Chapter 13

Internet and Society in a Global Perspective: Lessons from Five Years in the Field

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Overview

The World Internet Project (WIP), of which "Surveying the Digital Future" is the part conducted in the United States, originated in 1999 at what is now the USC Annenberg School Center for the Digital Future as the study of the Internet "that should have been conducted on television." For over a generation, it has been a truism that since television was the one mass medium expected to be a mass medium, a panel study should have commenced in the late 1940s as the United States and much of Western Europe and Asia acquired television.

A long-term study of individuals as they became television users would have done much to answer some fundamental questions about the rise of television and its effects on the audience. When American households had their televisions turned on three hours a day in 1960 and were asked where that time came from, most users simply did not know and claimed they simply found the time from "somewhere." A long-term tracking study could have shown whether television time came from time spent talking with family members, from time spent reading books or newspapers or listening to the radio, or from somewhere else. Such a study also could have documented television's effects on consumer behavior to determine whether and how it affected consumer purchases, connection to the civic process, desire to travel, career aspirations and much else.

In the U.S. television is used primarily for leisure and entertainment, while the Internet has the potential, like the printing press, to transform work, play and learning. Therefore, a much more compelling case can be made to track the growth of the Internet than could

have been made in the 1940s with television. Believing the impact of the Internet would eventually be much more significant than that of television, in 2000 the World Internet Project launched the study of the Internet that should have been conducted on television.

Methods

Using a RDD sample, the Center creates a carefully constructed representative sample of the American population. Non-users as well as users make up the sample, as it is essential to talk to non-users before they go on the Internet and understand as much as possible about their lifestyle. While the project did not begin before a significant portion of the population was online, the project is at the beginning of broadband at home, online media and the wireless Internet in the United States. In the first year, when the household was contacted, the interviewer crafted a roster on all household members over the age of 12. The computer then randomly chose one of those members and the interviewer spoke only to that person. A parent's permission is required for interviews with those between ages 12-17 and the survey is conducted in English and Spanish.

The interviews cover a wide range of topics. For both users and non-users of the Internet, the interview examines all types of media use and users' credibility toward media. Communication patterns, ranging from telephone use to conversation time face-to-face with family, friends and neighbors, are covered, as is a whole range of questions about buying behavior and shopping decisions. Questions also are asked about use of leisure time, trust in institutions, attitudes toward technology and much more.

Non-users are asked about why they are not online, whether they anticipate ever connecting and what it might take to get them to connect. They are also asked their perceptions of what is happening online. Users of the Internet are asked when they first went online, what made them connect and their perceptions of online life. Users also are asked detailed questions about how they connect to the Internet and from where, how often they connect and for how long and what they do online. In the area of consumer behavior they are also asked about whether they buy online and, if not, what is barring them, as well as general attitudes toward online security and privacy.

The World Internet Project is based on the belief that the technology may continue to grow in important ways and the best way to understand the impact is to watch non-users as they become users, telephone modem users as they move to broadband and all users as they gain experience. In addition to watching that change, the project will also determine whether people drop off the Internet (between 2000 and 2004, about 3% of Internet users left each year—some of them later returned) and whether they ever return and, if so, when and what brought them back. The study also believes that some of the most important impacts of the technology may be in unpredictable areas and, therefore, the best way to see that change is to create a baseline profile of people's lifestyles and to go back to the same people year after year in order to watch the impact and change.

International Partnerships

While technology change is occurring in America faster than in most of the world, the United States is not at the forefront of that change. Penetration rates for the Internet have been higher in Scandinavia than in the United States, and America is just beginning to enter the wireless area for anything more sophisticated than voice communication. While high percentages of Europeans and Asians use their mobile phones for SMS and accessing the Internet, this use of mobile is in its infancy in the U.S. Therefore, to gain a worldwide perspective on the rate and nature of technological change and its impact on lifestyle, the project reached out to partners around the world to conduct parallel studies in their own countries. At the moment, close to 20 other countries are part of the World Internet Project.

In year one, in addition to the United States, surveys were conducted in Sweden, Italy, Singapore, Hong Kong, Taiwan and Japan. The second year saw the addition of Germany, Hungary, Spain, Macao, China, South Korea, Canada and Chile. Additional partners are now in India, Argentina, Israel, Australia, Portugal and the Czech Republic. Great effort is now being focused on finding African and more Latin American partners.

In each country the work is carried out by a university or qualified research institution. Membership in the World Internet Project requires the use of common questions in each nation's survey,

although each country is free to add additional questions of particular interest to them or their region. In Asia, Chinese-speaking countries (China, Hong Kong, Singapore and Taiwan) are aligning their efforts to look at issues of common concern.

Lessons Learned from Five Years in the Field

Conducting such a widespread international, longitudinal project begins to yield real results and trends after three years in the field. While the project has four years' or more data from the United States, Singapore, Italy and Sweden, enough countries have produced data from two or more years in the field to begin to discern and understand trends. The latest report from the United States (http://digitalcenter.org) identifies ten major trends that have shown themselves after ten years of the public Internet in the U.S. and after five years of data. Most of those trends can also be found in the industrialized nations of Europe and Asia and in many of the developing nations as well. Not surprisingly, each country has also identified unique issues and trends that have more to do with national culture or development and demonstrate the local character of the Internet around the world. This paper focuses on the common issues, problems and developments that have become clear in a longitudinal look at the social, political and economic impact of the Internet.

The Advantages of Experience Have Diminished

Sometime over the past year, a subtle but important development on the Internet began to emerge: for the first time the advantages of having Internet experience began to diminish and even disappear. The rate of this diminution is greatest for those countries that have had the greatest Internet penetration for the longest time: United States, Sweden, Germany, Japan and Canada.

Over the past five years we have been tracking Internet use, following the same non-users as they became dial-up and then broadband users. From the beginning we saw significant and pronounced differences between the newest users (who had just gone online) and the most experienced users (who had been online seven years or more). Those experience differences accounted for enormous differences in how often users went online and with what type of connection, how

long they stayed connected, their attitudes towards the Internet and, most importantly, what they did while connected. Indeed, Internet penetration only moved to large numbers in Europe as users could move to broadband (mostly DSL), bypassing the expensive per-minute phone charges associate with dial-up. In the U.S. and Canada, where low-cost unlimited dial was possible, users stayed on modem connections far longer until broadband costs began to decline over the past two-to-three years.

The most experienced users connected over twice as long as the newcomers and were far more likely to be connected through a high-speed connection. Long-time users also connected from more places, both inside and outside the home. The biggest differences, however, over four years was in what the new and experienced users did while connected. New users were much more likely to be looking at chat rooms, playing games and searching for entertainment information and—most interesting to us—searching for medical information. We were intrigued that medical searching seemed to be one of the heaviest uses by new Internet users: they seemed to have an unlimited curiosity about medical issues, issues about which, perhaps, they did not feel comfortable asking friends, parents or even physicians.

Over the years, experienced users were spending much more time than novices buying online, doing work related to their jobs and looking at news online. Fours years ago the average new Internet users did not make an online purchase until they had been online between 18 and 24 months. The most important factor accounting for this lag was fear about privacy and security, although other fears and concerns came into play. Prospective shoppers four years ago also did not buy online because they feared the product would not be delivered or would be delivered damaged. They were also concerned whether they could trust online descriptions of products. Overwhelmingly, they did not like the absence of live human beings in the buying process.

Sometime in late 2003 or early 2004 everything began to change. Now the differences between new and experienced Internet users have almost disappeared. Although long-time users still connect longer, in most other areas the differences have flattened enormously. New users are only slightly more likely to be looking at chat rooms or playing games online, and they are just about as likely to be looking at news, entertainment information or doing work related to their jobs.

Shopping differences have shown immense change. Today, new users buy online almost from the day they get connected. Indeed, the desire to make an online purchase is one of the most compelling factors causing non-users to get an Internet connection in the first place. The 18-to- 24-month lag period is gone. Both Internet users and non-users believe that prices are lower online and that the availability of products is greater. Merchants successfully convinced many non-users to go online and start buying at lower prices. Many merchants (especially airlines) now charge service fees when buying over the phone or in person, but no service charge when buying on the Internet.

While fears about privacy and security have not diminished over the years, they no longer serve as a barrier that prevents buying: people now buy in spite of the fears. Concerns about damaged products or misleading descriptions have also disappeared as actual buying experience has demonstrated there was little basis for the fears. And the most dramatic change: lack of live humans in the buying process has been transformed from a liability to an asset. Now buyers report they don't want to have to deal with a real person and prefer buying through a computer—unless they experience a problem and need customer service.

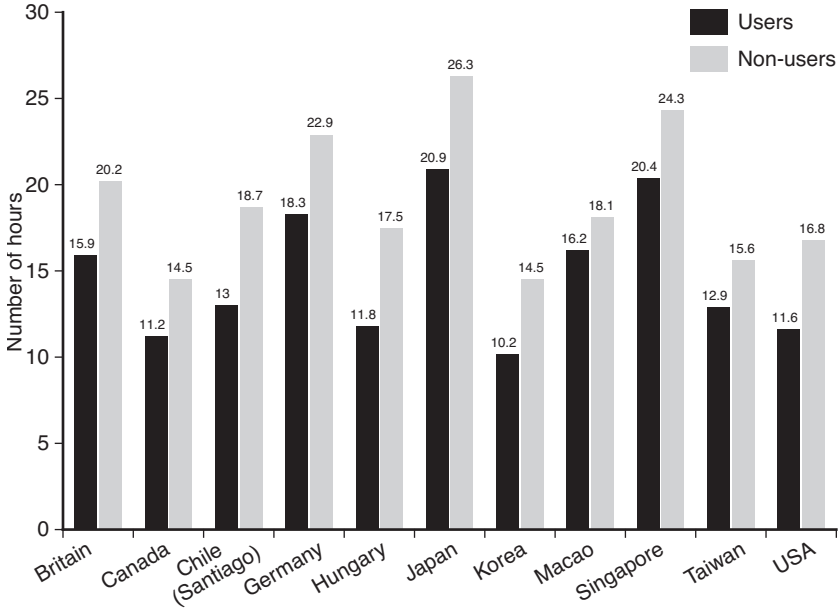
The most likely cause four years ago for the vast differences in Internet use by experienced and new users was demographic differences. In the United States, the earliest Internet users were much more likely to be white or Asian, highly educated, male and with higher incomes. They were also much more technologically inclined. Over the past four years, more and more of America has gone online, with the fastest growing groups being African-Americans and Latinos, females, lower income and those with less education. In virtually all the other nations of the project, the first and heaviest users were also the most educated with higher incomes and much more likely to be male.

Another important change is that new users go online knowing what to expect from the Internet having, in many cases, been online before with a friend's or relative's connection. The learning curve for online behavior is much shallower. New users know what to expect when they connect and now get down to business much faster than new users of several years ago. Four years ago new users did much more exploring and experimenting before getting down to business on the Internet. For many of the reasons stated above, now they get to business right away.

Internet Users Watch Less Television

In every country for which we have collected data, Internet users watch less television than those who are not online. The amount of television watched lessens, although not significantly, as users gain experience on the net. It is not surprising that Internet users watch less television than non-users since for many people their at-home, awake time has been dominated by television; if they are to carve out time from their lives to go online, it almost must come from television.

Figure 13.1 Number of hours of watched television per user and non user of internet



Looking at 2003 data and the 12 countries that collected information on television use, the average across those countries is that non-users of the Internet watched 4.03 hours more television a week than users. The country with the highest television viewing among users and non-users is Japan and the nation with the lowest among the countries measured is South Korea. In Japan non-users watch 26.3 hours of television per week (and users 20.9) while, just a few hundred miles (and a great cultural divide) away, South Korean non-users watch 14.5 hours of television a week and users watch 10.2.

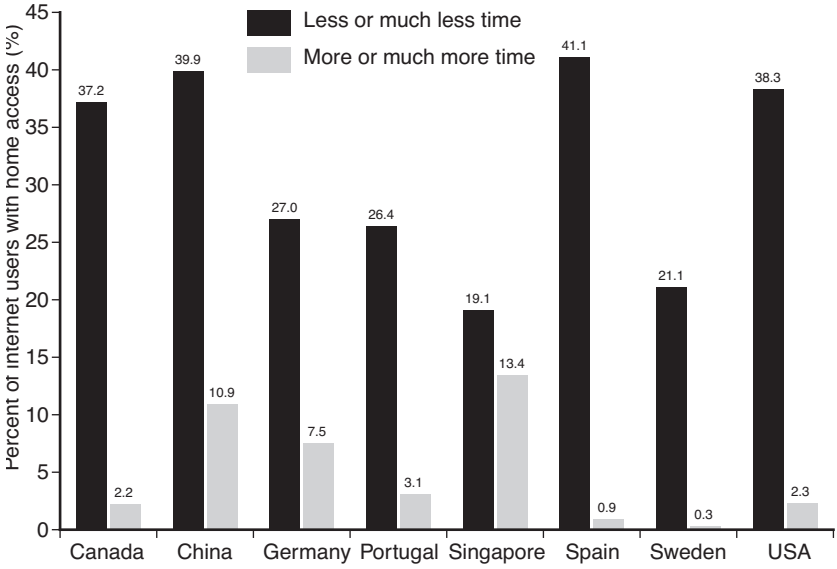
Looking at the gaps between Internet users and non-users and television use, the greatest gap is found in Chile and Hungary at 5.7 hours a week more television by non-users. It is important to note that in 2003 the Chilean data was urban-based and drawn mostly from Santiago. Had the entire Chilean nation been measured (as it is now), the numbers and the gap might be slightly different. Although the gaps between Hungary and urban Chile are the same, Chileans report watching slightly more television. It is also noteworthy that the biggest gaps between users and non-users occurred in two places that had relatively low television viewing when compared to the nine other countries. The nation surveyed with the smallest gap between Internet users and non-users is Sweden where the difference comes to 1.4 hours a week. Not far behind is the region of Macao (now part of China) where the gap, although very low, is slightly higher than Sweden at 1.7 hours a week.

When Internet users are asked whether they watch more or less television, it also becomes apparent that the Internet is cutting into television time. Relatively few Internet users report that they are watching more television. Among those who do, the highest percentage is that in Singapore where 13.4% of users say they are using television more. The country reporting the smallest increase is Sweden where only 0.3% say viewing has increased. Spain also reports tiny increases at 0.9%. Across eight countries, an average of 5.08% report more television use after discovering the net. Far larger are the percentages reporting watching less television. The average of those saying they are watching less television across the same eight nations is 31.3%, or about six times as many saying they are watching more. The country with the highest percentage of Internet users watching less television is Spain at 41.1%, closely followed by urban China at 39.9% and the United States at 38.3%. The country reporting the smallest number of those saying they are watching less television is Singapore at 19.1%, closely followed by Sweden at 21.2%.

The year-to-year results are able to clearly demonstrate that Internet users watch less television than non-users. Those differences may be due to demographic factors, that in many countries Internet users are somewhat younger or have higher education or incomes. It is compelling to learn that users watch less television, but the more relevant research question is whether the Internet is the reason they watch

less. Would they watch the same amount of television if there were no Internet? As they access the net does their television use decrease and, if so, in predicable patterns as they gain experience and knowledge of the web? These are the very questions that a panel study can begin to elicit. Great attention is currently being focused in those countries that have been in the field for three or more years to look at changes in lifestyle as people use the Internet. Although it will take another two-to-three years to fully answer these questions, early data show that television use does decline as non-users become Internet users. The scientific answer to this question is of critical importance to the television industry around the world as millions of people move onto the net every year. If these new users begin a process of watching consistently less television, the long-term future of television will be as a vastly smaller and less significant medium than it has been in the past.

Figure 13.2 Changes in time of watched television per user and non user of internet



As we measure television watching and its possible displacement by the Internet, two essential observations are coming into focus. First, a majority of Internet users in most countries are multi-tasking and, at

least some of the time, are on the Internet at the same time as they are watching television. Television began as a medium that received the audience's full and undivided attention. Only after years of experience did viewers begin to eat or engage in other activities as they watched television. The Internet, on the other hand, because it can be asynchronous, began as one activity among many (talking on the telephone, watching television, sending Instant Messages, listening to the radio) for its users. The American data show that not only do a vast majority of people multi-task while they are online, a small majority are occupied with three or more tasks while on the web. Clearly, the mindset and environment of younger users is not focused on one media activity at a time.

Second, we have also noticed that television displacement begins to change as Internet users move from dial-up use to broadband. Dial-up users at home tend to go into another room away from family members and television and stay online an average of 20-to-30 minutes at a time (with some exceptions). Broadband users are online many more times a day for far shorter periods. Broadband users are more likely to go online with other people around them and, whereas dial-up use tends to displace television program viewing (30-minute blocks), broadband use tends to disrupt television advertising viewing (1-to-2-minute blocks). All of this will ultimately change the nature of television displacement, likely resulting in users not watching significantly less television, but, rather, watching it in a significantly different manner.

Internet as an Important Source of Information

For several generations, survey researchers have been tracking how citizens get their information. In the United States organizations such as Gallup and Roper have tracked where Americans get their information and how that has changed over the years. Internationally, the Internet became a medium for public use in the 1990s, especially after browsers were developed allowing users to access the world wide web (WWW). From the beginning, people turned to the web to get information, whether it was a movie start time, product information or research on a catastrophic illness.

From the beginning, the World Internet Project has been tracking the importance of the Internet as a source of information and enter-

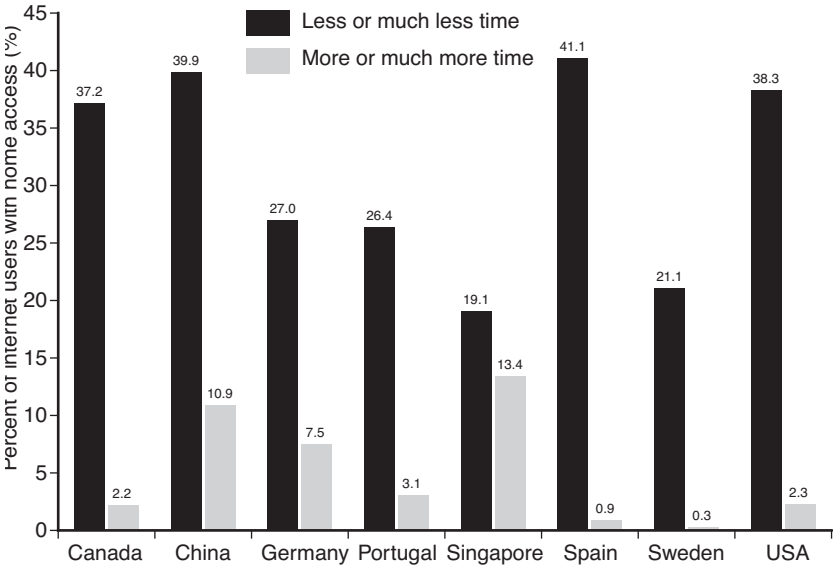
tainment and the ways in which usage changes and may affect other media as well. Clearly, during the first five years of tracking the Internet, it has been perceived much more clearly and strongly as a source of information rather than as a place for entertainment (although it is heavily used to find information about entertainment).

In the United States, the Internet has surpassed television as a source of information and remains heavily used for information in most of the world surveyed in the project. Only in Sweden do the majority of users not consider the Internet to be an important or extremely important source of information. In eight other countries the majority do consider the net to be an important or extremely important source of information. The place with the highest reliance on the web for information is urban Chile where 81.8% say the Internet is at least important in their use of information while only 3% say it is unimportant. Following Chile are Singapore at 77.6% and Spain at 71.8%. Urban China is close to Spain at 69.7%, raising important political questions that the project is striving to study. In the United States and Canada about 60% of Internet users consider the web an important source of information. During the course of the project the trend is toward the perception of the Internet as a place to go to get information and increasingly users are relying on it for that purpose. At the same time, the Internet has made far less significant inroads in the perception that it is a place to go for entertainment.

Reliability and Credibility of Information

As the Internet becomes one of the most important sources of information for people in countries throughout the world, it is essential to track the faith users have in the credibility of that information. The Internet will continue to grow as a source of information in people's lives if those users continue to believe they can trust the information they find there. In most countries television has surpassed newspapers and magazines as the most credible of media. Most of this is attributable to the sense that "seeing is believing." Many critics have argued that, if people had a better understanding of media literacy and the process of editing and special effects that can go into video compilation, they might be more skeptical of the information they receive through television.

Figure 13.3 How important is the Internet for Information purposes

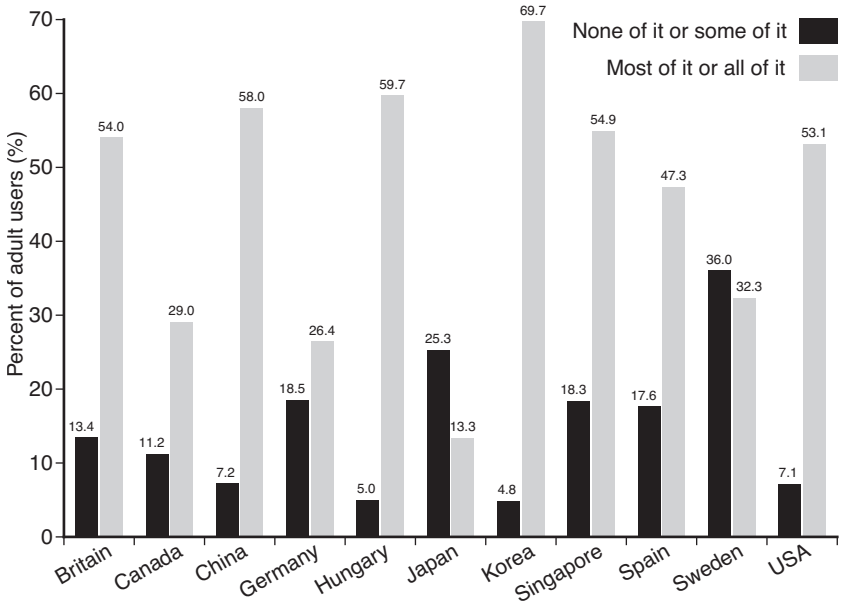


In the United States, faith in the integrity and reliability of traditional print and broadcast media has been high over a period of generations. Because Americans have trusted their media, they largely have not developed the critical media skills necessary to readily distinguish good information from bad or to withhold judgment until after examining the source of the information. The results of the World Internet Project's worldwide data suggest that only people in countries where faith in the reliability of information has not been so traditionally high may have developed more critical media skills.

The American data show that in the first two years of the project, Internet users in the United States had growing faith in the quality of the information they found online. In 2001 55% of American Internet users said they trusted most or all of the information they found on the web (here the term "web " is used so as not to ask about chat rooms or e-mail). In 2002 that 55% grew to 58% and then in 2003 it fell to 53% and then fell again the next year to 50%. Attempting to understand this phenomenon, later questions were asked to distinguish sources of information such as traditional media on the web, government web sites and

individual web sites. In 2003 74% of Internet users said they trusted most or all of the information found on the web sites of traditional news organizations, while only 10% said they trusted information on the web sites of individuals. This is a distinction that American Internet users did not make in the first year of our study. The compelling result that has emerged from the course of the work in the United States is that, as people use the web more and more for information, continue to rely on it and develop strong relationships with certain web sites, they have become more skeptical overall about the information on the entire web.

Figure 13.4 How trustful is the information in the Internet



Compared to other countries, the United States is toward the middle with regard to belief in the reliability of online information. Using 2003 data, as mentioned above, 53% of American Internet users said they trusted most or all of the information online. That level of trust is consistent with Britain (54.0%) and Singapore (54.9%). Slightly higher faith in the quality and reliability of online information is found in China (58%) and Hungary (59.7%), while the country in the project that most trusted the quality of online information was South Korea at 69.7%. More skeptical than these countries were Spain at 47% and

Sweden at 32.3%. The countries with the fewest people trusting most or all of the Internet's information were Germany at 26.4% and at the very bottom, far below the others, Japan at 13.3%. As with differences in television viewing, the greatest gulf among the countries with data in the project was between South Korea and Japan.

When looking at the other side of the question and examining the number of cynics who find none or only a small amount of online information credible, it is not Japan but Sweden that tops the list at 36%, while Japan comes in second at 25.3%. The countries with the lowest percentage of users finding little or no information credible is the United States (7.1%), Hungary (5.0%) and South Korea at 4.8%. A great deal of attention is being spent looking at the cultural and technological factors accounting for these differences.

Workers Feel Internet has made them More Productive

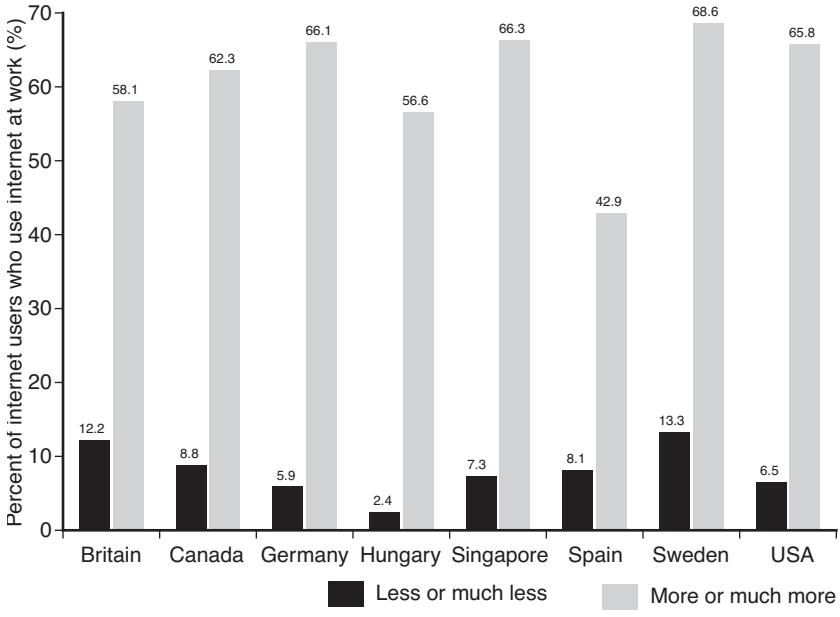
One of the most important questions faced by industry is whether the Internet makes workers more productive and efficient with their time or, because of heavy personal use, actually interferes with productivity. Historical studies have looked at the role the telephone played in increased productivity in the workplace. The telephone allowed workers to reach out immediately to other workers in the same location and across their cities, countries and the world. The telephone was far faster than letters and allowed for immediate feedback. Answers to business questions could be found instantly, and the telephone allowed business people to deal with far more people and issues in a single day or hour than was possible with face-to-face visits if such visits were even possible. On this level there is no question that the telephone made workers more productive. But, at the same time, families and friends could reach into the workplace and sap workers' time and energy in a way that also was not possible before. Some employers placed restrictions on employees' use of the telephone for personal matters, frequently to little avail. These histories showed that, while personal use of the telephone could distract workers, overall it significantly improved productivity.

The WIP data has shown that there is significant use of the Internet at work for sending personal e-mail and browsing web sites (the same data also shows an equally or perhaps even more significant use of the net for work-related activities while at home). It falls to other studies to examine

actual rates of business productivity over the next generation and to look at the ways the Internet and other technologies may affect this productivity. (A very important effort in this direction is the BIT Study being conducted by Uday Karmarkar at UCLA's Anderson School of Management. The study is currently measuring the ways in which Internet technology is affecting business in close to 10 countries (http://www.anderson.ucla.edu/documents/areas/ctr/bit/Annualreport.pdf).

While the WIP Project cannot measure actual increases or decreases in productivity, it can gauge whether workers believe this technology has affected their productivity. It is clear that across the world workers strongly believe the Internet has affected their business productivity in a positive way. It is important to note that many of these workers add, frequently with some unhappiness, that this increase in productivity means that they take on even more work (not always voluntarily) with the result that they are working more and harder than ever before. The U.S. data also show that a majority of workers believe their use of e-mail and the web is being monitored, sometimes closely, by their employers. A third complaint (to be examined later) is that this technology has tied them to their work and offices whether at home or on vacation.

Figure 13.5 Does the Internet improve your productivity at



work?

Looking at eight countries in the WIP, first it is striking that only small minorities of workers believe that access to the Internet has negatively affected their work productivity. Across eight countries, an average of 8% of workers feels their productivity has declined because of the Internet. The country most likely to feel this is Sweden at 13.3%, followed closely by Britain at 12.2%. The nation least likely to feel that productivity has declined because of the net is Hungary where only 2.4% see negative effects. In the middle are Canada (8.8%), Spain (8.1%), Singapore (7.3%), the United States (6.5) and Germany at 5.9%. On the other end, an average of 61% of Internet users across these eight countries feel they became more productive at work once they gained Internet access. Here, most of the nations are clustered close together in the 60-percent range. Interestingly, the highest is Sweden, which also had the highest percentage believing the net made them less productive. Fully 68.6% of Swedes see productivity gains because of the Internet. In the same range are Singapore at 66.3%, Germany at 66.1%, the United States at 65.8% and Canada at 62.3%. Slightly lower are Britain at 58.1% and Hungary at 55.6%, while Spain is still lower at 42.9%.

One of the goals of the project in the next cycle is to separate work into discrete tasks to gain a better understanding of whether workers feel that the Internet has improved productivity in all tasks or whether it is concentrated in only certain areas. The addition of data from developing countries will also make this data even more meaningful.

Frequency of Checking E-Mail High, but may be Changing

By any measure, for almost all Internet users, e-mail has become an established part of their lives. In nearly every country, Internet users report that the attraction of e-mail was usually the major reason or one of the top two reasons for seeking access to the Internet. In the American data, the highest level of satisfaction with the Internet over the past four years has been in the ability to communicate with other people. In a mid-year, special survey taken of U.S. Internet users shortly after September 11, 2001, it was found that e-mail use increased significantly in the days after the terrorist attacks. Moreover, many people reported using e-mail to reach out to friends, many of whom they had not communicated with for long periods, to show caring and support

and, in many cases, to repair injured relationships. What was most compelling about these "I care messages" is that, in most cases, the senders indicated they would not have sent a letter or made a phone call; the communication only occurred because e-mail perfectly matched their emotional state and desire to communicate. More than a quarter of Americans on the Internet reported receiving messages from outside the United States within a week of September 11.

Clearly, there are very special needs filled by e-mail that are not filled, or at least in the same way, by the use of the telephone or mail. That e-mail has become an important part of many Internet users' daily lives can be shown by looking at the WIP data. In nine countries the project looked at how frequently Internet users check their e-mail. Across those nine countries, an average of 52% checks their e-mail at least once a day. At the very bottom of that list is urban China at 21%. This low number can be easily explained by the small percentage of Chinese who own their own computers. With many Chinese accessing the Internet through cyber cafes, it is not surprising that only a few are able to gain access at least once a day. High percentages in the other countries report checking more than once a day, with many checking once an hour or more.

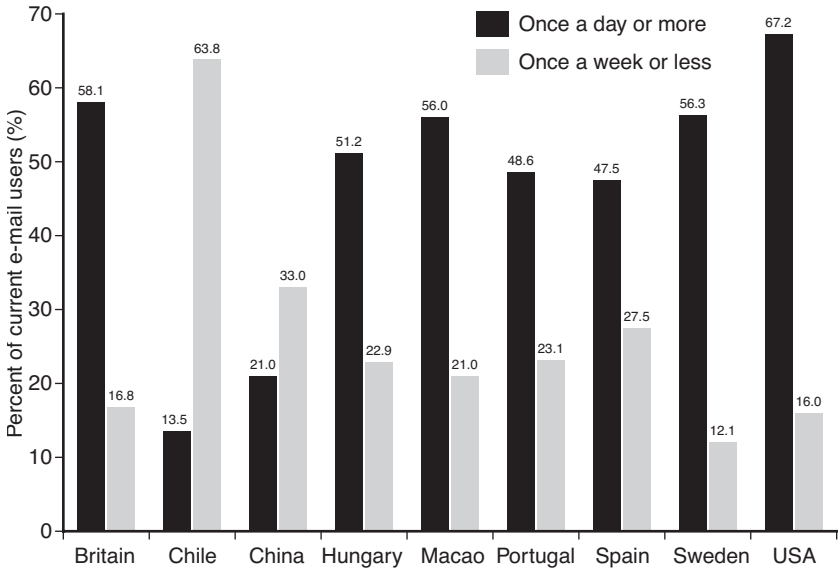


Figure 13.6 How frequently Internet users check their e-mail

Americans check their e-mail most often, with 67.2% looking at messages at least once a day, followed closely by urban Chile at 63.8%. Other than China, all the countries report a majority or very close to a majority accessing e-mail at least once a day. On the opposite side of the scale, even though Americans are the ones most likely to check e-mail at least once a day, they are not the group with the smallest percentage checking least often (once a week or less). That distinction belongs to Sweden, where 12.1% check only once a week. After Sweden are urban Chile (13.5%) and then the United States. The country most likely to check only once a week is China at 33.1% for reasons stated above.

In the fourth year of the American data a new development was observed that may be the beginning of a trend that will deepen in the United States and perhaps become evident elsewhere in the world as well. Of course, it is also possible that this is a trend that will not truly develop over a period of several years and could prove to be an aberration. Among the most experienced Internet users in the U.S. (those on-line seven years or more), there may be the signs of an "e-mail overload." All of the most experienced users see the great advantages in convenience and productivity that e-mail has added to their business and personal lives, and none of them want to give up either e-mail or the Internet. Although they report high levels of satisfaction with the technology, they also report that they feel this technology is controlling and even, in some cases, defining their lives. Many report that they have become tethered to their e-mail and always feel they have to check and answer messages. This has created in some a constant sense of always having to deal with an issue that did not exist in their lives ten years before. As mentioned, none of them want to abandon e-mail, but report they want to take control of the technology and enjoy the benefits of instant communication without suffering the disadvantages. This phenomenon, referred to in the latest U.S. report as "E-nuff Already," can be evidenced in a number of ways.

Over the first three years of the work, there was always a relationship between Internet experience and frequency of checking e-mail. In the fourth year, there was a change and it was the newest users who were checking more often than the experienced users. When asked how quickly one should reply to a personal e-mail (business e-mail

was not looked at here because one may not have a choice of how often to access business e-mail since their job could depend on checking), in the fourth year it was the newest users who believed in the fastest response. Of those online for less than a year, 29.7% felt that a personal e-mail should be answered as soon as possible while less than half as many experienced users (14.7%) felt a reply was called for that quickly. On the slower side, 18.9% of new users felt that a reply in two or three days was acceptable, while 30.8% of the experienced users felt this way.

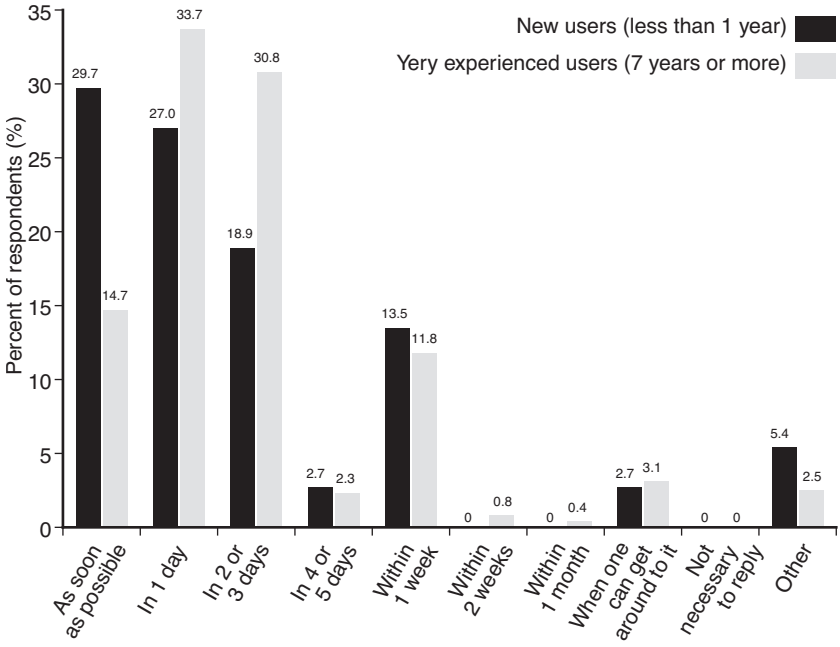


Figure 13.7 Frequency in replying to their e-mail

Like television, the Internet has become a significant part of many users' lives. Its importance as a medium of communication and information is already significant and likely will continue to grow and become more pronounced. As it moves from a novelty to an ingrained part of daily (or hourly) life, it will have increasingly unanticipated effects on daily life. Beyond displacing some existing activities, the Internet will change the core of social interaction, politics, learning

Chapter 14

E-topia: Information and Communication Technologies and the Transformation of Urban Life

William J. Mitchell

What kinds of buildings are required by the network economy and the knowledge society? How should these be distributed spatially within a city? These are the questions that I shall explore in this chapter—first generally, then with specific reference to the context of Portugal.

The technological context

To begin with, we should note that the technological context of the network society is established not just by microprocessors and the Internet, but by an emerging wave of diverse new technologies that find their uses relative to one another. The 2005 Lemelson-MIT list of the top twenty-five technological innovations of the last twenty-five years provides a good sense of this. These innovations proved to be important not just because they provided new capabilities, but because these capabilities met real human needs in a technological context established by earlier innovations and in an evolving social context. The list runs:

1. The Internet
2. The cellphone
3. Personal computers
4. Fiber optics
5. Email
6. Commercialized GPS
7. Portable computers
8. Memory storage discs
9. Consumer level digital cameras

10. RFID (radio frequency identification) tags
11. MEMS
12. DNA fingerprinting
13. Air bags
14. ATM
15. Advanced batteries
16. Hybrid car
17. OLEDs
18. Display panels
19. HD TV
20. Space shuttle
21. Nanotechnology
22. Flash memory
23. Voice mail
24. Modern hearing aids
25. Short range, high frequency radio

Notice that most make practical use, in some particular context, of digital information and inexpensive, miniaturized electronics. Notice, as well, the mutual interdependencies. The Internet needed the personal computer, and the personal computer needed the Internet. Email needed both.

The emergence of fusion space

From an architect's perspective, new technologies often provide new ways of adding value to architectural space. The electric light, for example, made rooms more versatile and valuable at night. The technologies of the network society are no exception. In general, they are producing fusion space—architectural space in which digital electronic technology enables new and socially valuable combinations of people or activities. Here are some examples.

These days, the seminar rooms at MIT fuse the hitherto distinct activities of group discussion and Web surfing. The students bring their wireless laptop computers to class. Whenever I introduce a topic, somebody Googles it—and then interjects any relevant discoveries back into the conversation. This radically changes the social and intellectual dynamic in the space. It produces a very high level of intellectual engagement, it generates a thrilling, high-speed, vividly

grounded discourse, and it shifts the role of the teacher. I can no longer rely on my superior command of the subject matter to maintain my classroom authority!

In university dormitories, isolated working under intense academic pressure turns out to be a triggering factor for student depression, binge drinking, and even suicide. Networking dormitory rooms for personal computers can exacerbate this. But creating fusions of study space and social space—lounges with wireless connectivity, and quiet corners to work as well as areas for socializing—reduces isolation and increases opportunities for peer-group support.

In research libraries, the former functions of the carrel and the telephone box are fusing. You can frequently find young researchers with their laptops open, surrounded by books and journals, talking on their mobile phones. If you eavesdrop, you find that they are not just blabbing, but are getting guidance from their supervisors or coordinating with distant collaborators. Then, when they find interesting pages of text or images, they simply snap pictures with their camera phones. Librarians disapproved of all this at first, much as classical chefs looked askance when they first encountered the new wave of fusion cuisine. Then they started to see it as an important new intellectual practice—and to demand space designed to accommodate it.

Walk around a building that accommodates a high tech company, and you will probably find that a surprising number of the private offices are locked and dark. But look, by contrast, at the electronically supported work going on in airplane seats, high-speed train seats, airline lounges, cafés, hotel rooms, and even park benches. Much of the activity has shifted from classically conceived, single-purpose, assigned space to fusion space.

Imagine an apartment that is jammed with sensors everywhere, and that processes the resulting data stream to recognize the current activities of the occupants. (Kent Larson, at the MIT Media Laboratory, has recently constructed just such a dwelling—known as PlaceLab.) It knows when you are making a cup of tea, or folding the laundry. Now imagine that, based on what it observes of your behavior patterns over time, it offers carefully calculated, well grounded advice on diet, exercise, taking the opportunity to go out for a walk, taking your medication, and other things that will keep you healthy. It fuses the private

apartment and the elderly-care nursing home. If you are an ageing baby-boomer, it might enable you to live independently in your community for many more years.

Finally, imagine a school bus that uses its GPS location system to retrieve and present information about the areas that it is passing through. It fuses the geography, history, ecology, and civics classrooms with transportation and the public space of the city.

In all of these cases it is the new, connectivity-enabled fusion of previously distinct activities that is the source of new value.

Rethinking adjacency, proximity, and urban spatial patterns

Let us turn, now, to the changing relationships of urban spaces to the other urban spaces that surround it. A simple hut is a single, undifferentiated space that accommodates many activities, but a larger and more complex building is a system of more specialized spaces with circulation networks and exchanges of various kinds linking them. (The distinction between single-celled organisms and larger and more complex biological systems is a similar one.) At larger scales, we can think of cities as systems of specialized buildings linked by transportation networks and exchanges, and of cities embedded in global transportation networks. Digital telecommunication changes spatial patterns of activities within such networks, but not (as many early theorists thought) by simply substituting telecommunication for transportation, producing the "death of distance," and allowing anything to happen anywhere and at any time.

To clarify the mechanisms at work, it will be useful to introduce an elementary cost model. The cost per unit of time to operate a spatially differentiated, geographically extended, networked urban system might be represented as the sum of:

1. The *fixed costs* (think of them as rents) of assigning particular activities to particular urban locations.

2. The *interactive costs* (time and money spent, over time, on transportation) of the flows of people, materials and goods, energy, and information among locations.

The interactive cost per unit of time is the sum of the costs of the exchanges between pairs of activities at their assigned locations. And the cost of exchanges between any pair of activities is given by:

Distance x Volume x Cost coefficient

The *distance* between the activities depends upon the spatial layout of the system. The *volume* of traffic depends upon the nature of the functional connection between the activities—such as the connection between a factory and a warehouse. The *cost coefficient* depends upon the efficiency of the network connection between the locations.

Historically, the fundamental role of new urban networks has been to reduce the cost coefficients in the system. Tracks for people and vehicles reduced the cost of moving people and goods among locations; pipe networks reduced the cost of moving water and sewage; wires enabled efficient distribution of electric power; and wired and wireless channels now allow fast, inexpensive movement of information.

The first-order effect of introducing an efficient new network or network link, with a low cost coefficient, is to reduce the cost of the existing assignment of activities to locations. In other words, the existing spatial pattern can operate more efficiently. The second-order effect is to allow the emergence of *new* spatial patterns when the system is subjected to pressure to grow or to accommodate new needs. Consider, for example, the introduction of a piped water supply network into a village that had hitherto depended upon a central well. The first-order effect is simply to reduce the human time and energy spent on carrying water to existing houses. A second-order effect is to eliminate the need for houses to cluster within water-carrying distance from the well, and to enable them to spread out along the water lines as the village grows. Another second-order effect may be to change bathing, as the village becomes more affluent, from a centralized, public activity at the point of water availability to a decentralized, private activity that takes place in the private bathrooms of houses. Yet another effect is to destroy the efficacy of the old village well as a social magnet and focus of community life, and to create the need for something new—maybe a café.

The first-order effect of new telecommunication networks is, obviously enough, to provide more efficient information distribution and exchange among locations within existing urban patterns. Less obviously, the second-order spatial effects of introducing wired telecommunication networks, with low cost coefficients for movement of information, are:

1. To reduce the need for adjacency and proximity among activities that primarily exchange information.

2. To allow other, latent demands for adjacency and proximity to become effective.

3. To produce, as a result, spatial restructuring through fragmentation and recombination when the system is subjected to pressure to grow, to accommodate new demands, or to become more competitive.

Consider, for example, the traditional urban bookstore and Amazon.com. The urban bookstore clusters, at one location, the functions of book storage, display and browsing, point of sale, back office activity, and advertising. Amazon.com has taken advantage of digital telecommunications to produce an efficient new spatial pattern. By moving the browsing and point of sale functions online it virtualizes and decentralizes them—making them available at any point of Internet access, and efficiently reaching a large number of widely scattered customers. Simultaneously, it centralizes the book storage function in large, highly automated warehouse and distribution centers located at nodes in transportation networks—enabling economies of scale, taking advantage of low-rent space, and keeping many more titles in stock than an urban bookstore can do in its limited, expensive space. And, through use of sophisticated e-commerce technology, the back office functions are freed up to move to wherever the labor market is most attractive.

If you look at many traditional building types and urban patterns today, you can see processes of fragmentation and recombination at work. Most significantly, perhaps, concepts of "home" and "workplace" are changing—together with concepts of the relationship of the home to the workplace. A standard pattern of the twentieth century was for an information worker to have a home in the suburbs, an office in the

central business district, and a daily commute between the two. In the network society, though, the home may double as an electronically connected workplace. There is little evidence that this will turn everyone into housebound telecommuters—though it does open up new work opportunities for the disabled, and for the geographically isolated. For many, though, it means that work times and locations are much more flexible, and that the home must now accommodate a home office. And, in some contexts, it allows homes and workplaces to recombine into new urban villages, with twenty-four-hour populations, composed of live/work dwellings. In some cities, the development of electronic live/work villages is becoming an attractive option for the rehabilitation of historic but underutilized building stock.

Another way to say all this is to say that digital technology can add value to a space in two ways. It can do so directly, by increasing the comfort, efficiency, or versatility of the space itself—in other words, by producing fusion space. And it can do so indirectly, by increasing the connectivity and accessibility of the space for various purposes—that is, increasing the value that it has by virtue of its location within the larger, multiply networked urban system.

Wireless connectivity

Wireless networking overlays an additional set of spatial effects on the fragmentation and recombination produced by wired networks. Depending upon the degree of miniaturization of wireless devices, it can:

1. Simply substitute for wired infrastructure over rough terrain, and in other circumstances where wired connections are difficult or expensive.

2. Provide mobile connectivity to vehicles—enabling flexible and efficient dispatch of taxis, direction of emergency service vehicles, and so on.

3. Free sedentary information work and entertainment from fixed locations, and increase the value of places to sit down and work at a laptop computer.

4. Provide mobile connectivity to pedestrians.

A practical architectural effect of this is to reduce the demand for specialized, assigned space—private offices, cubicles, library carrels and the like—and to increase the demand for unassigned public and semi-public fusion space that can be appropriated for different purposes, by electronically equipped and connected inhabitants, as needed at any particular moment. Furthermore, in congenial climates, outdoor and semi-outdoor spaces can have new uses. With your wireless laptop you can work just as easily on a park bench, in the shade of a tree, as you can in a cubicle in an office tower.

Consider, for example, this very paper. I did not write it in my formally designated "workplace"—my office at MIT. I wrote it on my laptop in a series of hotel rooms, airplane seats, and cafés. I presented it in Lisbon. And I emailed the final text to the editor via a wireless connection in Italy.

All of this challenges the assumptions of the cost model that I introduced earlier, and forces us to reframe strategies for designing and managing urban space. It is no longer adequate to think solely in terms of fixed assignments of activities to locations, and specialization of those locations to their assigned activities—as homes, workplaces, places to learn, places of entertainment, and so on. An increasing component of urban space must consist of flexible, electronically serviced fusion space that is nomadically occupied.

The emerging, associated paradox of portable, wireless connectivity is that it does not produce space that looks "high tech." The better the miniaturized, wirelessly connected technology, the less obtrusive it becomes; it disappears into your pocket and into the woodwork. There is less necessity to organize buildings around technological requirements, such as the requirement for sealed, air-conditioned spaces to accommodate old-fashioned computers, or the requirement for teaching space to be darkened to allow the operation of audiovisual equipment—no longer necessary in an era of high-intensity display screens and video projectors. Without sacrificing functionality, architecture can return to an emphasis upon natural light and air, view and connection to nature, and sociability.

Implications for Portugal

Many of the implications of digital technology for Portuguese architecture and cities are those that have now become familiar throughout the world. We will see a growing role for electronically enabled fusion space, and we will see ongoing fragmentation and recombination of established building types and urban patterns as the effects of digital networking become stronger and more prevalent.

There are, in addition, some particular opportunities. Due to its pleasant climate and strong architectural traditions of making use of outdoor and semi-outdoor space, Portugal has a particular opportunity to take advantage of the architectural and urban potentials of wireless connectivity. And there is also an exciting opportunity for preservation and adaptive reuse of historic building stock in Lisbon and other beautiful urban and village settings by unobtrusively introducing digital infrastructure, and thus adapting historic built fabric to new uses without destruction of its character.

As I trust I have demonstrated, digital connectivity does not diminish the importance of place or of local architectural and urban character, but instead provides powerful new ways of adding value to places. A society is fortunate when it has distinctive, humane, pleasant places to add value to. The challenge for Portuguese architects and urbanists is to effectively relate the new technological opportunities of the twenty-first century to the extraordinary Portuguese context of culture, climate, and architectural and urban tradition.