates the characteristics of traditional and modern societies. This table is an ideal type in Weber's sense of the term, for no society comprises to the maximum degree all the traits listed here. All characteristics shown in the table should be interpreted as more or less rather than either or. Traditional or Gemeinschaft societies are small and rural, slow – changing, with little stress on formal education. Most illnesses are treated at home. People live in extended families, look to the past for guidelines to the present, usually show high respect for elders, and have rigid social stratification and much inequality between the sexes. Life and morals tend to be seen in absolute terms, and few differences are tolerated. Modern societies, in contrast, are large, more urbanized, and fast – changing. They stress formal education, are future oriented, and are less religiously oriented. In the third stage of the

demographic transition, people have small families, low rates of infant – mortality, longer lives, higher incomes, and vastly more material possessions. As technology from the industrialized world is introduced into traditional societies, we are able to witness how far reaching the changes are. For instance, the introduction of modern medicine into the Least Industrialized Nations helped to usher in the second stage of the demographic transition. As death rates dropped and birth rates remained high, the population exploded, bringing hunger, starvation and mass migration to cities. This rush to cities that have little industrialization, new to the world scene, is creating a host of problems yet to be resolved.

Technological shifts in the global map

Today's global divisions began to emerge during the sixteenth century. Trade alliances forged by those nations with the most advanced technology of the time- the swiftest ships and the most powerful armaments, created a division into rich and poor nations. Then, according to dependency theory, as capitalism emerged, the nations that industrialized exploited the resources of those that did not. This led to the non- industrialized nations becoming dependent on those that had industrialized (Webster, 1990; Bryant 1994). Today's information revolution will have similar consequences on global stratification. Those nations that take the fast lane on the information superhighway, primarily the most industrialized nations, are destined to dominate in the coming generation. Since the second world war, a realignment of national and regional powers called geopolitics has resulted in a triadic division of the world- a Japan centered East, Germany -centered Europe and a United States –centered western hemisphere (Robertson, 1992). These three global powers along with four lesser ones, Canada, France, Britain and Italy, dominate today's globe. Known as the *Group of 7 (G7)* these industrial giants hold annual meetings at which they decide how to divide up the world's markets and regulate global economic policy, such as interest rates, tariffs and currency exchanges. Their goal is to perpetuate their global dominance, which includes keeping prices down on raw materials from the Least Industrialized nations. Cheap oil is essential for this goal, which requires the domination of the Mideast, whether that is accomplished through peaceful means or by a joint war effort of the United Nations. Because of Russia's nuclear arsenal, the G7 has carefully courted Russia, giving her observer status at its annual summits and providing loans and expertise to help her maintain the status quo (Robertson, 1992). The breakup of the Soviet Union has been a central consideration in *G7* plans for a new world order, and events there will help determine the shape of future global stratification (Henslin 1998; Webster, 1990).

Threatening the global map so carefully partitioned by the G7 is the resurgence of ethnic conflicts. The breakup of the Soviet empire lifted the cover that had held in check the centuries –old hatreds and frustrated nationalistic ambitions of many ethnic groups. With the Soviet military and the KGB in disarray, these groups tuned violent on one another. In Africa, similar seething hatreds have brought warfare to groups only formally united by artificial political boundaries. In Europe, the former Yugoslavia divided, with parts self –destructing as pent-up fury was unleashed. Ethnic conflicts threaten to erupt in Germany, France, Italy, the United States and Mexico. At what point these resentment and hatreds will play themselves out, if ever, is unknown. For the most part, the Most Industrialized nations care little if the entire continent of Africa self- destructs in ethnic slaughter, but they could not tolerate inter- ethnic warfare in Bosnia. If it had spread, an inferno could have engulfed Europe. For global control, the G7 must be able to depend on political and economic stability in its own neighborhood, as well as in those countries that provide the essential raw material for its industrial machine.

How technology changes societies

In its simplest sense, technology can be equated with tools. In its broadest sense, technology also includes the skills or procedures necessary to make and use those tools (Henslin, 1998). Henslin further argues that the phrase new technology is often used to refer to the emerging technologies of an era. Many minor technologies appear from time to time, but most are slight modifications of existing technologies. Occasionally, however, technologies appear that make a major impact on human life. It is primarily these to which the term new technologies refer. For people 500 years ago, the new technology was the printing press (Henslin, 1998). For us these new technologies are computers, satellite and various forms of the electronic media. The sociological significance of technology is that its importance goes far beyond the tool itself. The type of technology a group has sets framework for its non-material culture. Technology even influences the way people think and how they relate to one another (Stromquist, 2005). An example is gender relations. Through the century and throughout the world, it has been the custom (a group's non-material culture) for men to dominate women or enjoy patriarchal relations, but today, with instantaneous communications (the material culture), this custom has become much more difficult to maintain. For example, when women from many nations gathered in Beijing for a U N Conference in 1995, satellites instantly transmitted their grievances around the globe (Stromquist, 2005). Such communications both convey and create discontent, sometimes a feeling of sisterhood, and women agitate for social change. In today's world, the long accepted idea that it is proper to withhold rights on the basic of

someone's sex can no longer hold. What is usually invisible in this revolutionary change is the role of technology, which joins the world's nations in to a global community network. Until recent technological advance, this was impossible. It must be underscored that apart from its particulars, technology always refers to artificial means of extending human abilities (Nisbet 1969; Edari, 1976). All human groups make and use technology, but the chief characteristic of post-industrial societies (also called post-modern societies) is technology that greatly extends our abilities to analyze information, to communicate and to travel. These new technologies, as they are called allow us to do what has never been done in history- to probe space and other planets, to communicate almost instantaneously anywhere on the globe, to travel greater distances faster, and to store, retrieve and analyze vast amounts of information. This level of accomplishment, although impressive is really very superficial. Of much greater significance is a level beyond this, how technology changes people's way of life. Technology is much more than the apparatus. On a very obvious level, without automobiles, telephones, televisions, computers and the like, our entire way of life would be strikingly different. In analyzing how technology spreads it is important to stress this sociological aspect of technology- how it affects people's lives. Sociological theorists, William Ogburn, Karl Marx, Oswald Spengler and Zald and McCarthy have dealt with this aspect comprehensively.

Ogburn`s theory of technology and social change

Ogburn (1964) identified technology as the fundamental driver of social change, which he argues comes through three pronged processes, invention, discovery and diffusion. Ogburn defined invention as a combination of existing elements and materials to form new ones (Vago 1992; Henslin, 1998). Whereas we think of inventions as being only material, such as computers, there are also social inventions, such as bureaucracy and capitalism. Social inventions can have far reaching consequences for society. Ogburn`s second process of social change is discovery, a new way of seeing reality (Vago, 1992). The reality is already present, but people now see it for the first time. An example is Christopher Columbus's "discovery" of North America, which had consequences so huge, that it altered the course of history. This example also illustrates another principle. A discovery brings extensive change only when it comes at the right time. Other groups such as the Vikings had already discovered America in the sense of learning that a new land existed (the land of course was no discovery to the Native Americans already living in it). Viking settlements disappeared into history, however, and Norse culture was untouched by the discovery.

Ogburn's third process of social change is diffusion, the spread of invention or discovery from one area to another (Henslin, 1998). Contact between cultures is the source of diffusion. Ogburn viewed diffusion as the major process of social change and argues that it can have far reaching effects on human relationships. For example, when missionaries introduced steel axes to the aborigines of Australia, it upset their whole society. Before this, the men controlled the production of axes, using a special stone available only in a remote region and passing axe-making skills from one man to another. Women had to request permission to use the stone axe. When steel axes became common, women also possessed them, and the men lost both status and power (Sharp, 1995). Diffusion also includes the spread of ideas. The idea of citizenship, for example, changed the political structure for no longer was the monarch an unquestioned source of authority. Today, the concept of gender equality is circling the globe, with the basic idea that it is wrong to withhold rights on the basis of someone's sex. This idea, though now taken for granted in a few parts of the world, is revolutionary. Like citizenship, it is destined to transform basic human relationships and entire societies (Ogburn, 1988). Further to the three processes of social change, Ogburn also coined the term cultural lag to refer to how some elements of culture adapt to an invention or discovery more rapidly than others. Technology, he suggested, usually changes first, followed by culture. In other words, we play catch-up with changing technology, adapting our customs and ways of life to meet its needs. The computer provides a good example. The subsequent discussion considers how it (the computer) is changing our way of life.

The impact of the computer

When we buy groceries, a computer scans our purchases and presents a printout of the name, price and quantity of each item. Our grades are computerized and probably our paychecks as well. Essentially the computer's novelty has given way to everyday routine. It is simply another tool. Many people rejoice over the computer's capacity to improve their quality of life. They are pleased with the quality control of manufactured goods and the reduction of drudgery. Records are much easier to keep, and people can type just one letter and let the computer print and address it to ten individuals. With much ease, one can modify this sentence, this paragraph or any section of a manuscript using the computer.

The most significant areas where the computer has had an enormous impact is in medicine, education, the workplace and in geographical and social mobility (World Bank, 2009). With computers, physicians can peer within the body's hidden recess to determine how its parts are functioning or see if surgery is necessary. Surgeons can operate on unborn babies and on previously inaccessible

parts of the brain. In a coming "Lab-on-a-chip," one million tiny fragments of genetic DNA can be crammed onto a disposable microchip. Read by a laser scanner, in just a few minutes the chip reveals such things as whether a patient carries the cystic fibrosis gene or has grown resistant to AIDS drugs (King, 1994). As the future rushes in, the microchip is bringing even more technological wonders. In what is called telemedicine, patients can have their heart and lungs checked with a stethoscope by doctors who are hundreds of miles away. The data are transmitted by fibre optic cables (Richards, 1996). Soon a surgeon in Boston or San Francisco, using a remote controlled robot and images relayed via satellite to computers, will be able to operate on a wounded soldier in a battlefield hospital on the other side of the world (Associated Press, 1995). Some analysts are now speculating that the computer might soon lead to "doctor less" medical offices.

In the field of education the computer continues to do wonders. For instance, almost every grade school in the United States introduces its students to the computer. Children learn how to type on it, as well as how to use mathematical and science software. Successful educational programmes use game like format that makes students forget they are studying. Classrooms are being wired to the Internet. Students in schools that have no teachers knowledgeable in Russian or Chinese subjects are able to take courses in these subjects (Cyber school, 1996). Schools able to afford the latest in computer technology are able to better prepare their students for the future. That advantage, of course, goes to students of private and other affluent public schools, thus helping to perpetuate social inequalities that arise from the chance of birth (Vago, 1992, Henslin, 1998). The computer can transform the college of the future. Each office and dormitory room and off campus residence can be connected by fibre-optic cables, and a professor can be able to transmit a 200-page- book directly from his or her office to a student's bedroom, or back the other way, in less time than it took to read this sentence (Harvard Wired, 1994). To help students and professors do research or prepare reports, computers will search millions of pages of text. Digital textbooks will replace printed versions. Students and lectures maybe able to key in terms such as, social interaction and gender, and select their preference of historical period and geographical areas and the computer will, for example, spew out maps, moving images and sounds.

In the workplace the computer is also transforming things on a deeper level, for it is altering social relationships. For example, no longer do I bring my manuscript to a university secretary, wait, and then retrieve it several days later. Since I make the corrections directly on the computer, the secretary is bypassed entirely. In this instance, the computer enhances social relationships, for the departmental secretary has much less work, and this new process eliminates excuses when a manuscript is not ready on time, and the tensions in the relationship that this brings. The computer's effects may be so radical that it reverses the historical change in work location (Stanz, 2010). As discussed earlier, industrialization caused work to shift from home to factory and office. Science workers can now be networked; this fundamental change may be reversed. Already millions of workers remain at home, where they perform their work on computers. On the negative side are increased surveillance of workers and depersonalization. As one telephone information operator remarked,

The computer knows everything it records the minute I punch in, it knows how long I take for each call … I am supposed to average under eighteen seconds per call … Everything I do is reported to my supervisor on his computer, and if I have missed my numbers I get a written warning. L rarely see the guy … It's intense. It's the computer and me all day. I am telling you, at the end of the day I am wiped out. Working with computers is the coal mining of the nineties, (Mander, 1992: 57).

Despite this factor, it is apparent that the value of the computer in the world of work is undoubtedly immeasurable. Technology is certainly the driving force in social change. There are of cause, other perspectives that help to account for the changes in society, as the ensuing discussion will show. These theories are evolutionary, cyclical and social movements (Richards, 1996, Henslin 1998; Zald and McCarthy, 1987).

Evolutionary theories of social change

The evolutionary paradigm presupposes that species are moving from the same starting point to some similar ending point (Henslin, 1998). This perspective contains theories that can be classified as unilinear, multilinear and cyclical. Unilinear Evolutionary theories assume that all societies follow the same path. Evolving from simpler to more complex forms, they go through uniform sequences (Barnes, 1985). Many different versions have been proposed, but one that once dominated Western thought was Lewis Morgan's (1977) theory that posited societies go through three stages, savagely, barbarism and civilization. In his eyes English society served as the epitome of civilization, which all others were destined to follow. Since the basic assumption of this theory that all preliterate groups have the same form of social organization, has been found to be untrue, unilinear theories have been discredited. In addition, to see one's own society as the top of the evolutionary ladder is now considered unacceptable ethnocentrism (Henslin, 1998; Eder, 1990; Smart, 1990).

Multilinear views of evolution have replaced unilinear theories instead of assuming that all societies follow the same path; multilinear theories presuppose that different routes can lead to a similar stage of development. Thus to become industrialized, societies need not pass through
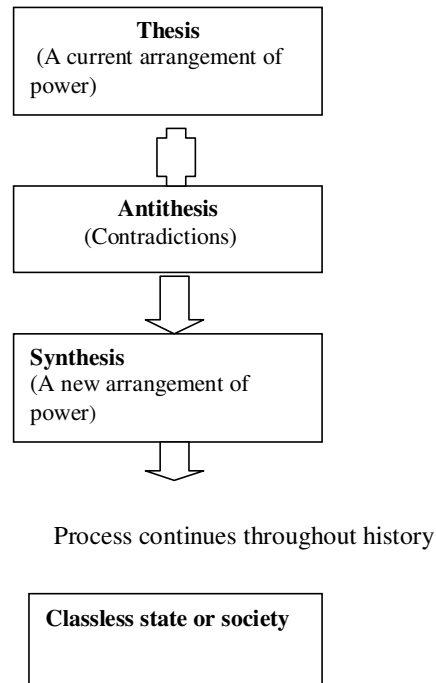
Figure 2. Marx's model of historical change

the same sequence of stages (Sahlins and Service, 1980; Lenski and Lenski, 1987). By way of evaluating evolutionary theories, one observes that central to these theories, whether unilinear or multilinear is the idea of progress, which pre-literate societies evolve from a simple form of organization toward a higher state. Growing appreciation of the rich diversity and complexity of traditional cultures has discredited this idea. Moreover western culture is now in crisis (poverty, racism, discrimination, war, terrorism, alienation, violent sexual assaults, unsafe streets and rampant fear) and is no longer regarded as holding the answers to human happiness. Consequently, the assumption of progress has been cast aside and evolutionary theories have been rejected (Eder, 1990; Stanz, 2010).

Cyclical theories of social change

These theories endeavor to account for the rise of entire civilizations, not a particular society (Henslin, 1998; Hughes 1972). Why, for example, did Egyptian, Greek and Roman civilization rise and then disappear? Cyclical theories assume that civilizations are like organisms: they are born, see an exuberant youth, come to maturity, then decline as they reach old age, and finally die (Hughes, 1972). To explain this pattern, historian Arnold Toynbee (1946) proposed that each time a society successfully meets a challenge, oppositional forces are set up. At its peak, when a civilization has become an empire, the ruling elite loses its capacity to keep the masses in line by charm rather than by force. As the oppositional forces are set loose, the fabric of society is ripped apart. Although force may hold the empire together for hundreds of years, the civilization is doomed. In a book that steered widespread controversy, *The Decline of The West (*1926-28), Oswald Spengler, a German teacher and social critic proposed that western civilization had passed its peak and was in decline. Although the west succeeded in overcoming the crisis provoked by Hitler and Mussolini that so disturbed Spengler, as Toynbee noted, civilizations do not necessarily end in a sudden and total collapse. Since the decline can last hundreds of years, some analysts think that the crisis in western civilization mentioned earlier (poverty, rape, murders, terrorism etc) may indicate that Spengler was right.

Conflict theory and social change

Long before Toynbee, Karl Marx identified a recurrent process in human history. He pointed out that each thesis (a current arrangement of power) contains its anti thesis (contradiction or opposition). A struggle develops between the theses and its antithesis, leading to a synthesis (a new arrangement of power).This new social order, in turn becomes a thesis that will be challenged by its own antithesis, and the so on. Figure 2 above gives a visual summary of this process.

According to Marx's view (called a dialectical process

of history), each ruling group sows the seeds of its own destruction. Capitalism (thesis) for example, Marx averred, is built on the exploitation of workers (an antithesis, or built- in opposition). With workers and owners of the means of production on a collision course, the dialectical process will not stop until workers establish a classless state (the synthesis). The analysis of G7 discussed on page 8 follows the conflict theory or model. The current division of global resources and markets is a thesis. An antithesis is resentment on the part of have-not nations. If one of the least industrialized nations gains in relative wealth or military power, that nation will press for a redistribution of resources. Any new arrangement, on synthesis will contain its own anti-thesis such as ethnic hostilities, contradictions that haunt the arrangement of power and must at some stage be resolved into a synthesis, and so on. Because these contradictions, which are built into arrangements of power, create huge discontent, they can lead to social movements, which phenomena are very significant for human lives (Marx and Engels, 1848, 1955).

Social movements as source of social change

Social movements consist of large numbers of people who organize to promote or resist change (Zald, 1992). Examples of such deliberate and sustained efforts include the temperance movement, the civil rights movement, the white supremacy movement, the women's or feminist movement, the animal rights crusade, the nuclear freeze movement and the environmental movement (Henslin 1998; Zald 1992). At the heart of social movements lie grievances and dissatisfactions. Some people find a current condition of society intolerable and their goal is to promote social change. Theirs is called a proactive social movement. In contrast, others feel threatened because some condition of society is changing and they organize to resist change. Theirs is a reactive social movement. To advance their agenda, people develop social movement organizations. These whose goal is to promote social change develop such organizations as the National Organization for Women (NOW) and the National Association for the Advancement of coloured People (NAACP). In contrast, for those who are trying to resist these changes, the stop – ERA and the KuKlux Klan serve the same purpose. To recruit followers and sympathizers, leaders of social movements use various attention getting devices, from marches and rallies to sit-ins and boycotts (Henslin, 1998). To publicize their grievances, they also may stage media events. Some do so very effectively. Sociologist Mayer Zald (1992) avers that social movements are like a rolling sea. During one period of time, few social movements appear, but shortly afterward a wave of them rolls in, each competing for the public's attention. Zald suggests that a cultural crisis can give birth to a wave of

social movements. By this, he means that there are times when a society's institutions fail to keep up with social changes, many people's needs go unfulfilled, massive unrest follows and social movements spring into action to bridge this gap. The Zimbabwean experiences between the years 2000 and 2005 stand testimony to this (Bloc, 2007).

Henslin (1998), Zald (1992) and Aberle (1966) argue that depending on their target (individual or society) and the amount of social change desired (partial or complete) social movements could be classified as alterative, redemptive, reformative, and transformative. Alterative social movements seek only to alter some particular behaviour of people. An example is a powerful social movement of the early 1900s the Women's Christian Temperance Union (WCTU), whose goal was to get people to stop drinking alcohol. Its members were convinced that if they could close the saloons, such problems as poverty and wife abuse would go away.

Redemptive social movements also target individuals, but here aim is for total change. An example is a religious social movement that stresses conversion. In fundamentalist Christianity, for example, when someone converts to Christ, the entire person is supposed to change, not just some specific behaviour. Self-centered acts are to be replaced by loving behaviours towards others, as the convert becomes, in their terms, a "new creation". The target of the next two types of social movements is society. Reformative social movements seek to reform some specific aspect of society. The environmental movement, for example, seeks to reform the ways society treats the environment, from its disposal of garbage and nuclear wastes to its use of forests and water. Transformative social movements, in contrast, seek to transform the social order itself and to replace it with a new version of the good society. Revolutions, such as those in the former American colonies, France, Russia and Cuba are ideal examples.

Sociologists have identified these stages of social movements: initial unrest and agitation, mobilization, organization, institutionalization, and finally, decline. Resurgence is also possible, if, as in the case of abortion, opposing sides revitalize one another (Lang and Lang 1981; Mauss, 1975; Spector and Kitsuse 1977; Tilly 1978; Jaspar, 1991). Under the stage of initial unrest and agitation it is found out people are upset about some condition in society and want to change it. Leaders emerge who verbalize people's feelings and crystallize issues. Most social movements fail at this stage. Unable to gain enough support, after a brief flurry of activity they quickly die.

Resource mobilization is the crucial factor that enables social movements to make it past the first stage. By resource mobilization, sociologists mean the organization of resources such as time, money, and people's skills, technologies, such as direct mailing and fax machines and attention by the mass media (Oliver and Maxwell,

1992; Buchler, 1993). In some cases an indigenous leadership arises to mobilize available resources. Other groups, having no capable leadership of their own, turn to outsiders, "specialists for hire." As sociologists McCarthy and Zald (1977), Zald and McCarthy (1987) point out, even though large numbers of people may be upset over some condition of society, without resource mobilization they are only upset people, perhaps even agitators, but not a social movement. In terms of organization, a group of labour is set up. The leadership makes policy decisions and the rank and file carries out the daily tasks necessary to keep the movement going. There is still much collective excitement about the issue, the movements' focal point of concern. Institutionalization implies that the movement has developed a bureaucracy, or type of formal hierarchy and chain of command. The collective excitement is gone, and control lies in the hands of career offices, who may care more about their own position in the organization than the movement for which the organization 's initial leaders made sacrifices (Zald and McCarthy, 1987). Organizational decline and possible resurgence may be realized as managing the day-to-day affairs of the organization come to dominate the leadership such that their attention is diverted away from the real issues around which the movement originated (World Bank, 2009). Decline is not inevitable, however more idealistic and committed leaders may emerge, step to the fore – front, and re-invigorate the movement. Or, as in the case of abortion, groups in conflict with each other may fight on opposite sides of the issue, each continuously invigorating the other and preventing the movement's decline (Specter and Kitsuse, 1977).

Mass media, propaganda and social movements

Aware of how influential the mass media are, the leaders of social movements try to manipulate the media in order to influence public opinion, how people think about some issue. The right kind of publicity enables them to arouse a sympathetic public and to lay the groundwork for recruiting more members. Pictures of bloodied, dead baby seals, for example, go a long way in getting a group's message across. A key to understanding social movements, then, is propaganda. Although this term often evokes negative images, it actually is neutral. Propaganda, by definition, is the presentation of information in the attempt to influence people (Jefkins, 1998). Its original meaning was positive, for propaganda referred to a committee of cardinals of the Roman Catholic Church whose assignment was the care of foreign missions. They were to propagate faith. The term has traveled a long way since then, however, and today it usually refers to a one sided presentation of information that distorts reality (Henslin, 1998; Jefkins, 1998). Propaganda in the sense of organized attempts to

manipulate public opinion is a regular part of modern life. Adverts, for example, are a form of propaganda, for they present a one-sided version of reality. They can see only one side of the social issue about which they are so upset. The mass media's relationship with social movements manifests itself through the fact that mass media are gatekeepers of social movements. If those who control and work in the mass media- from owners to reporters are sympathetic to some particular cause, one can be sure that it receives sympathetic treatment. If the social movement goes against their own views, it will be ignored or given unfavourable treatment or coverage. If you ever get the impression that the media are trying to manipulate your opinions and attitudes on some particular social movement or some social issue, you probably are right. Far from doing unbiased reporting, the media are under the control and influence of people who have an agenda to get across.

Sociology can be a liberating discipline (Berger, 1997). It can sensitize people on the existence of multiple realities, that is, for any single point of view on some topic, there likely are competing points of view, which some find equally as compelling. Each represents reality as the individual sees it, but different experiences lead to different perceptions. Consequently, although the committee members of a social movement can be sincere, and perhaps even sacrifice for the cause, theirs is but one view of the way the social world is. If other sides were presented, the issue would look quite different.

CONCLUSION

The discussion in this paper highlights the increasing inherent complexity of and in social movements due to technologies. It is evident from the discussion made in this paper that the dynamics of conflict, gender and development are now much more complex. It has also been noted that a change in technology inevitably leads to a change in culture, a people's way of life. To some, such changes are threatening, for example, the industrial revolution and its technological impetus (automation) affected the livelihood of many manual workers and rendered them redundant. Consequently, while some welcome new technology, others resist it. It has also been observed that the phenomenon of social change is inevitable for society owing to such processes as culture contact and its resultant effects, cultural diffusion, cultural leveling, globalization and the information superhighway views. For instance, except in rare instances, humans have some contact with other groups, during which culture contact occurs. In this process, cultural diffusion (the spread of invention or discovery from one area to another) occurs. This leads to cultural leveling, a state of affairs whereby many groups adopt western culture in place of their own customs. With today's technology, for

example, in travel and communications, cultural diffusion is certainly occurring rapidly. Air travel has made it possible for people to journey around the globe in a matter of hours. In the not-so-distant past, a trip from the United States to Africa was so unusual that only a few hardy people made it, and newspapers would herald their feat. Today, hundreds of thousands make the trip each year. The changes in communication are no less vast. Communication used to be limited to face-to-face speech and visual signals such as smoke, light reflected from mirrors, and written messages passed from hand to hand. Today's electronic communications transmit messages across the globe in a matter of seconds, and we learn almost instantaneously what is happening on the other side of the world. In fact, travel and communication unite to such an extent that there almost is no other side of the world any more. The result is cultural leveling, a process in which cultures become almost similar as the globalization of capitalism brings not only technology but also western culture to the rest of the world. On another note, social movements have been found to be another source of social change as the case with temperance movements, civil rights movements, women's movements; the animal rights crusades and environmental movements. At the heart of social movements lie grievances and dissatisfactions as people find the current thesis of society unbearable and work towards promoting social change. A relationship exists in the concepts mass media, propaganda and social movements. The mass media are gatekeepers for social movements. Their favourable or unfavourable coverage greatly affects social movements. Social movements make use of propaganda to further their causes.

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