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Beyond Connectivity: Artificial Intelligence and the Internationalisation of Digital Firms

Jose Santos
INSEAD, jose.santos@insead.edu

Peter Williamson
University of Cambridge, p.williamson@jbs.cam.ac.uk

The potential impact of artificial intelligence/machine learning technologies (AI/ML) on opportunities for born-digital firms to adopt new strategies for internationalisation has only recently begun to be systematically examined. In this paper we argue that by creating a digital space where users interact both with the entrant firm and between themselves, that a born-digital firm can engineer a situation where users reveal their preferences implicitly (unintentionally) through their behaviour. By deploying AI/ML tools to analyse data generated by these successive interactions, a firm can tailor its offering to an increasingly accurate picture of each individual user's preferences. This, in turn, enables the firm to create additional value by personalising the offering to the individual user when it enters a new market, based solely on the results of its digital interactions. As a result, foreign direct investment aimed at helping the firm learn experientially about country differences, hitherto a core element of internationalisation theories, becomes unnecessary. The use of country proxies for differences in user preferences between target markets becomes redundant, being replaced by personalisation based on segments-of-one. We illustrate these propositions with reference to value-creation activities of the short-video streaming born-digital TikTok.

Keywords: Artificial Intelligence, Machine Learning; Born-Digital Multinationals; Internationalisation; Implicit Interactions; Revealed Preferences; TikTok

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1.Introduction

Since the seminal work of Johanson & Vahlne (1977), theories concerning the process of firms' internationalisation have emphasised the role of local presence through foreign direct investment (FDI) in enabling an entrant to learn about the peculiar characteristics of its target market environment necessary to compete effectively there. Country differences have been adopted as proxies for variations in consumer preferences, supply conditions, and institutional environments to which a foreign entrant can adjust the attributes of its offering, its strategies, and processes to more closely align with the local requirements for success (Prahalad and Doz, 1987). By co-locating certain activities in the foreign market through FDI, new entrants could observe and understand these country differences in the revealed preferences (Samuelson, 1938) and behaviours of local market participants by interacting with them.

More recently, researchers have pointed out that advances in digital technologies have made some of these interactions possible in the absence of co-location, concluding that entrants can now at least partially understand these country differences at a distance, in the absence of FDI (Monaghan et al., 2020). Other authors, however, have observed that, in practice, digital firms require physical presence if they are to learn effectively about many critical peculiarities of local markets. They argue these include peculiarities associated with business development, marketing, customer support, software development, and stakeholder engagement (Coviello et al., 2017; Giustiziero et al., 2021; Stallkamp & Schotter, 2021; Verbeke & Hutzschenreuter, 2021). This literature, however, has not explored the implications of the application of modern artificial intelligence (AI) and machine learning (ML) tools for internationalisation by digital firms.

AI has long been part of the broader digitalisation of business (Haenlein and Kaplan, 2019). Rules-based algorithms and machine-learning (ML), for example, have been used for tasks such as classification, prediction, recommendation, and the control of intelligent machines for many years. Rules-based AI, sometimes termed "expert systems", is built using human knowledge (insights and theories) that determine the model with which the AI make a choice (the output), given certain inputs in the form of values for set of variables. To predict user behaviour, for example, a rules-based AI might use input variables such as user gender and age, nationality, or location. ML, by contrast, uses algorithms capable of imputing a predictive model by 'training' it on large quantities of data about inputs and output. The last decade has seen an accelerating development of ML and of deep learning, a subset of ML techniques particularly suited to autonomously learn without priors and discover complex patterns in vast amounts of data. The conception, development, and operations of the AI technical architecture required to deploy advanced ML dynamically at large-scale remains an emergent field (Waardenburg and Huysman, 2022). Increasingly, however, AI is shifting the sources of competitive advantage (Krakowski, Luger, and Raisch, 2023). Moreover, AI/ML is particularly suited to assist born-digital firms in creating new value, particularly by harnessing data network effects (Gregory et al, 2021), given that born-digital firms generate large amounts of user data, especially when they globalise.

Building on this literature, in this paper we argue that recent developments in AI/ML technologies have fundamentally altered the possibilities for born-digital firms (Eden, 2019)[1] to understand and respond to the particular preferences of users when operating purely virtually. Specifically, we argue that by creating a digital space where users interact both with the entrant firm and between themselves, that a born-digital firm can engineer a situation where users reveal their preferences implicitly (unintentionally) through their behaviour. By deploying AI/ML tools to analyse data generated by these successive interactions, a firm can tailor its offering to an increasingly accurate picture of each individual user's preferences. This, in turn, enables the firm to create additional value by personalising the offering to the individual user when it enters a new market, based solely on the results of its digital interactions.

As born-digital firms have begun to rapidly internationalise in recent years, researchers have argued that traditional IB theories of internationalisation need to be re-evaluated (Luo, 2021; Luo, 2022) and that 'there is also scope for developing new theories to explain what we observe rather than seeking to shoehorn new phenomena into our existing schemata' (Birkinshaw, 2022). We therefore go on to explore the implications of our

[1] We adopt the definition of 'born digital' firms proposed by Eden (2019: 19): 'Wholly digital businesses are typically digital from inception, operate digitally, and have their products delivered digitally. They are truly "born digitals."'

arguments for traditional international business (IB) theories concerning the internationalisation process, local responsiveness, and role of FDI for multinational enterprises (MNEs). We find that, under certain conditions, the use of AI/ML can render country proxies for differences in user preferences between target markets irrelevant when a born-digital firm internationalises. Careful use of AI/ML enables the born-digital firm to replace country proxies with data on individual user preferences as a basis for tailoring its offerings to serve 'segments of one'. As a result, FDI aimed at helping the firm learn experientially about country differences becomes unnecessary. Country-of-origin effects, however, may still be important in influencing the successful internationalisation of born-digital firms because the home country may provide an advantageous environment for the development of AI and training of ML algorithms.

Our analysis proceeds as follows. First, we examine how digitalisation is enabling dynamic interactions and mutual adjustment between firms and consumers across distance that were hitherto only possible under co-location. Second, we show how born-digital MNEs can shift these interactions from explicit (i.e., involving a purposeful decision by one participant to transfer information to another) to become unintentional interactions between participants whereby the behaviour of an individual generates unconscious interactions with others. Third, we explore how born-digital MNEs can use AI and ML to capture and analyse information from successive implicit interactions to develop a continuously improving and dynamic picture of users' revealed preferences. We then explain how these born-digital MNEs can use AI and ML and use the information on revealed preferences to create value for participants as well as internalising knowledge for the firm from which it might capture value for itself. Fourth, we show how, by using AI in this way, born-digital MNEs can replace local responsiveness based on cross-country proxies for differences in behaviour with personalisation based on the revealed preferences of individual participants. We illustrate our propositions with reference to value-creation activities of the short-video streaming born-digital TikTok. Finally, we discuss the implications of these findings for IB theories concerning internationalisation of born-digital MNEs and managerial practice.

2. The impact of digitalisation on globalisation

The adoption of digital technologies is leading to relentless, exponential increase in flows of data and information between locations right around the world (Grosse, Gamso &, Nelson, 2022; Altman & Bastian, 2021; McKinsey Global Institute, 2014). This is also becoming true of knowledge and, as more and more individual knowledge and organisational knowledge is codified with the aid of digital technologies (Steinmueller, 2000), it begins to move around the world.

But digitalisation not only changes the volume of global flows of information, it also enables changes in the nature of the linkages across distance. As Luo (2021) argues: "digitalization and globalization have converged to create a new normal of digital globalization fortifying deeper, broader, and more intricate connections between nations, businesses, and individuals. This connectivity has redefined who participates in globalization and how international expansion unfolds." Among these new types of connections, it is particularly significant for our purposes that digitalisation opens the way for dynamic (and often real-time) *interactions* between people, between people and machines, and between machines, that were previously only possible under co-location.

2.1. From connections to interactions

To understand this shift and begin to analyse it implications, let us begin by defining what we mean by interactions and how these differ from connections, flows, and transactions. The Collins Dictionary defines an *interaction* as "a mutual or reciprocal action or influence". Thus, interaction is a type of action that happens when two or more objects (or parties) have an effect upon one another. This two-way effect is essential to the concept of interaction, distinguishing it from connections that have a one-way causal effect on one of the parties. Additionally, however, the concept of interaction brings into play a second, dynamic dimension whereby the effects of one party on the other's behaviour in turn alters that party's response in their subsequent interactions.

This dynamic mutual adjustment distinguishes this type of interaction from either a connection across distance (which implies nothing about behaviour) or a flow of trade, finance, information, and knowledge between two geographically separated parties (which implies nothing about adjustment by the recipient). We can also distinguish dynamic interactions from transactions. A single transaction, or spot exchange, clearly lacks the dynamic element. Moreover, even if such a transaction was repeated, each transaction itself does not involve dynamic mutual adjustment. Moreover, while a series of transactions might lead to the parties changing their behaviour as the sequence progresses, any such behavioural change is not in response to information directly passed from the buyer back to the seller.

Dynamic interactions involving mutual adjustment between co-located individuals can generate new knowledge. The process by which this happens has been extensively explored by Joseph Luft. He showed how interactions between individuals or groups, driven by interpersonal behaviour, enables new knowledge about behaviour, feelings, and motivation to be created, shared, and integrated (Luft, 1969). Such social interactions enable the articulation and codification of implicit knowledge and the emergence of new insights about self and the other. Interactions between firm and consumers, for example, generate the knowledge required to underpin consumer value creation.

An analogous process is postulated by Nonaka (1994) in his dynamic model of organisational knowledge creation. This involves four modes of knowledge conversion: socialization (from tacit to tacit); externalization (from tacit to explicit); combination (from explicit to explicit); and internalization (from explicit to tacit). The socialization stage involves "creating tacit knowledge through shared experience", and it occurs "through *interaction* between individuals" (op. cit., pp. 19; our italics). Nonaka also notes that "an individual can acquire tacit knowledge without language ... through observation, imitation, and practice". The combination stage involves combining explicit knowledge held by interacting individuals "through such exchange mechanisms as meetings and telephone conversation".

As we detail below, one of the special characteristics of modern digital technologies is that they enable at least some of the types of dynamic interactions that normally occur when we socialise under co-location to happen across distance, generating new knowledge that can be captured, internalised, and acted up on by a firm. The fact that digitalisation opens the way for dynamic interactions that were previously only possible under co-location, therefore, has important implications for firms' internationalisation through entry into new markets.

Market-seeking internationalisation rests upon the capability of the firm to learn about the peculiarities of each new country market. To compete effectively in a new market, it was necessary for the firm to learn about the relevant market by acquiring experiential and location-specific knowledge (Doz, Santos, & Williamson, 2001) about local participants that would enable it to tailor an offering that would appeal to particular groups or segments of consumers located there. The interactions between the firm and participants in each host-market play a central role in acquiring this kind of market knowledge. Within this context, therefore, one of a new entrant's key objectives is to initiate a set of interactions with local market participants that reveal their peculiar preferences. These revealed preferences can then be used to guide the firm in adjusting its offering to better fit with these local peculiarities -- a process characterised in the literature as "national responsiveness" (Prahalad and Doz, 1987).

2.2. Revealed Preferences

Observing revealed preference (Samuelson, 1938) is a long-established method of dealing with a fundamental problem potential suppliers face: that patterns of utility underlying consumer demand functions are inherently unobservable. The solution to this problem commonly adopted by economic theorists relies on the simple premise that "the consumer chooses a bundle of goods that is preferred to all other bundles that he can afford." (Varian, 1982: 945). The demand function can then be estimated by computing the statistical best fit to these observed choices. Even with large volumes of data, the risk of errors associated with approach increases with the firm's ignorance of the implicit rules that shape the demand function in a new market (such as behaviours influenced by geography, demography, or other contextual variables).

Varian has shown that alternative, non-parametric approaches can be used effectively to estimate the demand function based on revealed preference data without any ex-ante hypothesis about the behaviour of the market (Varian, 1982). Such approach can now be operationalised using unsupervised, non-parametric ML (see, for an example, Blumberg and Thompson, 2022). Non-parametric algorithms do not require any ex-ante assumptions about behaviour, although they generally require larger data sets to produce reliable results. These results are also harder to explain, given the absence of a hypothesised, underlying behavioural model.

Born-digital MNEs have increasingly used these non-parametric algorithms to estimate the unobservable demand function when they enter new markets. The AI algorithms deployed by TikTok to work out which short videos to stream to users each time they use the app, are one example of the effective use of a non-parametric approach to revealed preferences. TikTok's AI architecture includes 'deep learning' algorithms that can handle non-linearity and infer complex relationships, along with online machine training and real-time adaptation, features that minimise the deviations that have been identified between the preferences revealed by user behaviour and the actual, normative preferences associated with their true interest in different types of content (Beshears et al, 2008).

Recognising these developments, we now turn to analyse how born-digital MNEs are able to use AI and ML to build a picture of user preferences in an unfamiliar, foreign market that they can use to effectively tailor their offerings even in the absence of local presence.

3. Shifting from explicit to implicit interactions across distance

The earliest born-digital MNEs used digital technologies to enable transactions and articulated, explicit interactions between individuals. If these were sufficient, as is the case for standardised goods and services such as foreign exchange, a born-digital firm could internationalise its business without any local presence. It was only necessary that the relevant digital infrastructure was in place to enable participants to access a platform that the born-digital MNE hosted in their home base (cryptocurrency exchanges would be a later example). But while such an MNE now operated its business in digital, virtual space, it was still tethered to its location and the associated context, including the local regulatory environment. Nasdaq, for example, does not have a physical location, but because it is subject to US regulations, it is firmly tethered to its home country despite being an online global marketplace.

Monaghan et al. (2020) extended this idea to argue that digital firms could use what Brouthers et al. (2022) termed 'virtual presence' to leverage their existing advantages in foreign markets while maintaining little or no physical presence in the host country. They pointed to recent advances in digital technologies that enabled firms to acquire customers or users and even deliver products (by using technologies such as 3D printing), or services (by, for example, using the cloud), while avoiding the need to establish formal foreign-based subsidiaries or utilise export channels. While born-digital MNEs could theoretically operate on the basis of interacting digitally with users through a series of explicit choices, other authors have pointed out that, in practice, such firms have found some of these interactions require physical presence to be effective. Monaghan et al. (2020) recognised this fact, introducing the notion of a 'space-place relationship' such that born-digitals might need to adopt different combinations of digital activities operating in 'space' with other activities physically located in a 'place', depending on their needs. Stallkamp et al. (2023) extended this argument further, contending that exploiting digital technologies internationally often requires a range of complementary, non-digital resources. They contend that born digitals typically deploy FDI when large cultural and geographic distances limit the fungibility and scalability of such complementary resources, so that FDI increases with cultural and geographic distance from the home to the target market (although this effect is moderated by business model type).

Other born-digital MNEs, however, have pursued a different course, relying on AI/ML to render the generation of data on revealed preferences through interactions with its users or between its users implicit (in other words, unintentional).

3.1. Implicit interactions

To introduce the concept and characteristics of 'implicit' interactions and their implications, let us consider the nature of different types of interactions. We propose that the social interactions necessary to support any activity, including experiential learning, can be classified into four types as shown in Figure 1. Activities may require interactions directly between humans (H2H) or interactions that are mediated and curated by an AI algorithm (H2A). In either of these cases, the knowledge associated with the interaction may be shared explicitly through codification by the individual. Examples include users tapping to "Like" a video on YouTube or a Facebook page; "Share" a post (such as re-tweeting a Twitter message); send a message to the author of a post (or add one to it as in LinkedIn); or "Bookmark" the post. Such 'explicit' interactions have long been used by digital firms (such as social media platforms and e-commerce marketplaces) using rule-based algorithms and expert-systems or ML to create models designed to predict a user's future behaviour.

Reliance on capturing data from explicit interactions to model behaviour, however, comes with several limitations. First, many users may choose not to codify or record the results of their interactions (failing, for example, to respond with a Like or choosing not to share, even if they appreciate a piece of content). Explicit interactions will, therefore, be incomplete. Second, much of the information about a user's underlying preferences will be lost in the process of codification into a single, explicit response. Responding with a Like, for example, will not reveal anything about the strength of that emotion. Third, relying on explicit interactions only provides information about the preferences a user intentionally recognises. Hence it is likely to provide only a limited picture of the user's normative preferences, many of which the user does not consciously recognise as underlying drivers of their own behaviour.

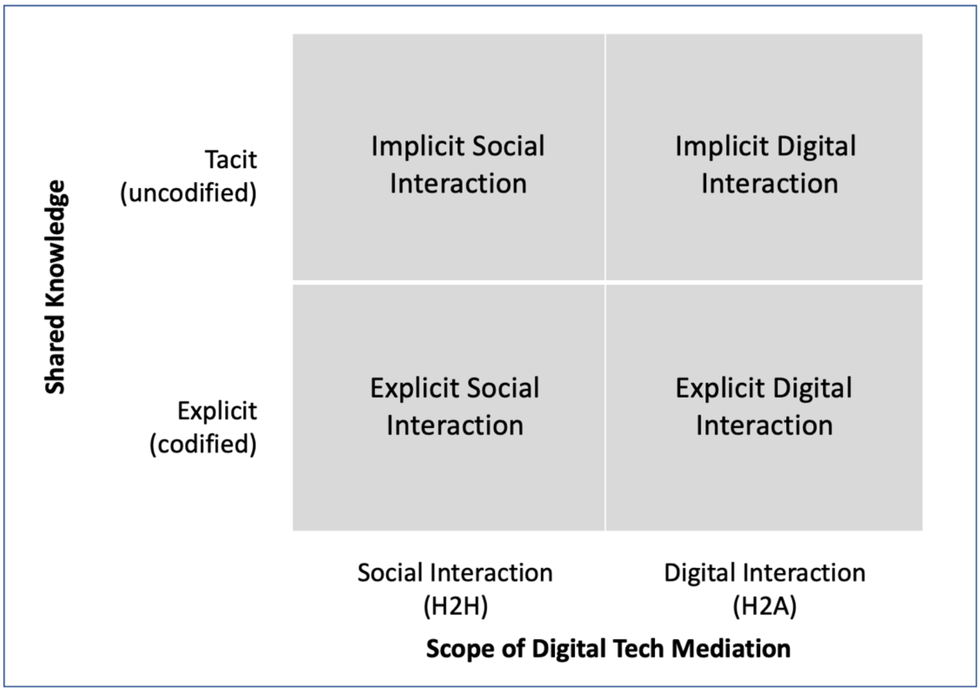

Figure 1: A Typology Knowledge Interactions

An alternative is to design a digital interaction such that users implicitly share their preferences through the implications of their behaviour (thereby creating an 'implicit interaction' that operates in the top right quadrant of Figure 1). Here, the information about the interaction and the preferences that drive it are not explicitly codified, but rather imputed directly from behaviour. Such interactions are mediated by digital technology on both sides and constitute technology-to-technology interactions (Yadav and Paul, 2020), such as the interactions between a user (through, for example, their mobile device) and the firm's AI algorithm.

The interaction between user-consumers and user-creators of short videos on TikTok is a good example of this implicit sharing. Hundreds of millions of participants supply new content which is then digitally shared with other participants using TikTok's app. Much of this new content is not even imagined by TikTok nor is it necessarily imagined by the potential users. TikTok users don't need to think about and search for the videos they might like but are fed personalised streams of short-videos. Nor do they consciously need to codify their reactions to a video by using a Like or tag. Instead, a user-consumer's actions, including which of the videos pushed by TikTok's algorithm they watch and which ones they discard with a swipe up, along with how may seconds this decision takes, or whether they watch the video in full, or view it several times in a row, or if they look for information on the user-creator of a video (by swiping left while watching it), constitute implicit interactions between user-consumers and TikTok's AI that will have an impact on the interactions between TikTok's AI and the user-creators of the content that was streamed. These interactions do not involve an explicit, intentional sharing of between users and TikTok or between users, but instead implicit interactions curated by the born-digital firm's AI.

3.2 Predicting revealed preferences

Implicit digital interactions occur entirely in a virtual space, obviating the need for physical co-location and untethering the interacting parties from where they are located. In the case of born-digital firms such as TikTok, the interaction between the firm and its individual users or between users (who may play the roles of consumer and/or creator) is through the intermediary of a digital platform that, through its associated algorithms, mediates and curates the interaction. The AI algorithm analyses these implicit interactions to construct an increasingly detailed and accurate estimate of the revealed preferences of each of the individuals involved. By linking the consumer's choices with the given attributes of each video (e.g., tags describing the video genre) the algorithm gains information on the revealed preferences of the consumer. The AI algorithm can also analyse data on each creator's preferences and capabilities. By analysing the underlying attributes of the short video (using, for example, ML techniques such as computer vision, speech recognition, and natural language processing), the AI algorithm is able to build up a predictive model of what type of video a particular creator prefers to produce and post.

Capturing information from implicit interactions with its users or between its users has several advantages for a born-digital firm, helping them overcome each of the limitations of relying solely on explicit interactions. First, the information about a user's preferences is more complete because it does not rely on the user choosing to interact explicitly with other users, such as adding a Like or making a comment, and hence captures relevant data even when users don't reveal their preferences explicitly. Second, data on a much richer set of variables can be collected by tracking implicit interactions (such as the time taken to make a choice to discard an offering) than is the case for explicit, codified interactions. Implicit interactions, therefore, can be mined to reveal more about preferences than purely explicit ones. Third, by tracking implicit interactions, preferences are revealed directly from behaviour even when users do not explicitly recognise them, reducing unconscious bias and post-rationalisation.

The ability of a born-digital MNE to effectively leverage the information on revealed preferences it gains from tracking implicit digital interactions with, and between, its individual users, depends on the types of AI architecture it deploys. ML algorithms (such as collaborative filtering, deep learning, unsupervised clustering, and k-nearest neighbours) have emerged as a preferred method for developing applications that understand consumer preferences (Kumar et al., 2019). The training that lies behind these ML algorithms can be updated on the basis of a 'batch' of new data or take place continuously as new data is generated by users.

Interestingly, as we explore below, from the standpoint of internationalisation and the role of 'place', AI based on continuously updated, ML algorithms using data on preferences revealed from implicit interactions does not need to capture any of the characteristics of the user or their environment. TikTok, for example, does not require users to provide any information about themselves, such as their demographics, or country of residence, when they register. This is because, instead of relying on user characteristics as proxies to predict behaviour, these AI algorithms are designed to work effectively in predicting behaviour solely on the basis of preferences revealed from implicit interactions. TikTok, therefore, does not stream short-videos to a user based on the user's social network, nor the creator's number of followers, because such criteria could distort the patterns derived directly from users' revealed preferences.

4. Born-digital MNEs, internalisation, and value creation

Casson (2022) shows that Dunning's (2001) internalisation theory of how MNEs create value can be extended to network MNEs, including born-digital MNEs, where the communication networks established by these firms can be used to create value that it is not possible for external market transactions to generate. It is economically beneficial for an MNE to internalise the exploitation of proprietary capabilities or information when the internal process of deployment is more efficient than the alternative of selling or lease its use to a third party (Buckley and Casson, 2020). Autio et al., (2021) go on to describe how this can hold true when digital firms establish a central facility capable of processing user instructions and connecting the appropriate participants. In the case of born-digital MNEs, by deploying appropriate AI algorithms, the MNE can internalise the implicit interactions with, and between, users separated by distance and use this knowledge to create value for its users (and potentially feed value capture mechanisms for itself).

If the implicit interactions took place through an external market, the information contained in the revealed preference would not be captured (Clough and Wu, 2022). By internalising these implicit interactions within the born-digital MNE, however, the information dynamically generated by the MNE's proprietary AI algorithm can then be deployed to create value for users by improving the fit between the MNE's personalised offerings and their revealed preferences. As noted above, this can include offerings that the users would not have imagined nor wished for.

TikTok, for example, details four main sources of value that are created by internalising information from implicit interactions with its AI algorithm: 'user [consumer] value', '[user] creator value', 'long-term user value', and 'platform value' (Smith, 2021). These sources of value result from TikTok's AI technical architecture (Mage, 2022; TikTok, 2020).

5. AI and internationalisation at-a-distance

In the case of the most basic form of internationalisation, export, where the 'international department' takes responsibility for exporting a good or service to an overseas customer, knowledge is shared by means of a series of explicit social interactions between individuals (such as the preparation of quotation, specification of an order, the issue and payment of on invoice) undertaken either at a distance or face-to-face. In the case of the export of a service, the contract may have to be delivered by co-locating production with the customer. As Monaghan et al. (2020) described, born-digital exporters can use this model through virtual presence, but only where the interactions required are relatively simple and can be standardised.

In the classic internationalisation process of MNEs, by contrast, FDI plays a key role (Caves, 1982). FDI is important because it enables the MNE to learn about the distinctive nature of local market actors including consumers, suppliers, and regulators abroad (Johanson & Vahlne, 1977). As the distinctive, local characteristics of the market and their interactions are typically subtle and hard to discern and transfer across borders, such learning is difficult to achieve remotely and so co-located, experiential learning over an extended period is generally required. The concept of the liability of outsidership extended this definition of the learning challenge that a foreign entrant faces to include investments in accumulating the relationship-specific knowledge necessary to establish a position within local networks (Johanson & Vahlne, 2011). This further justified the need for investments "on the ground" locally either through establishing a subsidiary or multiple, often extended visits by employees to build relationships with local distributors or other providers of complementary services.

Once an MNE had acquired the necessary knowledge of the distinctive characteristics of the local market and its network of relationships, it could use this as proxies to predict the behaviours of local participants. This includes the buying behaviour of consumers, the behaviour of local suppliers and the likely response of competitors. Born-digital MNEs who follow this traditional internationalisation strategy also face the problem of learning about the proxies necessary to predict local market behaviour, with the added challenge of working virtually. Indeed, Brouthers et al., (2016) argue that because what they term "ibusiness firms" generally produce value through the creation and coordination of a network of users with distinctive local behaviour, these firms will tend to suffer greater liabilities of outsidership when expanding abroad.

Born-digital MNEs that rely instead on utilising AI to predict behaviour using information on revealed preference gathered by internalising implicit digital interactions, however, will have little need to accumulate knowledge necessary to proxy local behaviour. Instead of localising their offering designed to match the expected behaviour of a geographic or country market segment, they will personalise the offering to what they know about an individual's revealed preference over time. This business model provides a way of realising the possibility of tailoring the offering to a 'segment of one' as envisaged by Prahalad and Krishnan (2008).

To successfully sidestep the need to accumulate local experiential knowledge the born-digital MNE's strategy needs to satisfy certain specific conditions. First, it is necessary for the space where interactions take place to be untethered from geography. This requires the digital space to be capable of stimulating dynamic, implicit interactions between the firm and its users and between the users that can be internalised and used to reveal their preferences through AI. This happens in TikTok, for example, when creators/producers and consumers reveal their capabilities and preferences by posting or responding to content presented (pushed) to them the moment they open the application. In this way, the producers of content also become segments-of-one on the supply side of the platform, able to create their short-videos and adjust their offering guided by and AI that is capable of real-time adaptation. Prahalad and Krishnan's (2008) notion of 'co-creation' is, therefore, extended to involve bilateral segments-of-one engaging both producer and consumer, rather by the consumer simply reacting to an invariant offering presented by a producer.

Second, the frequency of these implicit interactions must be sufficient to generate enough data to reveal consumers' preferences. If an individual consumer utilised the born-digital MNE's offering only rarely, it would not be possible for the AI algorithm to build up an accurate picture of that individual's preferences. Because TikTok's content comprises a huge quantity of short videos, for example, it enjoys access to information on a very large number of implicit interactions between producers and consumers from which it can capture their revealed preferences. TikTok also chose to push a stream of short-videos every time a user opens its app, stimulating the user to react to it by swiping it away or keep watching it if they like what they see. This distinguished TikTok's approach from competitors who simply recommended a list of videos that the user must explicitly choose from before even starting to see the video. If it were to deal only with feature length movies of several hours, by contrast, it would have much less information on the preferences of its users available to its AI algorithm.

Third, for the born-digital MNE to dispense with the need to invest in local networks, its digital space must enable users to perform all the activities required for value creation independent from involvement of other local stakeholders. This enables producers to move from being suppliers of physical resources (which are, by necessity, situated in a particular location) to become users who supply virtual content that is not location-bound. In the TikTok example, this is enabled through the provision of a comprehensive suite of tools and help functions that enable all users to create, distribute, promote, and consume short videos.

These requirements mean that the possibility of shifting away from country-based segmentation and FDI to supplying personalised, segments-of-one do not hold true for all born-digital MNEs. Most importantly, for local presence to be unnecessary, both the tools that participants use to interact with the platform and the AI and ML methods must be universal (or “general purpose”) technologies with respect to geography. In the case of TikTok, for example, both their digital platform and their algorithms use a set of universal methods and tools which can deliver value regardless of the content users contribute and consume. This is also true in businesses of information search, news aggregation, and music or video streaming, because in each of these sectors firms may choose an AI architecture that enables them to infer the preferences of individual users revealed by their actual behaviour, avoiding the need to accumulate knowledge of proxies such as demographic traits, social networks, or location that would otherwise be used to predict behaviour by traditional MNEs.

Of course, born-digital MNEs may choose to localise their offerings to improve the fit with particular groups of users based on dimensions that go beyond an individual’s revealed preferences as assessed by the AI algorithm. The simplest example is for a born-digital MNE to present a potential new user with an app, or a site, expressed in the language most frequently associated with the geographic location they connect from. Even then, however, the use of this geographic proxy is not aways straightforward, as is the case with Switzerland with four official languages and many German-speaking users, for example, living in the majority Italian-speaking canton of Ticino. A new user may also be signing up while travelling. Hence, born-digital MNEs are likely to revert to reliance on individual preferences by asking a new user to choose a preferred language to be used in explicit interactions. Likewise, the born-digital MNE may, for example, localise its offering by dubbing audio or video captions into a local language. Again, however, this adjustment to improve the offering’s fit with the potential user will generally be based on the revealed language preference of the user rather than adaptation to the user’s geographic location.

The localisation of a born-digital MNE’s offering can also happen inadvertently where it relies on users’ revealed preferences drawn from implicit interactions. In the case of TikTok, for example, the AI algorithm incorporates 'collaborative filtering' whereby if two users have watched a set of videos with similar attributes, the next video one user prefers will be suggested to the other user. As a result, if the two users happen to be in the same country, therefore, the AI algorithm will offer them a similar selection of videos. But again, this commonality is driven by similarities among their individual revealed preferences, not any attempt to use their geographic location as a proxy for their tastes.

The main reason why a born-digital MNE might need FDI in a country in order to create value, then, is not to improve the fit of the offering to users' preferences. Instead, it is more likely the result to satisfy regulatory constraints. Regulatory requirements in the European Union, China, and the United States, for example, are increasingly requiring that data be stored on servers located within these jurisdictions. FDI might also be necessary to support various value-capture activities of born-digital MNEs. A local sales team, for example, may be required to understand the criteria advertisers in a particular country use in deciding whom to target and to pitch the distinctive strengths of the born-digital MNE as a marketing tool to potential corporate buyers. Given that the interaction with users takes place virtually, and that the offering is personalised to individual users based on their revealed preferences, however, local presence through FDI will be unnecessary for a born-digital MNE that internalises implicit interactions and uses continuously updated, ML algorithms harnessing revealed preferences to create value for users and accumulate a proprietary information asset.

6. Implications for International Business theory

The new approach to internationalisation by born-digital MNEs described above has important implications for international business theory. Much of the huge literature on entry into foreign markets (Shen, Puig, & Paul, 2017) is built around the assumption that expanding MNEs need to invest in understanding proxies for differential behaviour of local consumers compared with other countries, such as culture, demographics, or tastes. The ability of born-digital MNEs to use AI/ML algorithms to collect and analyse data using non-parametric methods directly on the revealed preferences of individuals as segments-of-one renders it unnecessary to invest in testing priors or understanding indicators at the country level that are traditionally used to predict differences in behaviour. Countries, therefore, are no longer necessarily a fundamental unit of analysis for born-digital MNEs' internationalisation being replaced instead by personalising the MNE's offering for segments-of-one – wherever they are.

Contrary to the assumption of existing IB theory, born-digital MNEs utilising AI will require a process of internationalisation that enables it to use AI to overcome a different set of challenges, viz:

1. Rapidly building a user base sufficiently large and diverse such that it creates the potential for implicit interactions as they react to a large variety of offerings;
2. Encouraging these interactions to become sufficiently frequent that an AI algorithm can rapidly accumulate the information on individuals' revealed preferences necessary to predict their behaviour with the level of accuracy at least that necessary to keep them engaged;
3. Internalising these interactions within the born-digital MNE so that the proprietary information accumulated can be used by the AI to create value by reliably matching the attributes of the offering with the revealed preferences of its users.

TikTok, for example, achieved the first of these requirements by acquiring Musica-ly. Musica-ly was established in China as born-digital platform for users to create and share short videos of lip-sync singing to a large database of songs. It became quite popular in the US, attracting tens of millions of "musers" (Musica-ly users). Meanwhile, China-based ByteDance, known for its advanced AI/ML technology, launched Douyin (in China), a copycat of Musica.ly. However, Douyin was built using ByteDance's proprietary AI algorithms capable of generating personalised recommendations based on the revealed preferences of each user. In 2017, ByteDance acquired Musica-ly and merged it with Douyin. The new platform, that grew in scope well beyond lip-sync short videos, was named TikTok (outside China). It benefited from the large base of users in the US (and other countries) and the accumulated data that Musica-ly had gathered about these users. With the acquisition of Musica-ly, ByteDance could immediately benefit from millions of interactions between "musers" in the US (and other countries) and tune its own AI algorithms accordingly.

TikTok achieved the second of these requirements by means of some seemingly small, but important strategic choices. By restricting the content to very short videos they increased the frequency of implicit interactions with and between its users. By enabling immediate video streaming when a user opens the application TikTok also made the process of interacting with new content more seamless compared with competitors such as YouTube where the consumer had to explicitly search for and choose content.

The third requirement was satisfied as a result of the experience gained by TikTok's parent company, ByteDance, in building Toutiao in China since 2012. Toutiao was a news aggregator coupled with AI algorithms that would select and push content for individual users by applying machine deep learning with natural language processing and computer vision capability to analyse headlines and news (content). The frequent interaction between the application and its users associated with news afforded Toutiao the possibility to improve its algorithms over time. By internalising these interactions, it generated proprietary information that was used to improve the likelihood that the news content it offered would fit the individual preferences of each of its consumers. In addition, by harnessing proprietary information generated by the frequent interaction between Toutiao and its consumers over time, it could share some of these data with the traditional news providers and with the new, social media creators (such as "influencers") allowing them to expand the variety of content to fit consumers' preferences. ByteDance was able to draw on this experience to replicate the AI strategy in Douyin and TikTok.

The possibility of born-digital MNEs using AI to internationalise following the process illustrated in the TikTok example, calls for the development of an additional theory of internationalisation complementing Johanson & Vahlne (1977, 2011). We have sought to take step towards developing such a theory by highlighting the replacement of FDI to build the MNE's knowledge about proxies for differences in market behaviour between target countries with strategies designed to accumulate proprietary information about the revealed preferences of individual users dispersed globally.

Within this theoretical framework, where 'country' is not necessarily a relevant unit of analysis of international product-markets, the country of origin of the internationalising firm (rather than the characteristics of the target country market) may still be relevant due to country-specific advantages associated with its home base. In some countries, for example, the prevailing culture or institutional environment may favour the development of key elements required for a strategy of internationalisation without FDI. Developing and training an advanced AI/ML algorithm at the required scale are complex, challenging, and costly tasks.

In China, for example, users and regulators have displayed fewer concerns about data privacy compared with other countries, making China a large and fertile environment for developing AI technology such as that at the core of TikTok's strategy.

Our findings, of course, have a number of limitations that suggest fruitful avenues for future research. Our focus has been exclusively on the opportunity for value creation by born-digital MNEs, not on strategies for value capture and monetisation. Value capture may still require local presence (such as a salesforce capable of understanding and serving the needs of potential advertisers in a target market). It is worth exploring, however, how born-digital MNEs might be able to use AI/ML tools to capture the preferences of counter-parties capable of providing revenues and profits in a process analogous to the one we have described for value creation. Likewise future research could examine how AI/ML might be used to further alternative motivations for internationalisation beyond market entry, such as strategic assets seeking. Nor do we examine how the nature of the product-market, industry structure, the nature of a firm's digital offerings, or non-zero prices may impact the ability of a born-digital MNE to enter new markets by deploying AI/ML algorithms to reveal user preferences.

Future research might also explore the relative effectiveness of different AI/ML technologies in capturing users' revealed preferences and on the cost or training the algorithms. These might include the use of multi-modal data sources (such as video, sound, speech, text, quantitative data and metadata) and the integration of AI/ML tools with human intervention (as is being explored by TikTok).

8. Conclusion

The new possibilities opened by advanced AI/ML highlight the need for born-digital firms seeking to internationalise to go beyond the use of digital technologies simply to reduce the costs of transacting across geographic distance or to enable only explicit social interactions. Such passive use of digital technology constrains the amount of value that can be created.

By embracing strategies that go beyond promoting explicit, conscious interactions with and between users, born-digital firms can create implicit digital interactions. These implicit interactions, mediated and curated by an AI under the conditions deduced above, reveal the preferences of each individual user and can be leveraged by the born-digital firm to offer personalised offerings to segments-of-one. This untethers both the born-digital firm and its users from their locations. The use of the information accumulated on individuals' revealed preferences by a proprietary AI, rather than using FDI designed to learn about the characteristics of country markets as proxies to predict the general behaviour of consumers located there, provides a new way to enter foreign markets and adapt to differences among consumers around the globe. It can, therefore, enable born-digital firms to build new kinds of competitive advantages.

Despite this potential for new strategies for born-digital MNE to create value internationally without FDI, there are important limitations on the conditions under which this potential can be realised. As Rong, Kang & Williamson (2022) have pointed out, for example, some digital business models (such as ride-hailing) require the development of complex local ecosystems to support locally in order to become viable. Even born-digital MNEs that create value through international expansion using AI without FDI, such as TikTok, may require local investment in a host country to capture a share of the pool of value they co-create there (for example, investing in the capacity to understand and build relationships with local advertisers or the local logistics capability required for e-commerce activities). In the case of such diversified business models, not only will internationalisation still require FDI to build local ecosystems, but new market entrants will face various "liabilities of ecosystem integration", analogous to the widely recognised liabilities of foreignness (Zaheer, S., 1995). Nonetheless, as we have shown, the use of rapidly evolving AI/ML technologies may enable born-digital MNEs to move from a model of internationalisation one country at a time to global expansion one person at a time.

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