Wheel of Fortune

Emma Duncan discusses the potential effects on the entertainment industry of the digital revolution

A. Since moving pictures were invented a century ago, a new way of distributing entertainment to consumers has emerged about once every generation. Each such innovation has changed the industry irreversibly; each has been accompanied by a period of fear mixed with exhilaration. The arrival of digital technology, which translates music, pictures and text into the zeros and ones of computer language, marks one of those periods.

B. This may sound familiar, because the digital revolution, and the explosion of choice that would go with it, has been heralded for some time. In 1992, John Malone, chief executive of TCI, an American cable giant, welcomed the '500-channel universe'. Digital television was about to deliver everything except pizzas to people's living rooms. When the entertainment companies tried out the technology, it worked fine - but not at a price that people were prepared to pay.

C. Those 500 channels eventually arrived but via the Internet and the PC rather than through television. The digital revolution was starting to affect the entertainment business in unexpected ways. Eventually it will change every aspect of it, from the way cartoons are made to the way films are screened to the way people buy music. That much is clear. What nobody is sure of is how it will affect the economics of the business.

D. New technologies always contain within them both threats and opportunities. They have the potential both to make the companies in the business a great deal richer, and to sweep them away. Old companies always fear new technology. Hollywood was hostile to television, television terrified by the VCR. Go back far enough, points out Hal Varian, an economist at the University of California at Berkeley, and you find publishers complaining that 'circulating libraries' would cannibalise their sales. Yet whenever a new technology has come in, it has made more money for existing entertainment companies. The proliferation of the means of distribution results, gratifyingly, in the proliferation of dollars, pounds, pesetas and the rest to pay for it.

E. All the same, there is something in the old companies' fears. New technologies may not threaten their lives, but they usually change their role. Once television

became widespread, film and radio stopped being the staple form of entertainment. Cable television has undermined the power of the broadcasters. And as power has shifted the movie studios, the radio companies and the television broadcasters have been swallowed up. These days, the grand old names of entertainment have more resonance than power. Paramount is part of Viacom, a cable company; Universal, part of Seagram, a drinks-and-entertainment company; MGM, once the roaring lion of Hollywood, has been reduced to a whisper because it is not part of one of the giants. And RCA, once the most important broadcasting company in the world, is now a recording label belonging to Bertelsmann, a large German entertainment company.

F. Part of the reason why incumbents got pushed aside was that they did not see what was coming. But they also faced a tighter regulatory environment than the present one. In America, laws preventing television broadcasters from owning programme companies were repealed earlier this decade, allowing the creation of vertically integrated businesses. Greater freedom, combined with a sense of history, prompted the smarter companies in the entertainment business to re-invent themselves. They saw what happened to those of their predecessors who were stuck with one form of distribution. So, these days, the powers in the entertainment business are no longer movie studios, or television broadcasters, or publishers; all those businesses have become part of bigger businesses still, companies that can both create content and distribute it in a range of different ways.

G. Out of all this, seven huge entertainment companies have emerged - Time Warner, Walt Disney, Bertelsmann, Viacom, News Corp, Seagram and Sony. They cover pretty well every bit of the entertainment business except pornography. Three are American, one is Australian, one Canadian, one German and one Japanese. 'What you are seeing', says Christopher Dixon, managing director of media research at PaineWebber, a stockbroker, 'is the creation of a global oligopoly. It happened to the oil and automotive businesses earlier this century; now it is happening to the entertainment business.' It remains to be seen whether the latest technology will weaken those great companies, or make them stronger than ever.

*Which paragraph mentions the following (Questions **1-8**)?*

*Write the appropriate letters **(A-G)** in boxes **1-8** on your answer sheet.*

***NB** Some of the paragraphs will be used **more than once**.*

1 ____ the contrasting effects that new technology can have on existing business

2 ____ the fact that a total transformation is going to take place in the future in the delivery of all forms of entertainment

3 ____ the confused feelings that people are known to have experienced in response to technological innovation

4 ____ the fact that some companies have learnt from the mistakes of others

5 ____ the high cost to the consumer of new ways of distributing entertainment

6 ____ uncertainty regarding the financial impact of wider media access

7 ____ the fact that some companies were the victims of strict government policy

8 ____ the fact that the digital revolution could undermine the giant entertainment companies

ROBOTS

Since the dawn of human ingenuity, people have devised ever more cunning tools to cope with work that is dangerous, boring, onerous, or just plain nasty. That compulsion has culminated in robotics - the science of conferring various human capabilities on machines.

A. The modern world is increasingly populated by quasi-intelligent gizmos whose presence we barely notice but whose creeping ubiquity has removed much human drudgery. Our factories hum to the rhythm of robot assembly arms. Our banking is done at automated teller terminals that thank us with rote politeness for the transaction. Our subway trains are controlled by tireless robo- drivers. Our mine shafts are dug by automated moles, and our nuclear accidents - such as

those at Three Mile Island and Chernobyl - are cleaned up by robotic muckers fit to withstand radiation. Such is the scope of uses envisioned by Karel Capek, the Czech playwright who coined the term ‘robot’ in 1920 (the word ‘robota’ means ‘forced labor’ in Czech). As progress accelerates, the experimental becomes the exploitable at record pace.

B. Other innovations promise to extend the abilities of human operators. Thanks to the incessant miniaturisation of electronics and micromechanics, there are already robot systems that can perform some kinds of brain and bone surgery with submillimeter accuracy - far greater precision than highly skilled physicians can achieve with their hands alone. At the same time, techniques of long-distance control will keep people even farther from hazard. In 1994 a ten- foot-tall NASA robotic explorer called Dante, with video-camera eyes and with spiderlike legs, scrambled over the menacing rim of an Alaskan volcano while technicians 2,000 miles away in California watched the scene by satellite and controlled Dante’s descent.

C. But if robots are to reach the next stage of labour-saving utility, they will have to operate with less human supervision and be able to make at least a few decisions for themselves - goals that pose a formidable challenge. ‘While we know how to tell a robot to handle a specific error,’ says one expert, ‘we can’t yet give a robot enough common sense to reliably interact with a dynamic world. ’ Indeed the quest for true artificial intelligence (Al) has produced very mixed results. Despite a spasm of initial optimism in the 1960s and 1970s, when it appeared that transistor circuits and microprocessors might be able to perform in the same way as the human brain by the 21st century, researchers lately have extended their forecasts by decades if not centuries.

D. What they found, in attempting to model thought, is that the human brain’s roughly one hundred billion neurons are much more talented - and human perception far more complicated - than previously imagined. They have built robots that can recognise the misalignment of a machine panel by a fraction of a millimeter in a controlled factory environment. But the human mind can glimpse a rapidly changing scene and immediately disregard the 98 per cent that is irrelevant, instantaneously focusing on the woodchuck at the side of a winding forest road or the single suspicious face in a tumultuous crowd. The most

advanced computer systems on Earth can't approach that kind of ability, and neuroscientists still don't know quite how we do it.

E. Nonetheless, as information theorists, neuroscientists, and computer experts pool their talents, they are finding ways to get some lifelike intelligence from robots. One method renounces the linear, logical structure of conventional electronic circuits in favour of the messy, ad hoc arrangement of a real brain's neurons. These 'neural networks' do not have to be programmed. They can 'teach' themselves by a system of feedback signals that reinforce electrical pathways that produced correct responses and, conversely, wipe out connections that produced errors. Eventually the net wires itself into a system that can pronounce certain words or distinguish certain shapes.

F. In other areas researchers are struggling to fashion a more natural relationship between people and robots in the expectation that some day machines will take on some tasks now done by humans in, say, nursing homes. This is particularly important in Japan, where the percentage of elderly citizens is rapidly increasing. So experiments at the Science University of Tokyo have created a 'face robot' - a life-size, soft plastic model of a female head with a video camera imbedded in the left eye - as a prototype. The researchers' goal is to create robots that people feel comfortable around. They are concentrating on the face because they believe facial expressions are the most important way to transfer emotional messages. We read those messages by interpreting expressions to decide whether a person is happy, frightened, angry, or nervous. Thus the Japanese robot is designed to detect emotions in the person it is 'looking at' by sensing changes in the spatial arrangement of the person's eyes, nose, eyebrows, and mouth. It compares those configurations with a database of standard facial expressions and guesses the emotion. The robot then uses an ensemble of tiny pressure pads to adjust its plastic face into an appropriate emotional response.

G. Other labs are taking a different approach, one that doesn't try to mimic human intelligence or emotions. Just as computer design has moved away from one central mainframe in favour of myriad individual workstations - and single processors have been replaced by arrays of smaller units that break a big problem into parts that are solved simultaneously - many experts are now investigating whether swarms of semi-smart robots can generate a collective intelligence that

is greater than the sum of its parts. That's what beehives and ant colonies do, and several teams are betting that legions of mini-critters working together like an ant colony could be sent to explore the climate of planets or to inspect pipes in dangerous industrial situations.

List of headings

i Some success has resulted from observing how the brain functions.

ii Are we expecting too much from one robot?

iii Scientists are examining the humanistic possibilities.

iv There are judgements that robots cannot make.

v Has the power of robots become too great?

vi Human skills have been heightened with the help of robotics.

vii There are some things we prefer the brain to control.

viii Robots have quietly infiltrated our lives.

ix Original predictions have been revised.

x Another approach meets the same result.

1 [ ] Paragraph A

2 [ ] Paragraph B

3 [ ] Paragraph C

4 [ ] Paragraph D

5 [ ] Paragraph E

6 [ ] Paragraph F

Example *Answer*

Paragraph G **ii**

YES *if the statement agrees with the information*

NO *if the statement contradicts the information*

NOT GIVEN *if there is no information on this in the passage*

7 Karel Capek successfully predicted our current uses for robots.

8 Lives were saved by the NASA robot, Dante.

9 Robots are able to make fine visual judgements.

10 The internal workings of the brain can be replicated by robots.

11 The Japanese have the most advanced robot systems.