An environmental NGO's viewpoint

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Abstract:
Despite positive examples, the relations between the digital and environmental transitions are far from natural. Not only does the digital transition have a major impact on the environment, but also many of the new uses and practices resulting from it fall far short of a better conservation of our planet. The explanation is simple: that is not the reason for being of digital technology. Should we continue thinking about these two transitions in parallel? Might certain electronic innovations not be necessary for a revolution in the production and consumption of energy and in the means of transportation — especially for conducting this revolution at a level and pace sufficient for shielding us from an irreversible climate change? Far from being the only instrument for the environmental transition, the digital transition has a role to play under certain conditions…

Two transitions — digital and environmental — are taking place right in front of us but at different paces.[1]

The digital transition, moving at a furious tempo, is now a full-fledged part of new models for business and industry. The environmental transition, its pump well primed, is moving at a gait too slow to protect the planet, in particular to avoid global warming of more than 1.5°C by the end of the century. In the one lane: a digital transition that has taken off, exponentially, but without having any definite goal. In the other lane, an environmental transition with a clear, well-identified finish line but with trouble falling into the requisite stride to reach it. Given the coincidence of these two transitions, pooling the resources of both would, according to some pundits, provide leverage for placing the digital transition at the service of the environmental transition.

True, some developments in the digital realm are evidence that this technology can accelerate the environmental transition: crowdfunding platforms on the Internet for funding projects in renewable energy, car-pooling via digital applications, etc. These obviously positive illustrations should not, however, paper over the differences, namely the digital revolution's noticeably negative impact on the environment. To cite but one example: from fifty to sixty scarce, nonrenewable metals are used to make smartphones with, as a consequence, a devastating environmental impact: the overworking of mineral deposits.

For digital technology to eventually play a positive role in the environmental transition, it must reduce its own environmental footprint and must clearly be assigned the goal of fostering environmentally friendly practices.

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[1] This article has been translated from French by Noal Mellott (Omaha Beach, France). The translation into English has, with the editor's approval, completed references.

The digital transition's big environmental footprint

The depletion of natural resources, the consumption of energy, the emission of greenhouse gas, the destruction of the ozone layer, the eutrophication of watercourses, the production of wastes… mobile telephones have all these negative effects on the environment. These effects are mainly produced during the manufacturing phase, as shown by the analysis made by ADEME (Agence de l'Environnement et de la Maitrîse de l'Énergie). Even though it renders services and has "immaterial" uses, information and communications technology (henceforth ICT) is a tangible reality: the manufacturing, utilization and end of life of our various e-devices bring an unsustainable pressure to bear on our planet. As much can be said about the colossus in this sector, the Internet. At the planetary level, the storing, protecting and sharing of data in data centers voraciously consume electricity, most of it generated by burning fossil fuels. Information systems account for 7% of worldwide electricity consumption — an impact on the climate equivalent to aviation's. In 2012, Greenpeace examined the cloud computing services offered by the major players on the Internet, such as Amazon, Apple and Microsoft.[2] The very strong demand for electricity from these services is mainly satisfied by dirty energy sources, such as coal. For instance, 55.1% of the electricity for Apple's data centers comes from thermal power plants using coal; for HP, the percentage is 49%.

Besides the supply of "dirty" energy to information systems worldwide, we should also look at how digital technology is being used. What impact do these uses of electronic equipment and services have on our environment? E-mail seems, offhand, to reduce our consumption of paper and make savings on the energy needed to move mail. However the multiplication of electronic messages has a major impact on the climate. In a French firm with one hundred employees, each employee receives approximately 58 e-mails per day and sends about 33. Sending 33 e-mails with an attachment of one megabyte to two destinations per day and per employee produces 180 kilograms of CO_2/year — the equivalent of driving a car more than 1000 kilometers.[3] Yet another example: we replace, on the average, our mobile telephones every 18 months; and our personal computers, every three years. The shortening duration of use of these devices is damaging to the environment. The objective of global warming amounting to less than 1.5°C will simply be out of reach if we pay no attention to the environmental impact of this new technology, as it is being ever more frequently put to use.

Mention should also be made of the social consequences of the proliferation of digital devices and services. Scarce metals are often mined under inhuman conditions, evidence of this being coltan in the Democratic Republic of Congo. From social and environmental viewpoints, the digital revolution has a long haul before it can be deemed "virtuous".

Beyond the foregoing observations, does the digital transition have, in parallel, positive effects on the environment? Insofar as it opens new prospects for changing the behavior patterns of groups and individuals, it can serve as a vector for the environmental transition. A few examples:

— Crowdfunding platforms enable people to place their savings on projects beneficial to the climate. For example, Énergie Partagée, an initiative for funding local renewable projects, has already managed to bring together nearly 5000 shareholders, raise €12 million and finance 32 local projects.[4]

— Websites for trading or purchasing secondhand goods have the potential of reducing the purchases of new products and thus spare us the manufacturing of them.

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[2] "How Clean Is Your Cloud? Catalyzing an Energy Revolution", 52p. (Amsterdam, NL: Greenpeace International, April 2012) available at http://www.greenpeace.org/international/en/publications/Campaign-reports/Climate-Reports/How-Clean-is-Your-Cloud/.

[3] "Internet, courriels: réduire les impacts. Limiter nos consommations d'énergie et de matières premières"; 9p. (Angers, FR: ADEME, February 2014) available at https://www.ademe.fr/sites/default/files/assets/documents/guide-pratique-internet-courriels-reduire-impacts.pdf.

[4] https://je-souscris.energie-partagee.org/

— To fight against traffic congestion with its heavy negative impact on air pollution, health and the climate, the Lyon metropolitan area has set up a data warehouse to which residents can connect via their mobile phones and learn how to optimize their trips. For freight, an on-line tool has been designed for optimizing the management of rounds in real time. Optimod'Lyon spares the production of more than 30.000 tonnes of CO_2 per year.[5]

As we see, examples of bringing the digital and environmental transitions together do exist in everyday life.

To gauge whether the digital transition brings, or could bring, a net gain to the environment, aspects should also be brought under consideration such as: *a)* counterexamples of digital innovations that impede the protection of the environment; and *b)* the deceptive gains due to certain environmentally oriented innovations. If digital technology opens the way to changing behaviors, these changes might be positive or negative with respect to our planet's conservation. Alongside the websites for car-pooling, many a site has sprung up for finding the best last-minute offer for booking a flight. The reason for being of the digital revolution has never been conservation of the environment.

After all, and contrary to what is taken for granted, "dematerialization" does not necessarily lead to a lesser impact on the environment. Reality is much more complicated; and consumption patterns in a "sharing economy" can be deceptive. As ADEME's analysis of thirteen examples from the sharing economy has shown, these practices do not automatically coincide with responsible acts of consumption. In effect, the gain for the environment strongly depends on the conventional practice that the "sharing" practice has replaced.[6] In the case of car-pooling for long-distance rides, despite a rather high average number of passengers per vehicle (3.5), it is still necessary to take into account the practices replaced: 12% of riders would not have traveled had there been no car-pooling offer, and 63% would have taken the train. The reduction of the environmental impact is but 12% if this rebound effect (due to substitution) is brought into the picture. Likewise, the heavy use of applications such as Uber for rides in passenger vehicles has deviant effects. In New York City, the increasing number of these vehicles on the road has worsened congestion downtown.[7] As this study has shown, the use of this transport is, owing to its low cost, growing faster than public transit. It all depends, therefore, on what the new practices and new services offered by digital technology are used for.

Like digital innovators, the first intention of users in the "sharing economy" is not to have a positive effect on the environment. In other words, an outside intervention is necessary for connecting the digital and environmental transitions.

The need to "connect" the digital to the environmental transition

Since digital technology does not have an innate environmental calling, a deliberate outside intervention is needed to reduce its heavy negative environmental footprint and orient its development toward conservation of the environment. This outside intervention can come from the pressure that NGOs and citizens bring to bear on firms to make them lessen their negative effects on the environment. Since 2009, Greenpeace, for example, has ranked ICT firms with respect to energy.[8] It has asked the big firms to make a commitment to a *"100% renewably powered Internet"*. Facebook, Apple and Google were the first to pledge to do so. Apple is now in the lead with 83% of

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[5] https://data.grandlyon.com/2015/06/17/les-donnees-mobilite-au-coeur-de-linnovation-metropolitaine/

[6] BIOby Deloitte, CREDOC & OuiShare. *Potentiels d'expansion de la consommation collaborative pour réduire les impacts environnementaux*, final report, 112p. (Angers, FR: ADEME, November 2016) available at http://www.ademe.fr/potentiels-dexpansion-consommation-collaborative-reduire-impacts-environnementaux.

[7] B. SCHALLER, "Unsustainable? The growth of app-based ride services and traffic, travel and the future of New York City", 38p. (New York: Schaller Consulting, February 2017) available at http://schallerconsult.com/rideservices/unsustainable.htm.

[8] G. COOK, J. LEE, T. TSAI, A KONG, J. DEANS, B JOHNSON & E JARDIM, *Clicking Clean: Who Is Winning the Race to Build a Green Internet?*, 102p (Washington, DC: Greenpeace Inc, 2017) available at http://www.clickclean.org/usa/en/.

renewables in its energy consumption. This outside intervention could also come from public authorities, as they make rules and regulations and target incentives in favor of the firms that back environmentally friendly innovations. The French government, for example, has set up *GreenTech*, an incubator for startups at the junction between the digital and environmental transitions, the intention being to create a synergy between the relatively dispersed parties in this ecosystem.

Fighting against climate change requires considerable effort throughout the economy. Whether in transportation, housing, agriculture or energy, new digital technology should play a major role in the much needed reforms. In transportation — the leading sector of greenhouse gas emissions in France — it should be a vector of knowledge about mobility patterns and a lever for changing behaviors. Approximately 175 million trips are made per workday in France.[9] Learning more about these movements and practices is indispensable to the environmental transition. Sharing data on mobility could be useful when making decisions about rural and urban planning. Ultimately, applications of this sort would benefit individuals owing to improvements on transportation's supply side.

Another example: at the time of the 2015 Paris Climate Conference (COP21), 700 cities around the world made the commitment to use 100% renewables by 2050. Digital technology is indispensable for reducing the energy consumed by transportation, buildings and urban lighting, and for managing the equilibrium between the demand and supply of energy. At the level of a neighborhood or an urban development zone, "smart grids" should increase the local flexibility of electricity systems by better matching the available local supply of electricity with real-time demand. This would help optimize the uploading of renewables to the grid. Associated with actions for improving energy efficiency, this global approach would limit investments in energy infrastructures. Owing to this value-added service for consumers, the digital transition would improve its chances of finding a business model; it would be part of an overall plan. This is the type of innovation to be encouraged by public authorities (central and local governments).

Conclusion

The relations between the digital and environmental transitions are ambivalent. On the one side, the environmental transition, itself a necessity, needs the support of technological innovations. On the other side, the digital transition has always had, overall, a harmful impact on the environment owing to its underlying production models and certain uses that it spawns. There are two levers for seeing to it that the digital transition will play a positive role. First of all, the stakeholders in ICT will have to overhaul their models of production and consumption. Secondly, the digital transition must be oriented and supported, in particular by public authorities, if we truly want it to pursue the objective of protecting the environment.

Even under these conditions however, the digital transition is not a magic wand for successfully making the necessary turn in environmental matters. Like any other tool in our hands, its benefits very much depend on the uses to which it will be put. Once again, other types of tools and instruments (taxes, regulations, etc.) must be wielded so that each product that we use and each use of a product comply with the environmental imperative.

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[9] J.P. HUBERT, "Dans les grandes agglomérations, la mobilité quotidienne des habitants diminue, et elle augmente ailleurs", Paris. *INSEE Première*, 1252, 31 July 2009 available at: https://www.insee.fr/fr/statistiques/1281086.