

# GOING VIRAL

## THE SPREAD OF INNOVATIONS

Many people believe that advantageous, useful technologies and social innovations will sell themselves, that the benefits of a new idea will be obvious to all, and that the innovation will spread rapidly far and wide. This is rarely the case. Most, in fact, diffuse at a disappointingly slow rate, at least in the eyes of the inventors, technologists and social engineers involved in creation and promotion.

### DIFFUSION

Everett Rogers defines the word innovation<sup>1</sup> as “*an idea, practice, or object that is perceived as new by an individual or other adopters*”. The perceived newness of the idea for the individual determines his or her reaction to it.

He defines diffusion<sup>2</sup> as “*the process in which an innovation is communicated through certain types of channels over time among the members of a social system*”. It is a special type of communication, in that the messages are concerned with new ideas, which always involves some degree of uncertainty.

Some innovations diffuse from first introduction to widespread use in a few years. For instance, some 71% of adult Americans adopted the internet within 12 years - from 1989 to 2002.<sup>3</sup> Another innovation like the wheelie case may take 30 years to gain mass acceptance.

**Rogers says that the rate of adoption of an innovation is affected by its perceived attributes, such as the following:<sup>4</sup>**

- **Relative advantage** - how much better is the innovation perceived to be than the idea it supercedes?
- **Compatibility** - how consistent is the innovation perceived to be with the existing values, past experiences and needs of potential adopters? How compatible is it with previously adopted ideas?
- **Complexity** - how difficult is the innovation perceived to be to understand and to use?
- **Trialability** - how easily can the innovation be experimented with on a limited basis before you commit to adopting it? New ideas that can be trialled on the instalment plan are generally adopted more rapidly.
- **Observability** - how visible to others are the results of an innovation? How easy is it to describe to others?

<sup>1</sup> Everett M. Rogers (2003) *Diffusion of Innovations (fifth edition)*; p. 12

<sup>2</sup> *Ibid.*; p. 6

<sup>3</sup> *Ibid.*; p. 219

<sup>4</sup> *Ibid.*; Chapter 6

The rate of adoption is also affected by the nature of communication channels diffusing the innovation, the nature of the social system in which the innovation is diffusing and the quality and level of promotion of the innovation.

People who have early knowledge about something new do not necessarily become early adopters. Knowing about a new product is quite different from using it. Most individuals know about many innovations that they have not adopted; they may not regard it as being relevant to their situation or potentially useful. Attitudes towards an innovation frequently intervene between the knowledge and decisions stages in the innovation adoption process.

One motivation for many individuals is the same old chestnut - the desire to gain social status. At the persuasion and decision stages a person will look for messages that reduce uncertainty about the innovation's expected consequences. The person wants to know whether their thinking is on the right track in the opinion of their peers.

If the price of a new product decreases so dramatically during its diffusion process a rapid rate of adoption is encouraged.

Innovations are not viewed singularly by individuals. Instead, they may be perceived as an interrelated bundle of new ideas. The adoption of one new idea may trigger the adoption of others. The name and symbols given to the innovation often affects its perceived compatibility and therefore its rate of adoption. The US car, the Nova, means "no-go" in Spanish. The liqueur Irish Mist, means something quite different in German!

The level of complexity - the degree to which an innovation is perceived as relatively difficult to understand and use - also has an impact.

---

## CRITICAL MASS

Everett Rogers talks about the concept of "critical mass"<sup>5</sup> whereby a process becomes self-sustaining after some threshold point has been reached. He gives the example of a single log in a fireplace, which will not continue to burn by itself - a second log must be present so that each log reflects its heat onto the other. When the ignition point is reached, the fire takes off, and the two logs burn to ashes.

The concept of critical mass is fundamental to understanding a wide range of human behaviour because an individual's actions often depend on a perception of how many other people are behaving in a particular way.

Shermesh and Tellis (2002)<sup>6</sup> gathered data on the rate of sale of ten products in each of sixteen European countries. They found that a distinct takeoff (or critical mass) occurred for each of the new products in each country, averaging six years from introduction of the new product to its critical mass. The average time-to-take-off for kitchen and laundry products was 7.5 years, compared to only two years for information and entertainment products. A new product was likely to take off in a relatively short time if that product had already reached critical mass in neighbouring countries.

After the social threshold is reached, the norms of the social system encourage further adoption by individual members of the system.

It seems likely that individuals adopt an innovation, in part on the basis of their expectations of others' future adoption - they base their choice on what they expect the others to do - everyone watches while being watched.

---

<sup>5</sup> Everett M. Rogers (2003) *Diffusion of Innovations (fifth edition)*; p. 349

<sup>6</sup> *Ibid.*; p. 351

Just as the critical mass affects the rate of adoption of an interactive innovation, it may also speed up the rate of discontinuance.

**Everett Rogers gives the following strategies for reaching critical mass:**

- 1 Target highly respected individuals in a system's hierarchy, so that they will be the early adopters.
- 2 Shape people's perceptions of the innovation, by for instance, implying that adoption is inevitable, very desirable, or that critical mass has already occurred or will occur soon.
- 3 Introduce the innovation to intact groups in the system, whose members are likely to be more innovative.
- 4 Give incentives for early adoption, at least until a critical mass is reached - the most direct way of doing this is to give the service free to a selected group of people for a limited time.

---

## THE TIPPING POINT

Malcolm Gladwell<sup>7</sup> calls the point of critical mass the "tipping point". He examines how little ideas, if communicated effectively through appropriate channels, can spread and have a large impact. He describes how innovative ideas, products or social behaviours can cross a certain threshold - the "tipping point" to become a ubiquitous social fad, behaviour or paradigm. The best way to understand the emergence of fashion trends, the ebb and flow of crime waves, the rise of teenage smoking, or the phenomena of word of mouth, or other mysterious changes in everyday life is to think of them as epidemics. Ideas, products, messages and behaviours can spread just like viruses.

Gladwell gives the fall in New York's crime rate as an example. In 1965, there were 200,000 crimes in the city and from that point on, the number began to rise sharply, doubling in two years and continuing almost unbroken until it hit 650,000 crimes a year in the mid-1970s. It remained at that level for the next 20 years, before plunging downward, in 1992, as sharply as it had risen thirty years earlier. 1992 was the tipping point.<sup>8</sup>

This example has three distinguishing characteristics - Firstly, a small number of people, in a small number of situations in which the police or the new social forces had some impact, started behaving very differently, and that behaviour somehow spread to other would-be criminals in similar situations - they got infected with an anti-crime virus. Secondly, little changes in the system combined to have a large effect; the crack trade levelled off; the population got a little older; the police force got a little better. And thirdly, the change happened in a hurry; it didn't build up over time; crime didn't taper off, it plummeted downwards in 1992.

There is more than one way to tip an epidemic. Gladwell puts forward three agents of change;

- 1 The Law of the Few,
- 2 The Stickiness Factor
- 3 The Power of Context.

## THE LAW OF THE FEW

Social epidemics are driven by the efforts of a handful of exceptional people. These people are either Connectors, Mavens, or Salesmen, and often they work in concert with each other.

---

<sup>7</sup> Malcolm Gladwell (2000) *The Tipping Point- how little things can make a big difference*

<sup>8</sup> *Ibid*; p. 7/8

**Connectors** are people with a special gift for bringing the world together, they know lots of people, they have a knack for making friends and acquaintances, an instinctive and natural gift for making social connections and they like people. They master what sociologists call the “weak tie” - a friendly, yet casual, social connection. They can span many different worlds as a result of some combination of curiosity, self-confidence, sociability and energy.

In the 1960s the psychologist, Stanley Milgram<sup>9</sup> conducted an experiment to find out how human beings are connected. He got the names and addresses of 160 people who lived in Omaha, Nebraska, and posted each one a letter. In it, was the name and address of a stockbroker who worked in Boston and lived in Sharon, Massachusetts. Each person was asked to write their name on the letter and send it to a friend or acquaintance who they thought could get it closer to the stockbroker. That person then passed it on through their chosen person. The experiment showed that most of the letters reached the stockbroker in five to six steps (hence the concept of six degrees of separation). The further breakdown is fascinating. 24 letters reached the stockbroker at his home, and, of those, 16 were given to him by the same person. The rest of the letters came to him at his office, and of those the majority came through 2 other men. In all, half of the responses that came back to the stockbroker were delivered to him by one of these 3 men. Six degrees of separation doesn't just mean that everyone is linked to everyone else in six steps. It also means that a very small number of people are linked to everyone else in just a few steps, and the rest of us are linked to the world through those special few. Those few are the Connectors.

**Mavens** are the people who accumulate knowledge, and they are not just passive collectors of information, they also want to share their information with others. Mavens, for no other reason than that they like to help, turn out to be very effective at getting people's attention. Their motivation is to educate and to assist, not to twist your arm. They are like information brokers, sharing and trading what they know. Mavens have the knowledge and the social skills to start word-of-mouth epidemics.

**Salesmen** have the skills to persuade us when we are unconvinced of what we are hearing. As people, they have charisma, charm, energy and enthusiasm. Persuasion works in subtle, hidden and unspoken ways.

Mavens provide the message, connectors the social glue and salesmen then convince us to act.

## THE STICKINESS FACTOR

This means that a message makes an impact. It doesn't go in one ear and out the other. Instead, you can't get it out of your head. The elements that make epidemic ideas or messages sticky generally turn out to be small and, initially, may seem trivial. Relatively simple changes in the presentation and structuring of information can greatly increase the impact it will have.

In the 1960s, social psychologist Howard Levanthal<sup>10</sup> wanted to see if he could persuade some college seniors at Yale University to get a tetanus injection. He divided them into groups and gave each group a 7-page booklet explaining the dangers, the importance of inoculation and the fact that the University was offering free shots. Some students got a “high fear” version of the booklet, describing tetanus in dramatic terms with graphic photos. In the “low fear” version, the language was toned down and the photos were omitted. Afterwards, all the students seemed to be well educated about the dangers of tetanus. When asked, those who got the high fear version were more likely to say that they intended to get inoculated.

But one month later, only 3% had gone to the health centre for the injection. Levanthal re-did the experiment and this time included a map of the campus, with the university health building circled and the times that shots were available clearly listed. The vaccination rate went up by 28% - an equal number from the high-fear and the low-fear group. As they were senior students they must have already known where the health centre was and they probably didn't even need the map. What made the difference was the subtle but significant change in

---

<sup>9</sup> Malcolm Gladwell (2000) *The Tipping Point- how little things can make a big difference*; p. 35/36

<sup>10</sup> Malcolm Gladwell (2000) *The Tipping Point- how little things can make a big difference*; p. 96/7

presentation. The students needed to know how to fit the tetanus stuff into their lives. The booklet shifted from being an abstract lesson in medical risk to being a practical and personal piece of medical advice.

## THE POWER OF CONTEXT

The key to getting people to change their behaviour sometimes lies with the smallest details of their immediate situation. As human beings, we are much more influenced by our surroundings than we realise.

And epidemics are sensitive to the conditions and circumstances of the times and places in which they occur.

Criminologists James Q. Wilson and George Kelling<sup>11</sup> argued that crime is the inevitable result of disorder. If a window is broken and left unrepaired, people walking by will conclude that no one cares and no one is in charge. Soon, more windows will be broken and the sense of anarchy will spread. Wilson and Kelling say that relatively minor problems like graffiti, public disorder and aggressive begging are all invitations to more serious crimes.

In the mid-1980s, Kelling was hired by the New York Transit Authority as a consultant and he urged them to put the Broken Window theory into practice. Which they did by hiring a new subway director, who drew up a new management structure and a precise set of goals and timetables aimed at cleaning the graffiti from the system, line by line and train by train. If a carriage came in with graffiti, it had to be removed in the changeover, or the train was removed from service. As more graffiti appeared, it was removed or painted over. The clean-up took six years, until 1990.

Then a new head of the transit police was appointed, William Bratton, and he decided to crack down on fare-dodging. Arrests for misdemeanours went up fivefold between 1990 and 1994. Bratton turned the transit police into an organisation focused on the smallest crimes, on the details of life underground. In 1994, when Rudolph Giuliani became Mayor, he was promoted to head of the New York City Police Department, and he applied the same strategies to the city as a whole. He cracked down on the “quality of life” crimes, car window-washers, public drunkenness and urination, litterers, and vandals. When crime began to fall in the city, both Giuliani and Bratton said that stemming the minor crimes caused the overall decrease. A build-up of these, seemingly insignificant, quality of life crimes, they said, had caused tipping points for more serious crime.

### **And according to Gladwell :**

- Starting epidemics requires concentrating resources on a few key areas.
- Small close-knit groups, no bigger than 150 people, have the power to magnify the epidemic potential of a message or idea. Once we're part of a group, we're all susceptible to peer pressure and social norms and a host of other kinds of influence.
- What must underlie successful epidemics, in the end, is a bedrock belief that change is possible, that people can radically transform their behaviour or beliefs in the face of the right kind of impetus.

---

## DIFFUSION IN PRACTICE

New innovations and ideas can often take a while to spread and take hold, as the following examples will testify:

---

<sup>11</sup> *Malcolm Gladwell (2000) The Tipping Point- how little things can make a big difference; p.139*

## SCURVY AND ITS CURE<sup>12</sup>

As we now know, scurvy is a disease resulting from a deficiency of Vitamin C. As Vitamin C cannot be produced internally by humans, it must be ingested through the diet.

It is a gruesome and deadly disease and manifests usually as malaise and lethargy, followed by formation of spots on the skin, spongy gums, and bleeding from the mucous membranes. Spots are most abundant on the thighs and legs, and a person with the ailment looks pale, feels depressed, and is partially immobilized. As scurvy advances, there can be open wounds with lots of pus, teeth loss, jaundice, fever and convulsions, muscle and sensory damage and a lingering, painful death.<sup>13</sup> Not a nice way to go.

In the early days of long sea voyages, the food aboard ships was of poor nutritional value. It was prone to spoilage, often inedible, and wholly void of vitamin C. Scurvy was a far greater risk to the lives of sailors than were warfare and accidents. For instance, of Vasco da Gama's crew of 160 men who sailed around the Cape of Good Hope in 1497, 100 died of scurvy.

In 1601, an English sea captain, James Lancaster, conducted an experiment to evaluate the effectiveness of lemon juice in controlling the disease. He was in charge of four ships that left England on a voyage to India. He gave three teaspoonfuls of lemon juice a day to the sailors on one of the ships. These men remained healthy. By the halfway point in the voyage, 110 of the 278 sailors on the other three ships (effectively the control group) had died from scurvy. - so many so that Lancaster had to transfer men from his "treatment" ship to keep these other ships going.

In hindsight, these results seem so clear that you would expect the British Navy to have promptly adopted lemon juice as a preventative measure on all their ships. But it was not until 1747, nearly 150 years later, that James Lind, a British Navy physician who had heard of Lancaster's results, carried out another experiment. To each of the scurvy sufferers on board the HMS Salisbury, he prescribed either two oranges and one lemon or one of five other supplements: a half pint of sea water, six spoonfuls of vinegar, a quart of cider, nutmeg or 75 drops of vitriol elixir. Those who got the citrus fruits were cured in a few days. Unfortunately, the supply of oranges and lemons was exhausted in six days.

In 1748, Lind left the Navy and returned to Scotland, where he enrolled at the University of Edinburgh to obtain his M.D. degree.

Surely Lind's work provided clear evidence of the effectiveness of citrus fruits? Yet it took another 48 years for the simple treatment and preventative measure to be introduced into the British Navy. When this happened in 1795, scurvy was almost immediately wiped out within the force. However, it took another 70 years for the British Board of Trade to adopt a similar policy in 1865, and scurvy was then eradicated in the merchant marine.

The large time lapse seems unbelievable to us now. Why on earth did it take so long for the British Navies to adopt such an approach? After all, they were quick to introduce new innovations relating to ships and guns.

The main block, of course was that they didn't know the cause was Vitamin C deficiency - the science for that didn't come until 1932. Other blocks were socio-cultural. For instance, when he made his claims Dr. Lind had little standing in the world of naval medicine, so his experimental findings did not garner much attention; the British admiralty saw care for the well-being of crews as a sign of weakness; fresh fruit was very expensive to keep on board, whereas boiling it down to juice allowed easy storage but destroyed the vitamin C content (especially if boiled in copper kettles); Lind believed that scurvy had multiple causes, including ill-digested and putrefying food within the body, bad water, excessive work

---

<sup>12</sup> Everett M. Rogers (2003) *Diffusion of Innovations* (fifth edition); P. 7

Jason A. Mayberry; *Scurvy and Vitamin C*; 2004 <http://leda.law.harvard.edu/leda/data/658/Mayberry.html>

<sup>13</sup> <http://en.wikipedia.org/wiki/Scurvy>

and living in a damp atmosphere, which therefore required multiple remedies; citrus juices had long been thought to be cold medicines, so many thought they would “obviously” be of no use in treating scurvy; competing remedies for scurvy were being promoted and each potential cure had its supporters; Captain Cook’s reports from his Pacific voyages did not provide support for the citrus fruit approach. The solution was not so clear cut at the time.

## THE MOBILE PHONE

AT&T came up with the world’s first mobile telecommunication service in 1947, known simply as “Mobile Telephone Service” (MTS). By the end of the year, the innovation had spread to more than a hundred towns and highway paths. The service relied on an operator to connect both incoming and outgoing calls. The telephones were not very portable and used a half-duplex “press to speak” system where the caller would have to release the button to hear the other person. The same year, two Bell Labs engineers proposed the foundations for the modern cellular network. At the time the plans were daring, and it took until the 1960s for them to be implemented and even longer to come to market.

In the mid 1960s, AT&T introduced a new improved service, but it was still in its infancy. In New York city, 2,000 customers shared 12 radio channels and on average it took 30 minutes to place a call! Other companies got in on the act, introducing more “portable” briefcase-sized full duplex devices.

In 1956, Sweden introduced the world’s first fully automated mobile phone. The system allowed for automated connection from a rotary handset (that’s the circular dialing knob to you and me) mounted within a car, but required an operator to forward calls. In 1958 development began on a similar system for motorists in the USSR. Then in 1973, Dr Martin Cooper, a Motorola executive made the first phone call from a handheld mobile phone. The rest as they say is history.

The prototype handheld phone weighed 2.5 pounds and measured 9 inches long, 5 inches deep and 1.75 inches wide. It offered a talk time of just 30 minutes and took 10 hours to re-charge.

In the 1990s, the ‘second generation’ mobile phone systems emerged, using digital instead of analog transmission. The first machine-generated SMS (text) message was sent in the UK on 3 December 1992 followed in 1993 by the first person-to-person SMS sent in Finland. The 1990s also saw the advent of prepaid mobile phones.<sup>14</sup>

Since then, mobile phones have, and are continuing to, spread ubiquitously across the globe. They are considered a common manifestation of the latest phase of globalization, along with Chinese consumer goods and Indian information technology services. With about 3.5 billion subscribers and users worldwide, mobile phones have out-diffused virtually every prior technology, including bicycles, radios, television (TV) sets, wallets, landline phones, and wristwatches. While usage levels differ in different countries - mobile penetration has been higher in Western Europe than in the United States, in China than in India, and in Eastern Europe than in Latin America.

Many commentators presume that people and cultures who like to talk are more likely to use a mobile phone. However, a 2008 report by Kas Kalba for Harvard University,<sup>15</sup> concludes that mobile talk time is largely determined by usage prices and not by communication culture. In particular, the report recognizes the role of prepaid technology (originally introduced in Mexico) in the diffusion of mobile communications in both developed and emerging markets. The report concludes that prepaid has been the most fundamental product innovation that the mobile communications market has experienced since the initial introduction of the mobile phone and its supporting cellular infrastructure. Prepaid has made mobile communications accessible to nonsalaried individuals, who on a worldwide basis outnumber people with automobiles and people with fixed salaries - the targets of the first two waves of mobile adoption.

---

<sup>14</sup> *The above paragraphs from <http://www.makeuseof.com/tag/history-mobile-phones/> and [http://en.wikipedia.org/wiki/History\\_of\\_mobile\\_phones](http://en.wikipedia.org/wiki/History_of_mobile_phones)*

<sup>15</sup> *[http://www.pirp.harvard.edu/pubs\\_pdf/kalba/kalba-p08-1.pdf](http://www.pirp.harvard.edu/pubs_pdf/kalba/kalba-p08-1.pdf)*

## THE WHEELIE CASE<sup>16</sup>

Wheelie cases were invented over 40 years ago, yet they have only become popular in the last five years or so. Nowadays, if you walk through any large airport in the world, you'd be hard pressed to see anyone lugging their spare clothes in an old fashioned suitcase. Yet only a few years ago, most of us, particularly men, wouldn't have been seen dead pulling their cases behind them. It was fine to use airport trolleys, and even small, fold up wheeled carts for awkward loads, but a personal wheelie? Goodness, no. That was for wimps. (Incidentally, the same inhibitions are still attached to personal shopping wheelies)

In 1970 as he hauled two heavy suitcases through the airport, Bernard D. Sadow, then vice-president of US Luggage in Massachusetts, had a eureka moment. Waiting at customs he watched a worker effortlessly rolling a heavy machine on a wheeled skid.

When he returned to work he took castors off a wardrobe trunk, attached them to a big travel case and put a strap on the front for pulling. The case was towed flat along the ground and worked perfectly. This invention, which he patented as "Rolling Luggage", took a while to take off. Sadow touted his prototype around New York for many months. "*People do not accept change well*", he commented to the New York Times.

Finally, Macy's made an order and promoted the wheelies as "The Luggage that Glides" and sales picked up. However, the invention didn't go viral.

Fast forward seventeen years to 1987, when Robert Plath, a Northwest Airlines pilot, and do it yourself enthusiast affixed two wheels and a long handle to his suitcase so it rolled upright. He sold his Rollaboard to fellow flight crew members. But when passengers saw them in action, as flight attendants - the early adopters - strode briskly through airports, they wanted one too. Within a few years, Robert Plath had left flying to set up Travelpro International, now a major luggage company.

As the twenty first century progresses, wheelie cases are now the norm even in Cork.

So why did it take so long for such an invention, which on the face of it seems so useful and practical? According to Bernard Sadow, it's simply a macho thing. People, especially men, didn't want to come across as wimps!

## TOILET PAPER<sup>17</sup>

Paper had been circulating in China since the 2nd century, and by the 6th century people were using it on their behinds. But the innovation didn't spread to the West. Here we used whatever came to hand, leaves, fruit skins, hemp, sheep's wool and the wealthy deployed scraps of cloth. After the invention of the printing press in the 15th century people soon turned to old pages of books or other documents. It took until the 1850s for "toilet paper" itself to emerge, when in the US, Joseph C. Gayetty launched his medicated paper. This caused quite a storm - why would you pay for bum fodder? And the medical establishment was incensed by his claim that the paper could cure and prevent piles (Gayetty's theory was that printer's ink was poisonous and caused haemorrhoids).

Roll on to 1980 and the launch of the Japanese Washlet with its triple-whammy of toilet comforts: a heated seat, a jet of warm water carefully targeted and a gust of air to dry you off. By 2009, 72% of Japanese households were equipped with a Washlet or equivalent device. However, it hasn't quite taken off here yet!

---

<sup>16</sup> [http://www.nytimes.com/2010/10/05/business/05road.html?\\_r=0](http://www.nytimes.com/2010/10/05/business/05road.html?_r=0)

<sup>17</sup> *New Scientist*; 22/29 Dec. 2012; p. 5