



Digitization and servitization in international entrepreneurship

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Welcome to a glance at the emerging future: the emerging trends in international entrepreneurship, business model transformations, open innovation, and increased stakeholders involvements through digitization and servitization. This special issue on Digitization and Servitization is the culmination of extensive time and efforts of the four guest editors of this issue. Although its title mentions only two concepts — Digitisation and Servitization — it presents diverse and in-depth researched topics and uncovers much more.

The main aim of this brief introductory preface is to highlight a few significant strategic developments that the researched content of this issue has already covered in some length and rigour, some of which have already influenced international entrepreneurship and holds the potential of not only further changing the face of entrepreneurial internationalization, but also that of international business as a whole over time.

Digitalization is neither a new phenomenon, nor a new strategic concept. It became a near necessity in the late decades of the twentieth century with advances in the Internet and the World Wide Web (WWW), both of which enabled rapid technological progress in communication and information-based capabilities (CICs) and technologies (CITs) that influenced how individuals and institutions would conduct their common communications, daily affairs, and business processes. However, not all institutions started to functionally digitize at the same time, nor have transformed their business models for migrating from their legacy to a fully functional digitized system at the same pace. The COVID-19 lock-downs restricting mobilities locally, nationally, and internationally highlighted the importance of complete functional digitization¹ for compensating for restrictions and responding to peoples' needs as global consumers were forced to shift to higher online purchases, even for

¹ A complete function digitization entails the digitization of communications, logistics, manufacturing, sales, and after-sale services from the very upstream to the very end-points of downstream(s) in favour of efficiency, saving time and delivering higher customer-enteric value to the ultimate customers (CCV).

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necessities,² and firms that could not fully serve them online suffered substantially, some under prepared smaller firms were compromised.

The reported research in more than 20 in-dept case-studies of SMEs perceiving COVID-19 as an unfolding crisis in 15 country environments (Etemad 2022a, 2022b) found that firms with the necessary dynamic capabilities (Teece et al. 1997) could identify new opportunities and seized them (Teece 2018) in a timely fashion suffered much less from, and even prospered during, the COVID-19 pandemic than their competitors that lacked capabilities to exploit unfolding opportunities. In contrast, those that had not capitalised on CICs and CITs earlier were not prepared prior to the emergence of COVID-19 in early 2020 were adversely affected, which in turn, pointed to *a much higher strategic and timely importance of functional digitization and servitization* in preparing for change in environmental conditions on the one hand, and improved competitiveness on the other hand, even in the absence of rapid contextual, environmental, or industrial change. Retrospectively, and as compared to slowly unfolding COVID-19 crises since the first quarter of 2020, other slowly unfolding, and unexpected global crises, have highlighted the increasing necessity, if not the urgency, of fully functional digitized, as well as forward — and backward — servitization capabilities to deal with the emerging, ongoing, and intensifying regional, national and global crises before they would stabilize. Notably, the intensifying global warming may trigger diverse crises, for which nations and the world had not yet prepared and the humanity may still suffer from their unfolding consequences directly and immediately, or indirectly over time (I will return to this topic at the end of this preface).

The birth of digitization

Although Ed Guilbert introduced electronic data interchange (EDI) in the 1960s, it took some time for even resourceful institution, such as the General Electric (GE), to adopt it for internal communication within the GE's family, but the rapid technological advances in CITs and increasing use of the Internet led to pioneering on-line institutions, such as eBay.com, Apple iTunes, Expedia.com, Priceline.com, Alibaba.com, AliExpress.com, and Amazon.com, amongst many others, to digitize rapidly for establishing their positions in the emerging and expanding multi-layered on-line market-places (Etemad 2017).³ Even Walmart, which has traditionally had the *largest number of large retail stores in the world*, was forced to functionally digitize its down-stream operations substantially for keeping its market position and competing in the growing online markets as well.⁴ Naturally, smaller enterprises were neither spared, nor could

² Most countries suggested, if not required, “stay-at-home” before May 2020, which drastically reduced the in-person public activities, including purchases.

³ By 1991, nearly 12,000 companies in the USA alone were using EDI. In 1996, The Uniform Code Council introduced EDI over the internet (EDIINT) to standardize the communications data over the internet.

⁴ Walmart was one of the pioneers in using satellite-based communication technologies in coordinating and even partially managing the upper streams of its massive supply chains.

keep pace with others nationally or internationally, but the situation has changed in the recent years. (see Etemad 2022a and 2022b, 2023). Those who barely digitized, and did not go beyond a mere informational website, achieved lower growth and some were demised in the harder times, such as those of COVID-19 global crisis. In short, a *transformation from the legacy to a digitization regime* has become a de-facto strategic necessity for achieving higher competitiveness and competing effectively. Such transformations are likely to enable the necessary adaptation for consequent changes through indepth and thorough efforts, including (i) a re-examination of, and innovation in, the firm's business model(s) for delivering higher values to their buyers, achieving higher efficiencies, and steadier growth as well as avoiding the commoditization of their product offerings, resulting in, (ii) a shift from strictly product-dominant (P-D) logic to a higher service-dominant (S-D) logic for hybrid offerings (e.g. combining supporting services as integral parts of their offerings) and consequently, (iii) devising strategic steps for gaining improved competitiveness locally, nationally, and internationally, and (iv) preparing to engage in higher buyer and suppliers' involvement, satisfaction, and value (e.g., higher *customer-centric value* (CCV)), which would in turn facilitate, (v) a co-creation consistent with stake-holders' interests, and coherent with, the evolving global ecosystems (Behl et al. 2023).

The well-publicized strategic re-orientation of General Electric's Airplane Engines in the early years of this century (i.e. throughout the first, and parts of the second decades) transformed GE's Jet Engines from becoming an industrial commodity to a reliable and efficient power source with much reduced down-time by continual digital diagnostic communication with its engines through the advancing Internet of Things (IOT) provisions. Notably, GE's combination of digitization and maintenance-oriented diagnostic communication for preventive service added incremental revenues, *nearing a billion dollars annually ever since the transformation*. Although GE was the first aero engine manufacturer to introduce sensors reporting data through IOT in using preventive maintenance for increased reliable service and reduced down-time and decreased service costs, and for generating higher revenues, it was not the first Airplane Engine manufacturer in moving towards Servitization by adding services to its offerings,⁵ as discussed below.

The birth of servitization

Servitization has followed a trend line nearly similar to that of digitization. Reportedly, the concept of "Servitization" was implemented by a British Aero-Engine company — The Bristol Siddeley Engine Limited (BESL)⁶ in the 1960s. Rather than growing by manufacturing more airplane engines as industrial commodities every year for generating higher revenues, while facing the increasing risks of commoditization of its engines at the same

⁵ For more information on GE and other adoptions of digitization and servitization, see Iansiti, M and Lakhani, K, 2014, Digital Ubiquity: How Connections, Sensor, and Data Are Revolutionizing Business, Harvard Business Review, Nov 2014, Vol. 92, No 11, PP 3 -11.

⁶ The British Bristol Siddeley Engines Ltd (BSEL) was an aero engine manufacturer. It was formed by the merger of Bristol Aero-Engines Limited and Armstrong Siddeley Motors Limited in 1959.

time, forced the firm to *seriously re-examine its legacy strategy of concentrating on higher manufacturing capacity every year*, without adding much higher capabilities for providing reliable and prompt after-sale service(s). That re-examination changed their business models from just manufacturing to a hybrid offering — i.e. Offering the firm's Viper Engines as the source of reliable "power by the hour" for sale, which enabled them to maintain, and even improve-upon the reliability, and high performance of, their engines, which in turn provided for higher and steady revenues, increased customer values, and continued satisfactory relationship with their customer, while learning about their engine's performance for further improvements over time without any losses of revenues. In fact, the company grew larger over time.⁷

On the scholarly side, however, in their pioneering article, Vandermerwe and Rada (1988)⁸ suggested that manufacturing companies could *deliver higher values* to their customers (i.e. Higher CCVs) *by adding related service as integral parts of their product offerings* for not only becoming more competitive faster, but also for overcoming their ongoing problem of relatively short involvements with their customers in favour of longer engagements at same time, which in turn pointed to the *increased strategic importance of time to all stake-holders*. In fact, Vandermerwe and Rada (1988) suggested that "servitization" would hold the potential of steadily improving upon all stake holders' values (i.e., Manufactures, service providers and ultimate customers) over time without any adverse effects for any.

The increasing value and urgency of time

Digitization and servitization are related to, and have relationship with, time from both the short- and longer- terms perspectives. In addition to saving costs, digitization saves the processing time of most operations, when the overall time involved in acquisition, transportation, and use of parts are considered. Consequently, when digital communication saves time, the operational speeds of most processes and capacity utilization are increased, capacity can be decreased, costs and time are saved, which at least preserve the time-related values and decreasing costs, if not increasingly improve upon most operational aspects overtime (e.g. delivering already sold product sooner). Generally, ultimate buyers and users prefer to utilize what they have purchased sooner than later with assurances that they would remain in good operational order for a longer time⁹, especially when digitization has saved time and servitization provisions have already improved upon buyers' desired (and declared) qualities through two way communications enabling the firm to learn about, and incorporate buyer preferences, into the its offerings. Logically, longer-term operational processes are generally costlier than the shorter ones and both the digitization and servitization save time, reduce costs, and thus increase offerings' value(s).

⁷ In 1961, the BSEL expanded further by its purchase of the "de Havilland" Engine Company and the engine division of Blackburn Aircraft later-on, expanding its hybrid product and service offerings.

⁸ Vandermerwe, S. and Rada, J. (1988), Servitization of Business: Adding Value by Adding Service, European Management Journal, 1988, Volume 6, No 4, PP 315–324.

⁹ The Internet of Things (IOT), only possible in already digitized environments can, for example, report declining performance or expected (or probable) operational difficulties quickly before they actually occur, which helps to preserve the expected values and reduce the uncertainties of failures.

Similarly, with buyers involved in on-line transactions, the higher speeds for faster reliable deliveries have assumed higher importance, and contributed to raising consumer preference in favour of outlets with faster and timely deliveries, upon all of which digitization can improve in a relatively short span of time. For example, Amazon.co promises next-day deliveries during a sale transaction to its “Prime” customers, for which many of its customers willingly pay a monthly premium for faster and reliable deliveries, amongst other promised benefits.¹⁰

Additionally, servitization can potentially raise the overall life-cycle value of product lines and their corresponding operational processes, as well as prolonging the respective life-cycle and associated revenues of related family(ies) of goods’ and service offerings as well, especially when both the feed-back information from the buyers and feed-forward from suppliers continually improve upon the quality and the value of involved processes. Furthermore, *servitization requirements of backward and forward information loops can systematically facilitate the possibility of co-creations and open innovation by buyers and suppliers*, and consequently improve upon the overall speed and timing of the entire supply chain and value net as well as keeping them as current as possible over the time-span of operations.

Further considerations

Retrospectively, during and in the aftermath of the COVID-19 pandemic, most institutions, especially smaller firms, suffered more, and some were demised, as neither their previous consumers could continue their pre-COVID-19 behaviours and in-person purchases, nor could SMEs quickly acquire the necessary logistics and on-line capabilities to continue operating as before. Those developments also highlighted not only the *increasing importance of time as a strategic variable*, but also its significant impact on the pace of communications over the entire supply chain and value net, from the very upper streams suppliers to the ultimate customers and users at the end, as discussed earlier. Furthermore, the near collapse of international logistics and marine shipping, due to slowdown in communication and transmissions of essential information caused irreplaceable shortages in products that were traditionally outsourced from timely international suppliers, which contributed to challenges facing buyers and suppliers, regardless of their respective locations. For example, such shortages in personal protection equipment (PPEs), including protective garments, preventive breathing equipment for the general public, and surgical masks for health-care workers, and first responders, reportedly contributed, if not caused, irreparable health care-related challenges and difficulties. These developments highlight the *importance of digital infrastructure* capable of providing and supporting efficient and effective two way communication governing all aspects of peoples’ lives and corporate

¹⁰ Amazon’s massive communication and regional warehousing infrastructure allows it to deliver on the promised time in addition to other benefits, which one can attribute to Amazon’s intensive servitization (See Etemad 2022a, b, c, and 2023 for more information). However, Amazon is not unique, as other multi-sided online platform offer nearly similar benefits through their digitized and servitization infrastructures.

operations to at least preserve the past and traditional operations, routineness, and possibly improve upon the quality of lives over time, regardless of time and location.

To conclude, this brief preface will close with brief description of three ongoing examples portraying the contributions of advanced technologies and the value of continual information loops using technological advances, such as digital communications, including, for example, detective sensors using the Internet of Things, and other rapidly advancing technologies to result in higher user values (CCVs) at lower costs with increased reliabilities and lower uncertainties, as exemplified by the following demonstrative cases.

- i) *Digitization and servitization in institutions: the expanding indirect internationalization of small digitized ventures (ISDVs)*. A casual examination of the multi-sided online platforms, providing an extremely large number of offerings for sales and rapid timely deliveries, point to their strong technological foundations and infrastructures supporting their continual advances in digitization and servitization with complete two-way information loops for enhancing their operations involving a large number of ISDV suppliers and untold number of buyers (see Etemad 2022a, b and c for more detailed information). The multi-sided online platforms' strong foundations appear to have already and continue to enhance, facilitate, and speed-up ISDV's internationalization and possibly dominating international sales through large and dominating platform, such as Spotify.com and Shopify.com, which are already present, or can be easily reached, in close to 200 country markets (for more details also see Etemad 2023).
- ii) *The role of digitization and servitization in lighting in critical operations*. In certain locations and circumstances the continuous, proper, and reliable lighting is essential. For example, in Surgical Rooms, Airport Runways, Life-preserving Devices in hospitals, and in highly hazardous operations, amongst many other situations, proper lighting and correct signaling by lighting devices are critical to their precision and proper respective operations. Prior to the introduction of the light emitting diodes and devices (LEDs), the less-efficient incandescent and fluorescent lighting were used in the commercial, industrial and residential places, which were not sufficiently reliable nor easily controllable as they were not digitally based and could not communicate through digital connections. Reportedly, a combination of using LED lights, supported by diagnostic and two way communication provisions through the internet of things (IOTs) are capable of reporting, for example, poor performance before a possible failure or malfunction; and thus avoiding unexpected difficulties. Reportedly, most of the large hub-airports, such as Schiphol Airport in Amsterdam, have already switched, or are in the ongoing process of switching, to LED lightings that are capable of continually reporting their state of performance through the various IOT provisions. Such new arrangements have not only increased operational reliabilities, but also have reduced operational costs leading to higher values for all concerned.
- iii) *The emerging and pending damages: challenges of the ongoing and out-of-control wild forest fires in vast areas across Northern Canada*. In contrast to the presence of detective sensors and digitization with communication provisions in the above cases, the absence of fire detecting and reporting devices in exposed and vulnerable forested areas, especially close to housing and establishments in smaller cities and villages, has resulted in complete evacuations of large areas close to forest fires, and facing the

risks of destruction by wild and out-of-control fires. In addition to a large number of houses and establishments already burned down to complete ashes, intensive smoke and fire-generated hazardous micro particles are floating in the air and are travelling to the neighbouring, and even distant, centers of population, such as Montreal, Toronto, New York City, and Philadelphia, amongst others, inhabited by more than 100 million people, producing severe air pollutions and causing breathing difficulties. As a result, outside activities were strongly discouraged for a few days, schools were closed and even flight operation in some airports (e.g. New York JFK, NewArk, La Guardia, and Philadelphia Airports) were shot-down and many flights were cancelled or delayed for a while.

In the context of above discussions of advancing digitization and servitization, and in light of the global warming, the *challenging questions before us are*: how advancing technologies can help humanity to reduce, and possibly stop, hazardous occurrences, such as vast wild forest fires, draughts, massive floods, destructive mudslides, hurricanes, tornados and the likes? On the bright side, one would hope that technological progress combined with increased human ingenuity, attention, care, caution and diligence can devise feasible plans for dealing with the rapidly emerging and damaging circumstances.

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