Some Problems with the Concept of 'Technology' in Design: Interview with David Edgerton

Interview conducted by Hugo Palmarola and Pedro Álvarez Caselli via email in January 2021

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David Edgerton is Hans Rausing Professor of History of Science and Technology and Professor of Modern British History at King's College. He was founding director of the Centre for the History of Science, Technology and Medicine at Imperial College London (1993-2003) and is member of the Council of the Architectural Association School of Architecture. His vision of the global history of modern 'technology' offers new ways of understanding the relationships between science, technology, and society. Edgerton has published *Britain's War Machine: Weapons, Resources and Experts in the Second World War* (Oxford University Press, 2011), *The Shock of the Old: Technology and Global History since 1900* (Profile, 2006), and *Warfare State: Britain 1920–1970* (Cambridge, 2005), among other books.

In this interview, Edgerton criticizes the scope of STS (Science, Technology, and Society) within design, pointing to the redundancy of applying already obvious perspectives to a discipline that deals with invention and use. He further points out that we must abandon the concept of 'technology' and replace it with more descriptive, narrow, and useful terms.

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Hugo Palmarola: The teaching and practice of design are currently moving from a discipline of specialties (industrial design, graphic design, etc.) to a more integrative discipline, encouraging inter or trans-disciplinarity, where both the creation and the use of technologies play a key role. How do studies on technology and the production/consumption of technologies see this change in the direction of design?

The issue hinges around the meaning of the term 'technology.' Of course, something called 'technology' is conceived as something transformative in design. It is, after all, a master concept of modernity. It is a great power in the world, and of course, designers need to know about it, to master it. But 'technology,' what is usually actually acknowledged by the term, is something else, something much more limited than it appears. Today 'technology' tends to mean something like novelties in Information Technology (IT), stuff like Artificial Intelligence (AI); technology is something digital. Obviously, in this limited sense, 'technology' will be central to the practice of design, to thinking about what design is, and to selling design to others. That is, the digital, from Information Technology to Artificial Intelligence, is – or might be used – in the everyday practice of design and it is important for designers to associate their work to 'technology' in this narrow sense. They also need, in their practice, to speak about 'technology' to connect with what is considered to be the main developmental thrust of modernity. But our usual understanding of 'technology' and thus our master-concept of modernity is profoundly flawed. When thinking about 'the material' and also techniques in design, and indeed about the product of design, we need much richer and variegated concepts. We also need a much more substantial understanding of the modern world that we get through thinking about the concept of 'technology.' It is a master-concept only for a very poor account of our world.

It is for this reason that we should abandon the concept of 'technology' and replace it with more descriptive, narrow, and useful terms. If we think of older subdivisions of design, then it is obvious that the study of materials, the nature of industrial processes that changed materials, and indeed the tools of the designer were all part and parcel of design. We have words for all of these. Indeed, we have a richer appreciation of design if we think of steel, and plastic, and machine tools, and presses, and indeed, pens, drawing boards, than if we just said 'technology'.

So, we have a paradox. Invoking the concept of 'technology' in design, focused on the disembodied digital meaning of the term, far from putting 'technology' into design, removes most of it, leaving behind only digital simulacra. In other words, rather than bringing in the mate-

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rial to design, or rethinking it, the concept of 'technology' can be a way of getting rid of it. There is a radical difference between a maker culture focused on digital devices and one concerned with physical workshops stuffed with many tools for working many materials.

By freeing ourselves from the conceptual prison 'technology' locks us into, we can think afresh, more richly and intelligently, about what designers do, and the place of the material in the modern.

HP: In some cases, design as a discipline and the history of design use some approaches such as SCOT (Social Construction of Technology), STS (Science, Technology, and Society), domestication or technological routinization, and the history of technology in use, superimposing and combining them in a free or unorthodox way. This is due to the fact that design implements some of these approaches in the various specific stages of the life cycle of technologies or products (invention, manufacture, commercialization, use, routinization, reuse, etc.). What advantages or disadvantages would this more hybrid and eclectic approach have in the study of technologies and products?

I have always been struck by the idea that design or design history would have something to learn from STS or SCOT. Why? Because Social Construction of Technology and STS were clumsy ways of teaching engineers and scientists (and social scientists) what has always been obvious to designers and architects. Designers of course know that what others innocently think are products of nature are made by design, through designs. Airplanes, dresses, shoes, electric cables, are as they are for complicated reasons – and every last aspect of any of these has been specified by a human being. And, by the way, it is no accident that the study of the material has been pioneered by architects and urbanists like, in the case of the United States of America, Sigfried Giedion (*Mechanization Takes Command*, 1948) and Lewis Mumford (*Technics and Civilization*, 1934). STS is a complicated way of telling others elementary truths about our world and how it has been made.

If STS and SCOT had more to say than the fact that the made is made from the material and the social; if it had more to say about the degree to which our world is made of the natural and the social; or what exactly is most important about the nature of the social or the material, then I would take them somewhat more seriously than I currently do.

But there is no need to go on repeating what designers already know. What we need is a much more concrete set of cases, arguments, and controversies which would be a really useful resource for

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designers. For this, we need a proper account of invention and innovation, and of what is in use. These are not things that STS and History of Technology, however you want to hybridize them, have given us.

HP: We know that technologies and products are great constructors of socially consensual and validated facts and realities. Within this process, what is the role and importance of the so-called 'technological imaginaries' and fictions about technology? For example, by various consciously created fictions (such as novels, fictional cinema, etc.), the mass media, or collective imaginaries around technologies and products.

To what extent does our use of things get shaped by technological imaginaries and by fictions? Well, we do not have much of an answer for design/invention, though there are some cases where it has been shown to be very important – where the fiction precedes reality, including in the case of the atomic bomb. I suppose the main answer concerning use must be advertising, which is surely powerful not just in pushing a particular product, but that class of product in general. It seems quite plausible that people were habituated to fly by film long before a majority had a chance to travel by airplane.

However, it is vital to remember that the great majority of things are invented, innovated, made, and used without in any way affecting how society sees itself. In fact, the problem is that when we think in 'technology,' we think of those things which have been so represented, giving us a very distorted and misleading impression.

Pedro Álvarez: It is often argued that 'new ideas' are linked to the notions of 'invention' (the creation of something new) and 'innovation' (when what is created is introduced to the market to be used). You have suggested that both concepts are used interchangeably as synonyms for 'technology.' Why do you consider this synonymy to be wrong? I ask you because invention patent registrations, for example, are sources for recording technological progress and decline. Why is 'use,' according to you, so decisive in the historical approach if it also presents problems as a source, since it is often difficult to check its impact or veracity in the absence of data or written, visual, and even oral documentation?

I have argued that the concept 'technology' involves a conflation of some things which come to be used, with a history of invention and innovation. It now means something like invention/innovation, in that the focus is on invention and innovation but with a terrible lack of precision, so that a later history is also implied. 'Technology' does not, however, stand for

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all invention/innovation. It stands for a tiny proportion of all invention, not even that small part that proceeds to innovation. It is a concept focused on invention/innovation of only those things deemed to be really important, looking to the future, and also indeed looking backward. Thus the great majority of inventions are not discussed when discussing 'technology'; in the case of inventions, because most fail; for innovations, because they too fail; and more still because they are deemed not important enough, for arbitrary reasons, to count as 'technology.' In other words, 'technology' is not even a good description of innovation, and even less so of invention. To put it another way, what is being invented and innovated is a mystery to most students of 'technology'.

Can we get around this by looking at patents? In part, we can. Patents are a rich archive of inventions, most of which fail. Patent offices are archives of failure, of disillusion. Most patents are never applied, never used, never cover even the cost of registering them. But patents are not a good indicator of what is being invented. The patent is not a measure of inventiveness, it is a legal document granting rights that depend on novelty (not significance), and the propensity to acquire this legal title varies radically across different industries. Patents are patents – they are not inventions.

'Technology' is a slippery concept because it pretends to be more than invention/innovation, to the extent of sometimes claiming to be an inventory of the material (and more – of non-material techniques also). In practice, it does not. So, if we are interested in the material constitution of our world, and how it is being changed, the concept of 'technology' is very unhelpful. For it is focused not on what is in use, but on the early history of things which will come into use, which are for particular reasons deemed to be important. 'Technology' does not give us a picture of what is in use at any one time. It gives an account of the origins of some of the things which are taken to be important for the present, and above all the future.
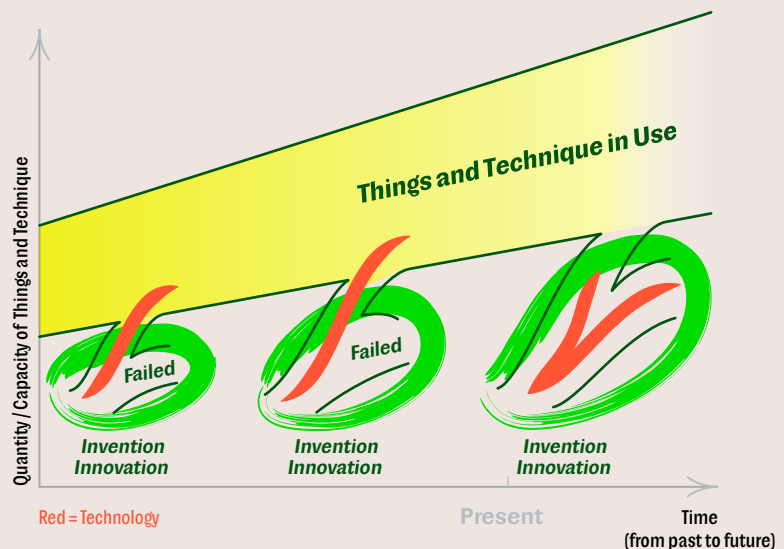
Understanding the nature of the material world is not easy, and sources are difficult to find. There is not an archive of the material – it is everywhere and nowhere. It is what it is, and it is poorly reflected in documents and images, and this is a crucial aspect of its existence: its very invisibility in the usual places is perhaps its most important feature. But for designers, the creators of these invisible things, the material constitution of our world, is what they are most concerned with. In invoking 'technology,' the designer is blinding herself to the materiality of her world, her tools, her ambitions to transform the material.

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PA: The world of invention and technology has been dominated by the male sphere, and it can even be said that at least until the 20th century that trend has continued. In the records of invention patents in Chile between 1840 and 1930, which number thousands, only three records of women inventors appear. What is your opinion of the female presence in technology in recent decades?

It is indeed true that most patentees have been men, and white men at that (until the very recent past and the rise of Asia). The number of African American patentees in the USA was very small, so much so that it justified US racist beliefs that they could not invent. But then there are lots of novelties that are not patented. Our world has been full of novelties whose parentage is not recorded, indeed that must apply to most. There are some intermediate cases like music. Who invented the Blues? Is it patented? Who invented the myriad routines of everyday life that are not recorded in patents? Who has invented what is still an open question. In any real catalog of inventions, I am certain we would find many more women than in the pages of patent records.

But of course, in terms of users, the question of gender and technology takes on a completely different character. It would be absurd to say that women use less 'technology' than men. That is if we use the word

Only a part of inventions and innovation becomes things and technique in use.
Source: David Edgerton.

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'technology' to mean the things we all use. Of course, in practice, as I have noted above, we don't. So we should not use the term! Let us ask what the relationship is between say gender and machines. However, we might note characteristic differences in the usage of certain kinds of machines. The use of things has been profoundly gendered. A very clear example would be weapons, where all sorts of long-standing, but changing norms, ensure a masculine near-monopoly. But there are many other cases. This gendering is hardly unchanging – indeed there has been a very obvious and very important at least partial degendering of many classes of machine – the car, for example, though not the lorry.

PA: The vision focused on the novelty of technological advances sometimes provides us with an altered image of the nature of 'who' generates new technologies in an ecosystem that integrates various actors (scientists, designers, engineers, self-taught, etc.). In this scenario, how do you see the role of design or designers in the process that considers the invention, innovation, diffusion, and use of the product or procedure? I raise this question considering design as not a purely formal factor, but also a strategic one that operates as a facilitator of 'use.' Do you think design is an articulator between the notions of innovation and use?

The concept of design seems to be a very rich one, in many ways superior in fact to the concepts familiar from STS like inventor, scientist, and the like. They focus on a very, very partial set of novelties and novelty creators, as defined very largely by academic scientists.

We need to appreciate that 'design' was once a very widespread term used to describe what today might in many cases be described as research and development. In the old days, new airplanes, engines, and cars did not come out of R&D, but out of the work of designers, who were concerned not just with the aesthetics, but indeed primarily with the materiality of a new product. The chief technical officer of an aircraft-engine firm, or a maker of aircraft, was called a 'designer.' In the case of the ship, they were called 'naval architects.' They were not called inventors, nor researchers. And what they did was to combine new and old to make new airplanes and ships. They did this not in laboratories, but in drawing offices and testing and experimental factories. It seems that these sorts of processes were, and are, hugely important, but have been written out of history through a focus on science, the laboratory, and so on. They are written out of our present too. **D**