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Convergence in Digitalization

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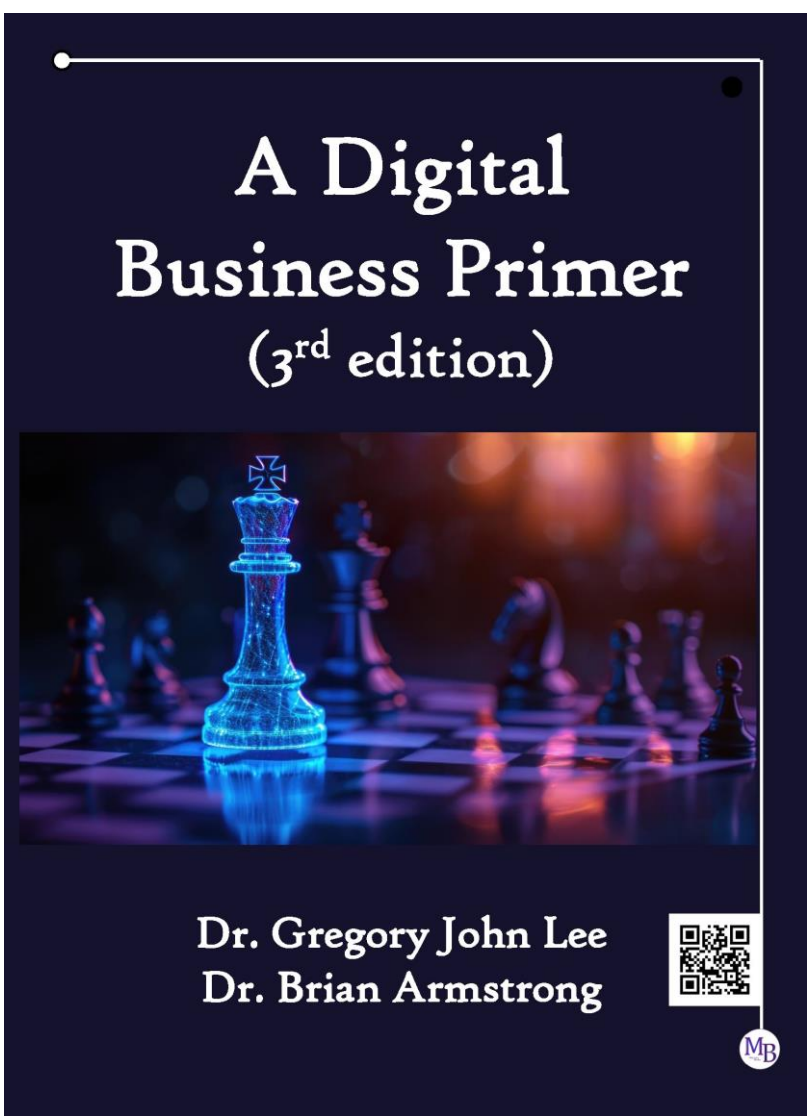

CONVERGENCE IN DIGITALIZATION

Convergence is one of the major factors that can be observed in successful technology revolutions. Convergences involve the bringing together of things that had hitherto been separate and distinct. In fact, convergence of things often creates something more than the sum of the parts, and it is not unusual to find something new and different arising.

In this section, we identify and talk about two different levels of convergence in the world of digitalization, namely, convergence at the level of innovation and convergence at an organizational and industry level.

Convergence at the Level of Innovations

The phenomenon of convergences creating innovation can be widely observed in the world. One of the earliest great human innovations was the convergence of fuel and heat to create fire (something very different from the constituent parts!). Many great artistic styles involve blending of previously separate styles, for instance, hip hop is a convergence of rap, the dance style known as b-boying, deejaying, and graffiti. In the natural world we see innovation in botany arising from blends, for instance, rose hybrids, new vegetables such as Kumatos™ or peppadews™, and the Pinotage wine grape (which was a convergence of the pinon noir and the cinsault grapes). In another example, linking concepts from the world of comedy and humor to creativity and innovation and creativity in organizations, the great actor and comedy writer John Cleese notes (Video Arts, 1991, adapted for dates[1]):

> *Creativity is like humor. In a joke, the laugh comes at the moment when you connect two different frameworks of reference in a new way. Example: there's the old story of a woman doing a survey into sexual attitudes who stops an airline pilot and asks him, amongst other things, when he last has sexual intercourse. He replies: "2020". Now, knowing airline pilots, the researcher is surprised and queries this. "Well", says the pilot, "it's only 21:15 now…". We laugh, eventually, at the moment of contact between two frameworks of reference: the way we express what year it is and the 24-hour clock. Now, having a new idea is exactly the same thing. It's connecting two hitherto separate ideas in a way that generates new meaning.*

Guy Kawasaki uses the term "deep" to talk about one of the characteristics of great innovations, by which he means innovations that combine multiple things in a new way. He gives a slightly tongue-in-cheek example of the Fanning sandal, which has a bottle opener in the sole. Kawasaki jokes (TedX, 2014):

> *This sandal has twice the functionality, twice the depth, of any sandal other in the world!*

Technology lends itself to convergences since it is an enabler of something fundamental. An important factor in successful technological disruption is to come up with innovative convergences that will create widespread user acceptance, and even delight. In this regard, there are three types of convergences that can be achieved with technology as discussed next

[1] This anecdote originally used the date 1958, but an adaptation seems more relevant.

A. Innovation Convergence Dimension # 1: Technology + Context

Technology inevitably penetrates specific contexts, and in the case of commercial contexts industries, be it medicine, retail, logistics, education, manufacturing and so forth. In fact, commonly it is not convergence of technology with a whole industry, but rather a sub-sector or even smaller parts of the industry. Of course, there are industry-crossing technologies (think of Microsoft Windows and Office), but even these generally try to create industry-specific versions or niches to their products. Many of the great digital disruptions are foundationally about smart penetration of specific industries – or, rather, sub-sectors - with technology. Netflix converged film and television with streaming technology. Uber converged ride hailing and mobile technology, Airbnb converged accommodation seeking and technology, and Amazon retail and technology. The key in great convergences between technology and industry is a deep understanding of three things:

- **People**: Understanding the people the technology is to be aimed at is critical, and such understanding ranges from understanding their culture, skills, history, sociology, and so on. Technology that accords with such 'people' elements is more likely to succeed.
- **Pain points**: Technology which addresses the most important or urgent problems faced by the recipients is, obviously, more likely to gain traction.
- **Processes**: Technology which fits well into the existing processes of recipients, or presents realistic alternative processes, may gain traction.

For example, Airbnb's app is not particularly impressive or new technology even from its outset – it is just HTML app pages, including profiles of accommodation and travelers, communication options, rating mechanisms, merchant services for payment, and some mapping. However, the technologies in combination - and especially in combination with a new business model idea, namely that normal residential accommodation could serve as short-term rentals - disrupted the travel accommodation model, bringing convergence of technology and industry to that sector. This example also demonstrates that when industry and technology converge a new business model can often arise from this convergence.

B. Innovation Convergence Dimension # 2: Digital + Analogue + Physical

Digital at its heart refers to computer programming, and digitization is the process of creating code which represents or replaces some previously physical thing or analogue process. However, the core point in this convergence dimension is that digital cannot fully replace either physical things or analogue information, rather, digitization actually always involves a convergence of digital, physical and analogue elements. Making deliberate and smart innovation choices about these combinations is a key to disruptive success.

Before exploring this further, let's briefly review the three components involved.

As noted above, **digital** at its heart refers to computer programming.

Physical is easy enough to understand, since it refers to tangible things that exist in the natural world and can be touched, stored, manufactured or crafted, and so on.

Analogue information refers to information produced in the way nature produces information, that is, it exists as waves of information and those waves have characteristics ranging from high to low along a continuum. Readers sometimes initially struggle to get this

concept, but it is quite easy if you consider some classic examples. Consider the five senses through which human beings experience the world. We hear sound waves, and produce them when we speak. Sound waves have characteristics like volume, treble, bass and so on which exist on continuums from low to high measurements. Similarly, we see light waves, which have characteristic on a continuous continuum like the relative amounts of red, blue, and other colors being seen. When we touch or taste, our brains are processing waves of sensations, like relatively how sweet or salty something tastes. In other examples, we may listen to traditional radio, which we all know is broadcast a radio waves. The FM radio stations broadcast exist on different places along a broadcast spectrum, so one station may be at 98.0 and another at 94.4FM. The digital era revolutionized information with a new idea: that all of this sort of information could be reduced to strings of binary code using only 1s and 0s.

However, as we discuss further in our books, digital technology cannot completely replace physical or analogue.

- **Digital cannot completely replace physical**. Digital systems must live within physical devices such as computers, servers, mobile devices, and so on, and use networking devices to communicate. These devices are stored on desks, in cases, within buildings, and so on. Of course, digitalization can replace or rather supplant some physical elements, for instance, e-books replace paper-based books with code and a device.
- **Digital cannot completely replace analogue**. No matter how much of the physical universe or analogue information is digitalized, it is also not entirely possible to do away with analogue. This is especially true because human users *experience* technology though their human senses like touch (how the technology feels), vision (how it looks), hearing, and so on. We also *commission* technology through activation based on analogue senses, for instance by typing, swyping, speaking voice commands, and so on. Even without human actors, technology still produces analogue information.

Smart convergences are also desirable between these elements: bringing together the right combination of digital and physical with elegant and functional design. Apple, for instance, has long leaned on the popularity of their device design as a cornerstone of their success in conjunction with their technological platforms. Sometimes, choice of the correct analogue element is the key to success.

C. Innovation Convergence Dimension # 2: Convergences of different technologies:

Sometimes, combining multiple digital technologies (often called a 'technology stack') adds an innovative touch that sparks successful disruption, even if the individual technologies are not themselves new. For instance, many apps now add some element of artificial intelligence to enhance the experience, such as voice-enabled searching and digital assistants in smartphone platforms.

We mentioned earlier that convergence may also operate at the broader levels of organizations or industries. We discuss this viewpoint next.

Convergence At the Organizational and Industry Level

In the previous section we discussed convergence as something that can be thought of at the level of an innovation, which equates to design science. However, we can broaden our gaze and see how digitalization is bringing about convergence at higher levels like organizations and industries. There are several such examples:

- We can think of any number of generalized "x-tech" industries which have arisen, where "x" can be substituted for any industry. Fintech, for instance, is a general class of products and organizations seeking to disrupt conventional finance with technologically-driven solutions. Edutech seeks to do the same in education. Insuretech is a third example; agritech is a fourth. We could go on. These "x-tech" sub-industries represent convergences of technology and industry on a broad level.
- Within and across various industries and organizations, we have also seen many examples of the convergence of previously-separate industry or even cross-industry areas. For instance, telecommunications companies have increasingly started to merge fixed-line and mobile businesses into common platforms, and to include other services or products not previously thought of as falling into the telecoms domain such as broadcasting, fintech offering, the internet of things, and so on. These cross-industry convergences are possible because all of these things are increasingly digitized and, therefore, amenable to combination (as discussed in **Error! Reference source not found.**). Another example is in banking, where banks have increasingly become platforms for the integration of traditional banking service as well as other financial services like insurance and fintech services offerings. Again, the commonality created by the underlying digitization of such services has allowed for their convergence into singular rather than separate financial services organizations.

Choices about which markets to play in and converge into are profoundly strategic, and convergence has a significant impact on industry structure and industry attractiveness. Volume II of this book series covers this topic of convergence at the industry and organization level in far more detail.