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Attracting Foreign Direct Investments Through Augmented and Virtual Reality

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Attracting foreign investment is a key component of many countries' economic development strategies. AR/VR solutions can help the process by providing engaging storytelling tools, helping to visualize potential investments, and reducing the need for in-person meetings and site visits.

KEY TAKEAWAYS

- Countries' initiatives to promote themselves as attractive places to invest are often overlooked in innovation policy—but the COVID-19 pandemic highlighted the value of innovative approaches to traditional FDI attraction strategies.
- AR/VR's ability to present information-rich, immersive spaces and reduce the barriers of physical distance makes the technology a promising tool for FDI attraction by facilitating information-sharing and supplementing in-person interactions.
- Immersive technologies can enhance key investment promotion agency (IPA) activities—image-building, investment generation, investment facilitation and retention, and policy advocacy—as well as broader public sector innovation.
- FDI-oriented solutions can serve as a starting point to build local capacity for AR/VR content creation, promote the use of these technologies in other sectors, and develop new public sector products to capitalize on this potential.
- To realize the full potential of AR/VR in FDI attraction and to maximize spillover effects, countries should focus on upskilling the public sector workforce to identify, develop, and implement AR/VR solutions.
- Countries should support the development of robust local AR/VR innovation ecosystems through public sector investment, cross-sector collaboration, and regulatory environments that allow for iteration and experimentation.

INTRODUCTION

Attracting foreign direct investment (FDI) is a critical component of many countries' economic development strategies that seek to promote targeted economic growth. Governments at the national, regional, and local levels look to FDI to generate new jobs, increase local capacity and knowledge, and add value to domestic economies. To create awareness of existing investment opportunities, governments develop FDI attraction strategies, allocate public resources to enact them, and establish investment promotion agencies (IPAs) to implement these strategies. The activity of IPAs is now an essential component of both national and local government strategies to attract investment in the domestic business ecosystem. A primary role of IPAs is to engage in activities and initiatives that enhance and emphasize countries' competitive advantages in order to attract FDI. Investors have a wide range of countries and locations to choose from, so IPAs must differentiate their value proposition in an increasingly competitive field.

In recent years, the global landscape for FDI has been volatile—and the COVID-19 pandemic only exacerbated this uncertainty. Projections predict a weak outlook for FDI in 2021, with a slow recovery in 2022.[1] Given these shifts in the global FDI landscape, governments have seriously reevaluated their FDI attraction strategies and investment policies. Traditional approaches to attract FDI rely on lengthy negotiations and significant travel, limiting the scope of FDI attraction activities. Due to restricted mobility and limited resources, countries struggle to raise interest—as polished websites with excellent stories and promising statistics are not enough. Digitalization of business environments should be a priority within countries' development plans to ensure accessible, cost-effective, and transparent public services for local and international players. Given the existing complexities of FDI attraction processes, this area is highly suitable for innovation, including using emerging technologies such as augmented and virtual reality (AR/VR), immersive technologies that enable users to experience digitally rendered content in both physical and virtual space.

AR/VR solutions could significantly bolster efforts to capitalize on current and potential investment opportunities. AR/VR technologies provide a sense of being in-person from a long distance and could save time and resources necessary for logistics in the FDI attraction process. AR/VR also offers dynamic, accessible environments for interaction, collaboration, and work. There is no need to be in one room to see presentations, review information, analyze data, or review the structure of a new factory. These technologies are widely used among different industries and could offer many yet-unrealized opportunities to mitigate the challenges that FDI attraction agencies, as well as investors, often encounter.

While still relatively nascent, these technologies are becoming more widespread, and with them, a growing market for AR/VR-based solutions. The global AR/VR market is expected to grow to $209.2 billion by 2022. Already, 78 percent of Americans are familiar with VR technologies and increasingly encounter them in their professional and private lives.[2] Thus, countries that invest in AR/VR development in key sectors such as real estate, industry, and tourism will also strengthen their position in this emerging global market by generating local demand and building local AR/VR innovation capacity.

This report reviews the current FDI attraction and promotion landscape and identifies potential entry points for VR/AR innovation throughout this process. It then provides recommendations for

policymakers and investment authorities to leverage AR/VR in their investment attraction strategies.

THE ROLE AND VALUE OF FDI ACROSS ECONOMIES

FDI creates value for both investors and host economies. Investors decide where to establish new businesses or relocate existing ones based on the strengths of the new location and whether they can add value for the company. Advantages of the location could include human capital, research and development (R&D) capacity, a favorable business environment, proactive government support, lower costs, geographic location, or availability of natural resources. On the host-economy side, new investments bring new knowledge and skills to their domestic workforce, while investments in infrastructure increase the long-term value of those locations. One of the most important gains is jobs created by new investments, particularly those with high value added and, in some cases, above-average salaries. FDI can have wide-reaching benefits for the host economy. According to the Organization for Economic Cooperation and Development (OECD), "FDI influences growth by raising total factor productivity and, more generally, the efficiency of resources use in the recipient economy."[3] When foreign investors establish a new company in the host country, the new trade channels, knowledge, workplaces, and technologies positively impact the host country's international trade by increasing productivity and value added. Thus, FDI is critical for a country to improve the overall value of its domestic economy.

There are two primary components of FDI attraction policy: long-, short- and mid-term incentives. Long-term policy incentives that impact FDI attraction include reducing bureaucracy, combating corruption, advancing R&D, improving business and innovation ecosystems, and building local linkages and specializations. These incentives are fundamental for economic development and are focused on enhancing social, economic, and regulatory environments. Short- and mid-term incentives are focused on attracting, promoting, landing, and retaining investments and maximizing spillover benefits across the economy that result from linkages between domestic and foreign companies.[4] While foreign companies may not directly share their technological capabilities or knowledge beyond their own operations, domestic companies involved in their supply chain could benefit from this knowledge.[5]

Both types of incentives present an opportunity to promote digitalization and innovation within a given country. However, FDI attraction strategies can be incredibly complex, and IPAs face growing challenges to gain investors' trust. Investment is based on risk—sometimes very high risk—that may not be within countries' or IPAs' power to mitigate. In recent years, the global environment for FDI has been characterized by rapidly eroding investor confidence because of trade and investment policy uncertainty, lagging global growth, falling commodity prices, and rising protectionism.[6] The COVID-19 pandemic has further exacerbated these challenges: In 2020, global FDI decreased by 42 percent, the lowest level since the 1990s.[7] Governments are beginning to revisit their approaches to address the challenges and increase countries' competitiveness for global FDI attraction.

Policies and Strategies for FDI Attraction

Approaches or models for FDI attraction policies differ from country to country based on competitive advantages and domestic policy objectives. Accordingly, the types of investments and industries they operate in also vary. This requires flexibility and custom approaches for every FDI case; there is no one-size-fits-all strategy or solution. Countries must develop a complex set

of activities to target, attract, and facilitate foreign investments that align with unique considerations. First, countries must know their position. For example, small economies are less likely to attract FDI, based on domestic market size. At the same time, countries should have a strong understanding of capabilities that enhance their competitive advantage. For example, a country that has a strong information and communications technology (ICT) industry with a large talent pool and R&D capacity could be a valuable investment for global ICT firms. During the value proposition discussion stage in an FDI attraction case, countries with high specialization or highly demanding capabilities have an advantage over countries with less-outstanding performance or that lacks a highly skilled workforce.

Overall, FDI policies cover incentives to lower barriers in areas such as opening a business, securing a location, accessing finances, dealing with day-to-day operations, or operating in a secure business environment.[8] Every investor expects a business-friendly environment, and FDI attraction policies also align with a host government's priorities. An export-led FDI attraction strategy, or the so-called "Irish Model," escalates a country's integration into the international market—a system Eastern and Central European countries have often used.[9] This approach is based on low-cost advantages, allowing foreign companies to increase their market competitiveness based on a product's price. Developing countries are keen to attract large multinational corporations (MNCs), which would signal approval of a country's development progress and attract more investors. A country's FDI investment portfolio is one of the tools IPAs use to show the success of FDI policy and the country's value to investors.

When a country's development level progresses and the costs of human capital, energy, natural resources, and other business components are increasing, a country loses its competitive advantage as a low-cost FDI destination. When this happens, the country needs to think about different FDI attraction promotion approaches. Many newly-developed economies such as South Korea's use an approach based on a strong FDI strategy and engagement in economic development processes. Here, governments set investment priorities based on countries' strengths, such as sector performance or specific human capital strengths. After careful analysis, countries target specific investors, such as in certain sectors, skills, or products, which could add value to their local supply chain or innovation ecosystem. This represents a more long-term approach.

The investment cycle has five main stages: attraction, entry and establishment, retention and expansion, linkages, and spillovers.[10] In the attraction stage, investors plan and explore potential opportunities to expand or relocate their operations. Once they find a location, the investor validates the selected location and starts an establishing process that begins the entry and establishment phase. After that, the established business enters the operation phase in order to expand, diversify, and create linkages by establishing new business entities and cooperation partners (e.g., enterprises, R&D organizations, universities). The investment transfers knowledge, technologies, and experience across the host economy in the final spillover stage. This final stage is crucial, especially if adding value to the local ecosystem is a priority in the country's FDI attraction strategy.

Most countries rely on IPAs (government bodies that develop and implement FDI strategies) to manage these complex processes. The activity of IPAs is now an essential component of both national and local government strategies to attract inward investment. National and sub-national

IPAs registered at the World Association of Investment Promotion Agencies (WAIPA) increased from 112 in 2002 to 170 in 2018, with a more than $2 billion total budget in the year 2017.[11] Although IPAs differ in their mandates, sizes, budgets, and approaches from country to country, they are an increasingly important part of investment attraction for economies of all sizes.

To promote countries as attractive investment destinations, IPAs carry out a large variety of marketing and servicing activities that generally fall under four core functions:

- **Image-building** focuses on building out a country's image across FDI attraction efforts through marketing plans, media campaigns, websites, brochures, general communications, and public relations (PR) events.
- **Investment generation** covers activities such as meetings with foreign investors, outreach campaigns, targeted communication, and sector- or investor-specific PR events.
- **Investment facilitation** is all about providing information, site visits, administrative support (including one-stop-shop services), and MNCs as well as small and medium (MNC-SME) linkage programs.
- **Retention and policy advocacy** is concerned with global rankings, surveys of foreign investors and industry associations, policy impact assessments, and meetings with host government policymakers.[12]

Innovation Policy and Country Competitiveness

Country promotion strategies are not limited to IPA activities; they cut across different public sector organizations to improve domestic legal and regulatory environments and enhance a country's value-added proposition for investors. In addition to complex internal processes and the increasingly precarious global environment for foreign investment attraction, the COVID-19 pandemic exacerbated underlying challenges for IPAs' FDI attraction activities. For example, in-person meetings and site visits were often not possible due to country restrictions or individual health and safety concerns, while image-building and other activities moved almost entirely online. A 2020 OECD report notes that "for IPAs, this has meant canceling in-person investor visits, events, fairs and missions, which have been a critical component of image-building and lead-generation efforts; regularly providing COVID-19-related information via their websites; and switching immediately to digital tools and solutions, among others changes."[13] COVID-19 restrictions highlighted the critical need for countries to adapt existing practices and processes to more dynamic digital tools. These changes are crucial to promote and represent a country and are also essential for IPAs and other government actors to carry out policies and strategies within a primarily digital environment. Therefore, a country's competitiveness in FDI attraction and its ability to advance public sector innovation and digital solutions are closely linked.

A 2013 European Commission report defines "public sector innovation" as the process of generating new ideas and implementing them to create value for society.[14] Unlike innovation in other sectors or industries, public sector innovation policy is closely tied to complex processes built on historical traditions and rules. Considering this complexity, generating and implementing innovative new solutions can be challenging for public officials. Governments need to have clear space for experimentation and iteration to promote valuable innovations and establish new legal formats to manage public and private sector relationships.

Over the last decade, governments have sought to increase the efficiency of the public sector through digitalization strategies. A 2019 OECD report notes that "becoming fully digital … entails a shift from e-government (e.g., online tax payments systems) to digital government, which refers to the use of digital technologies as an integrated part of governments' modernization strategies to create public value."[15] Government investment in digital solutions and integrating emerging technologies in public sector activities would give competitive advantages to an economy in the long term. Governments should invest in critical capabilities in order to accelerate the adoption of emerging technologies and necessary innovation processes, including technical capacity, knowledge, skills, and understanding of new technologies within the public sector.

Comprehensive digitalization is critical to driving public sector innovation. To achieve key economic development goals, regional and national governments should enable access to financial capital, skilled workforces, knowledge, and infrastructure as part of broader innovation policy approaches. The central role of innovation policy is to increase productivity and promote growth. The ICT industry has one of the most significant capacities to accelerate this.[16] The world is focusing on ICT innovation—and a strong ICT industry can increase a country's competitiveness for foreign business investments.[17] Considering that the ICT industry is linked to others such as manufacturing, health care, retail, and agriculture, bolstering ICT capacity could positively impact the development of these industries.

Thus, policymakers should promote innovative solutions within public goods and services. The public sector could encourage innovation through special support initiatives and directly purchasing custom solutions for the public sector. Considering the growth of the digital economy, policymakers responsible for economic development should be keen to develop strong local ICT capacities, including for new and emerging digital technologies, to support innovation policies and country competitiveness.

Digitalization as FDI Policy

Digital advancement is necessary for every country to ensure economic development and preserve and multiply their competitive advantages. As mentioned, national FDI policy includes a broad range of areas for such improvements, but vertical policies (e.g., building, tax regulation, and financing) should also promote digitalization. For example, one of the core values of the European Union's digital single market initiative is a "digital by default" principle for implementing public goods and services. In simple terms, every natural or legal person should be able to access goods and services provided by the government in digital form, which also should mean from all over the world. This is important to reduce administrative burdens on businesses and citizens by making interactions faster, more convenient, and less costly.[18] It also directly impacts countries' business environments and increases transparency, which is extremely important for FDI attraction.

FDI policy reflects policy objectives and government initiatives, and also represents investor interests. Governments should use public sector operations and services as a hub for innovative digital solutions, and policies should prioritize digitalization. Setting development priorities for the public sector will increase countries' specialized capabilities. For example, deploying emerging technologies will develop capabilities within both the public and private sector that increase countries' overall competitive advantage in high-tech industries. One example of a

government promoting economic development through emerging technology adoption comes from the United States, where the National Institutes of Health (NIH) funds research in VR for health care settings. Incidentally, North America, led by the United States, dominated the global AR/VR health care market by the largest revenue share (40.7 percent) in 2020.[19] As market growth is directly affected by policies governing public investments, countries should revise their policies such that they share the global value created by the digital economy.

Box 1: Varied Approaches to Building Innovation Ecosystems

Innovation policies will vary between different countries based on factors such as the size of their economies, existing infrastructure and technical capacity, and alignment with other policy priorities.

For example, Singapore's government has clearly stated that its goal as a nation is to be the leading digital economy. To achieve this goal, the government has set this as a priority in its policies and allocated resources to fuel the transformation process.[20] Meanwhile, the United States has promoted smart city development through innovation policy at the state and federal levels through programs such as the Department of Transportation's Smart City Challenge, wherein, for example, the city of Austin has received a $40 million grant to implement urban technology programs.[21] In another example, Property Assessed Clean Energy Financing in Maryland provides low-cost financing for eligible cleantech and energy efficiency projects. And in Atlanta, a citizen-approved infrastructure bond of $250 million is driving a smart city initiative.[22]

Small economies mostly choose to narrow down their specializations. For example, Latvia and Estonia are both focusing on e-governance. In the European Union's "Ranking Digital Economy and Society Index," Latvia and Estonia are ranked number five and number one, respectively, in the digital public services segment and are attracting international interest in their innovation ecosystems.[23] An innovative approach to overcoming the COVID-19 pandemic by developing e-solutions for government, health, and education has shown how capable the public and private sector can be at achieving specialized results. For example, in 2020, the Investment and Development Agency of Latvia attracted €252 million (about $308 million) of investment into Latvia—the highest amount in seven years.[24]

AR/VR AS AN FDI SOLUTION

AR/VR technologies offer many opportunities to enhance communication and increase efficiency in a number of industries, as well as support public sector activities such as FDI attraction. AR enhances physical spaces with information-rich digital overlays, allowing for more effective and engaging storytelling and information sharing. Meanwhile, VR allows users to interact with digital elements and other individuals in fully constructed virtual spaces—reducing barriers of physical distance and offering essentially unlimited possibilities when constructing these virtual environments. These solutions could also be quite versatile. While AR is likely to be most engaging when presented in a heads-up display (HUD), these digital overlays can also be displayed on any mobile device. Similarly, VR experiences are truly immersive when presented on a head-mounted displays (HMDs), but users can also access and navigate 3D immersive environments on two-dimensional screens.[25] And while many AR/VR solutions will be tied to

specific applications, innovations in WebXR—a technology that enables developers to offer immersive content as web applications accessible on any compatible browser—make these experiences more accessible and reduce the need for specific hardware or unique applications.[26]

There is a growing interest in these technologies to deliver innovative solutions across sectors. Already before the COVID-19 pandemic, many experts forecasted significant growth for the VR/AR industry. A 2019 report from PricewaterhouseCoopers finds that AR/VR could add £1.4 trillion to the global economy by 2030.[27] The COVID-19 pandemic accelerated this trend and highlighted the value of AR/VR solutions to address the mobility and distance challenges exacerbated by travel restrictions and safety concerns. One 2021 report concludes that, in Europe, the AR/VR industry could "reach between €35 billion and €65 billion by 2025, representing a gross added value of between €20 billion and €40 billion, and directly creating employment for up to 860,000 people."[28] Another favorable condition for rapid development is the progress of technologies. AR/VR devices are becoming increasingly more affordable and user friendly, and the cost of producing immersive content has also declined in recent years.[29]

AR/VR solutions are gaining more widespread adoption across sectors and in various industries, including entertainment, retail, health care, training and education, manufacturing, military, and others. These solutions consist of software development, hardware production, content creation, consultancy, and other services. Because these technologies are still relatively new, AR/VR deployment "requires specific knowledge, technical skills, and tools, which most [companies] don't have in-house," so "specialization in a specific vertical sector, or even a specific context within a sector, gives you a competitive advantage."[30]

Policymakers are sporadically exploring the opportunities these technologies could offer, but interest in the potential of AR/VR has yet to reach the levels of other emerging technologies such as artificial intelligence and 5G. So far, governments including those of the United States, United Kingdom, Finland, Sweden, France, and others have invested in AR/VR solutions in the health care, education and training, and military sectors. For example, in 2021, the U.S. Army signed an agreement with Microsoft to acquire more than 120,000 HoloLens mixed-reality headsets, at an estimated cost of nearly $22 billion.[31] In the United Kingdom, the Construction Industry Training Board is investing £3 million in several immersive tech projects that will help improve industry training.[32] There are many other opportunities the public sector could explore, including in public service management, city planning, remote work, and tourism promotion. Such initiatives have begun to emerge from a variety of governments, including the Health Reality platform in Germany, Digital Catapult in the United Kingdom, Culture VR in France, Virtual and Augmented Reality park in Belgium, Deusto Immersive Lab in Basque Country (Spain), and 3D virtual tours of main attractions in Croatia, Romania, Greece, Italy, and other popular destinations.[33]

Immersive Solutions for IPA Activities

FDI attraction contains four main activity areas: image-building, investment generation, investment facilitation and retention, and policy advocacy, all of which typically fall under the mandate of state or national IPAs. AR/VR solutions could bring FDI attraction to the next level by offering IPAs new tools to conduct virtual tours of potential investment sites, cities, streets, and offices; share rich and engaging information about local companies, organizations, and culture; and reduce the travel requirements necessary to meet people, work together, or develop a

project. The technologies needed to wholly or partially replace the existing FDI attraction process already exist, but not in one platform. This presents an opportunity for further innovations that combine existing solutions and supplement them with parts that are missing to create one holistic solution for FDI attraction.

Table 1: Immersive opportunities within the FDI attraction process

IPA Function	Objective	Key Activities	Potential for AR/VR
Image Building	Create awareness and generate positive perceptions of a country as an investment destination	• Marketing plans • Media campaigns • Websites and digital assets • Brochures • General outreach and PR events and activities	• Create immersive and interactive marketing materials • Integrate AR/VR solutions into media campaigns • Use AR/VR WebXR solutions to make materials available on multiple devices • Host virtual events in digital replicas of real locations • Create virtual exhibitions or supplement in-person presentations
Investment Generation	Reach out to foreign investors and convince them to locate their investment in the host country	• Meetings with foreign investors • Targeted outreach campaigns, communications, and PR events	• Creating virtual meeting places tailored to specific investors or industries • Integrate AR/VR solutions into targeted outreach strategies • Create virtual replicas of key locations for potential investors to tour
Investment Facilitation & Retention	Facilitate the implementation of investment projects, maximize their economic benefits, and generate follow-up investments	• Provision of information • Site visits • Administrative support • MNC-SME linkage programs	• Utilize immersive tools for data visualizations • Present investment possibilities (e.g., project projections and timelines) through immersive platforms • Develop virtual replicas of key locations for investors • Create multidimensional virtual spaces and events to engage and build connections across ecosystems
Policy Advocacy	Monitor foreign investors' perception of the host country investment climate and propose changes to improve FDI attraction policies	• Global rankings • Surveys of foreign investors and industry associations • Policy impact and assessment • Meetings with policymakers	• Develop surveys that engage respondents with immersive elements • Develop AR/VR-based policy analysis tools to visualize data, projections, processes, and policy impacts • Utilize AR/VR solutions for collaboration when developing FDI attraction policies

Image-Building

Image-building aims to "create awareness and generate positive feelings about a country as an investment destination."[34] Image-building activities typically include marketing plans, media campaigns, websites, brochures, general communications, and PR events. Although existing digital tools for planning, design, presentation, connection, and information have enhanced these activities, AR/VR solutions could further enrich image-building activities by giving more accurate and in-depth impressions about a given country in an accessible and relatively low-cost way. AR/VR lets countries share their visions, strategies, and business, social, and cultural environment more comprehensively, persuasively, and conveniently. How a country presents itself is very important in building the right image. In FDI attraction, the competition between countries and regions is fierce, so the main objective for a country's image-building strategy is to stand out. Using fully or partly immersive solutions within FDI attraction processes offers unique experiences to potential investors that could help a country stand out from the crowd.

AR/VR solutions may complement or replace existing image-building activities. IPAs use international exhibitions and other business gatherings to raise interest in a country among potential investors. For example, IPAs can create immersive and interactive marketing materials, or use AR/VR to enhance media campaigns or even organize big and small gatherings in virtual environments. Opportunities range from augmented marketing materials to comprehensive digital twins.

Further, AR/VR solutions can bolster image-building efforts as an example of a country's robust innovation ecosystem. Regardless of how country representatives use these solutions, it sends a message that the country is open to new technologies and knows how to leverage them—sending a clear message that it is open to innovation. The most important thing is to demonstrate the capability to work with new technologies successfully. To stand out and develop local capacity, countries should invest in AR/VR solutions now and establish a front-runner position.

Investment Generation

The objective of investment generation is to reach out more directly to foreign investors and convince them to locate their investment in a host country.[35] To do this, IPAs implement activities such as meetings with foreign investors (including initial discussions and negotiations or follow-up conversations), targeted outreach campaigns, or communications and PR events for specific sectors or investors. This stage offers some of the most promising opportunities to leverage AR/VR. For example, it is possible to create a virtual replica of a meeting room, building, street, or even a whole city. Such an approach is already frequently used in the real estate sector to plan and implement development projects, as the technology exists to make spaces remotely viewable, analyzable, editable, and ready for spatial computing applications by scanning and virtually rendering three-dimensional spaces.[36]

Using this technology, it is possible to scan the most important objects and locations for FDI attraction, such as industrial areas, office spaces, R&D facilities, cultural sites, and government buildings. After that, IPAs or other government agencies could develop virtual experiences that enable investors to explore potential investment sites using a fully immersive headset or on a desktop or mobile device. The benefit of such an approach is the ability to meet the potential investor without traveling and give them as realistic an experience as possible from a distance.

With digital replicas, meetings with foreign investors can be carried out virtually anywhere in the country, even before they would typically arrange a site visit. Full-scale platforms already exist for virtual meetings and events at exotic locations.[37] These synthetic solutions are based on real objects and locations, but for a more in-person feeling, it is possible to mix 360-degree images with interactive digital elements to deliver a full VR experience. IPAs can also use virtual environments to host exclusive virtual events (e.g., in a national opera house where potential investors meet local business ecosystem representatives such as business owners, policymakers, and researchers).

This capability is not just valuable for storytelling or branding, but it is also a more productive and efficient means of collaboration. Virtual meeting formats allow different people worldwide to work together, access the same information simultaneously, and work with project development in VR. For example, technologies such as this are already widely applied in architecture and real estate development, helping with staging, designing, and ultimately selling a property. People from different locations can collaborate in real-time with 3D (BIM) models in virtual space.[38] Also, when people are buying a new property, it is possible to have a virtual tour and even allow them to preview different layouts or furnishings.[39] During COVID-19, both Poland and Portugal implemented virtual site-selection visits to assist investors by providing information for projects regarding industry, logistics, and services.[40]

If a foreign investor decides to visit a country, IPAs and other actors (e.g., real estate developers) could use AR to illustrate the potential of a location more convincingly. These technologies would be effective in presenting information about the area that could be valuable to potential investors, such as accommodation costs, average salaries, real estate prices, traffic data, and population info. AR is useful when it is necessary to combine real-world experiences or observations with virtual elements. For example, objects under construction, such as new industrial spaces or office buildings, could be previewed and even manipulated in real-time using AR/VR solutions.[41] This could be a valuable tool to share with investors who are deciding between multiple properties because it reduces the number of in-person site visits they would have to make, such as to follow up on the construction process.

In response to the rapid development of AR/VR in real estate, solutions that allow individuals to design and furnish an apartment, office space, or laboratory are also increasing.[42] In FDI attraction, this could serve as a local product promotion platform, wherein an investor could buy local furniture, designs, art, or other products for a new office space.

Investment Facilitation and Retention

The objective of investment facilitation and retention is to assist with investment projects, maximize their economic benefits, and generate follow-up investments.[43] Within this function, IPAs provide investors with information, coordinate site visits, provide administrative support (including one-stop-shop services), and manage multinational enterprise and small and medium enterprise linkage programs, among others. IPAs could use AR/VR to enhance or replace existing processes such as site visits or add value to in-person processes for information sharing or linkage development.

IPAs gather, store, and share a wide range of data with potential investors, including information about the economic, social, and human capital characteristics of the domestic economy and business environment. The most common way to present this information is to use slide decks or

similar solutions. But two-dimensional presentations are often insufficient to reflect the complexity of large investments and economic activity.[44] IPAs could use HMDs or web-based immersive visualizations to tell more engaging, understandable, data-driven stories for both investors and in-country stakeholders.[45] For example, economic data about different regions could be overlayed on a map to allow presenters to "walk through" the data with their audience.

Presenting information in immersive formats can improve understanding and overcome potential language barriers.[46] One of the advantages of the virtual environment is it allows people to work together, so IPAs should be able to use tools to facilitate project development, management, and evaluation through AR/VR solutions. It is possible to create a shared virtual space where foreign clients could meet the representatives of IPAs to collaborate or work out issues or explore challenges.[47] IPAs could use this virtual space not just to facilitate foreign investment but also to deliver services nationally and reach out to international partners.

Creating linkages with the local business ecosystem are very important, as in many cases, investors choose a particular location because of a strong existing business ecosystem in their sector. AR/VR could add a high value to this function, considering the advantage of meeting high-level representatives from the private and public sectors. It is much more convenient to meet in the virtual environment, discuss the operations and cooperation possibilities, and then follow up with more traditional in-person interactions. Also, these technologies could add value to exploring the business ecosystem in other ways, such as virtual tours for other companies, nongovernmental organizations (NGOs), or R&D facilities.

Policy Advocacy

Policy advocacy aims to monitor foreign investors' perception of a host country's investment climate and propose changes to improve investment-related policies.[48] The role of IPAs in domestic policy could include collecting and compiling information for global rankings, carrying out surveys for foreign investors and industry associations, producing policy impact assessments, or organizing meetings with a government to advocate for investment-friendly policies. Although there are perhaps fewer opportunities to leverage AR/VR in these activities, these technologies do offer the potential to enhance some of this work. For example, IPAs might develop more interactive surveys to engage respondents better, demonstrate policy impacts in immersive virtual space, develop AR/VR-based data visualizations, or use virtual meeting spaces and policy analysis tools to develop FDI attraction policies.

These activities would require buy-in from across the government. Enthusiasts see AR/VR as one of the main channels for communication and interaction in the future. If this turns out to be the case, robust capabilities in AR/VR platforms could allow countries to expand virtual representation on a global scale in this immersive future and leverage immersive technologies in foreign policy, international relations, consular services, and diplomatic missions. For example, countries could host diplomatic meetings in virtual spaces or utilize AR/VR in their public diplomacy efforts.

Potential Challenges and Considerations in Implementing AR/VR Solutions for FDI

Although AR/VR offers promising solutions for FDI attraction and economic development, there are important considerations policymakers should address in order to fully take advantage of this potential. At the most basic level, public sector entities often lag behind in adopting emerging technologies due to several factors such as lack of awareness, knowledge, or skills to make full

use of new innovations.[49] Also, the maturity level of the public sector varies among different governments, creating a more significant gaps between innovation and public services for some. The situation in the public sector is not homogenous when it comes to digitalization, and is even more challenging when it comes to emerging technologies such as AR/VR. The level of understanding in the public sector about what these technologies are and what they can offer differs even between individual decision-makers within a given country. To be able to use emerging technologies, the public sector needs to have the awareness, will, and resources to innovate.

Another challenge the public sector could face is leveraging these solutions for highly specific use cases. Because of limited skills and capacity, solutions should be easy to use and maintain, which could also affect the scale of innovation. The more advanced a solution is, the more challenging it will be for the public sector to employ it in its full capacity.[50] Many of the potential uses for AR/VR in FDI attraction are highly complex because a high level of personalization is needed. Also, the particular value of AR/VR in FDI for each country or city is unique based on on-the-ground realities, government priorities, and cultures. Plus, the interest of investors differs between sectors, priorities, and the size of the investment. IPAs should tailor every pitch or offer to investors' unique needs, which requires skills and capacity within the public sector to adapt the product to the client.

There are also concerns about infrastructure—perhaps reflecting lingering perceptions from the earlier days of these technologies more than current reality. Even though devices on the market range from relatively low-cost, basic solutions to high-end devices with advanced capabilities, adoption remains low—which in turn could spell out a relatively low return on investment for IPAs if their target audiences do not have widespread access to AR/VR devices.[51] This could present challenges in the short term; however, as adoption continues to expand, so will the value of immersive solutions. The numbers here are promising. Global unit sales of VR HMDs in 2016 were 5 million units, but in 2020 were forecasted to rise to 68 million units.[52] Indeed, usage of headsets is likely to continue expanding as devices become more affordable and user friendly. Countries should concentrate on content production capacity development providing accessibility through headset-oriented applications as well as WebXR solutions. By investing in this content now, governments could facilitate a robust local ecosystem and establish themselves as front-runners in the future to offer high-quality experiences with authentic VR/AR content.

Finally, it is important to consider security measures when establishing new communication and data exchange platforms, including AR/VR solutions. Considering the sensitivity of the FDI attraction process and the potentially sensitive information AR/VR devices and applications could collect (such as highly detailed spatial mapping or confidential data), robust data governance and security measures should be in place before implementing more sensitive AR/VR solutions. Government should protect AR/VR content to ensure that it is securely owned and managed, especially if this content includes national defense interests or other sensitive aspects of a country's national security.

Potential Spillover Effects From AR/VR Investments for FDI

As this report has discussed, spillover effects are the additional value or opportunities for a host economy created as a result of investments or initiatives. Integrating AR/VR solutions into the

FDI attraction and retention process could yield additional spillover effects that bolster economic development and strengthen innovation ecosystems within a host country.

First, developing and implementing AR/VR solutions could build local capacity to create this kind of content, which will become increasingly valuable as these technologies continue to advance. To effectively use emerging technologies, specific knowledge and skills are necessary to work with these technologies and develop solutions. Public sector investment in this content, regardless of the industry, creates demand for AR/VR solutions, which can drive further innovation both within public organizations and the private sector. However, local innovators need to develop the necessary technology-specific skills. In the case of VR/AR, skill requirements include programming, software development (including for web, mobile applications, and headsets), 3D design skills, game development, video or sound production skills, user experience design and user interface design, and experience in operating HMD and HUD devices.[53] Skill development is an essential part of economic development, especially in emerging industries such as AR/VR. To build necessary skills, a country's education system should also identify new skill demands and respond by offering suitable education and training programs. To be able to use AR/VR in the public sector, including for FDI attraction and health care, education, defense, and other uses, a country needs skilled people who can translate existing tools and information content into an AR/VR format. Creating a local market for VR/AR also forms a local industry that can grow and compete internationally.

Another benefit of FDI attraction promotion including AR/VR solutions is it could serve as a promotional platform for other industries such as real estate, tourism, and workforce development. Governments could create immersive platforms for both public and private sector organizations to "plug in" to introduce their work and offer their services. For example, in the FDI generation stage in which an investor needs to establish their office or build a factory, local real estate companies could offer their services through AR/VR platforms. For the investor, it could be more efficient to find suitable real estate companies and work with them using immersive platforms, as doing so would reduce the extent of travel and other necessary time- and resource-intensive activities. Meanwhile, the local real estate industry could benefit from this capacity and utilize AR/VR platforms for other activities within the domestic economy.

Because there is not yet one singular platform for AR/VR solutions in FDI attraction, there is potential for new, innovative public sector products to emerge. It is worth noting that the global market for public sector solutions is similar to the private sector market. To develop such a product or even part of it, governments should turn to local innovators to develop new-and-improved solutions within the AR/VR sector. Considering the novelty of this sector, many AR/VR-based operations are in the development stage, which means new solutions and systems are needed. For example, standards and best practices to ensure high security and data privacy within AR/VR environments will be critical, as will a transformation of spatial mapping into a virtual environment (not synthetic solutions) with meeting options as the technologies to do so become more advanced and cost efficient. At the same time, the AR/VR market is growing rapidly, and predictions for these technologies are very promising for players within local economies. The government could mitigate these risks to encourage entrepreneurs to explore this field and create innovative solutions for public and private industries. By supporting new ideas within the AR/VR sector, government would promote emerging industry development despite the imperfect circumstances.

Finally, the benefits IPA employees could gain from learning how to use AR/VR technologies as a part of their regular duties to meet, collaborate, and develop materials could be used for functions other than FDI attraction. This could increase IPAs' work-management efficiency by brining regional subsidiaries closer together in daily planning, brainstorming, monitoring, and other internal activities. Perhaps more importantly, it could bring closer international employees stationed in offices abroad to more actively participate in IPAs' planning and development processes. If it is possible to have the same or even higher productivity as in-person, it could decrease travel time and expenses at the national and international levels and allow IPA workers to be more productive. AR/VR could also improve knowledge management and information sharing within and between organizations.

RECOMMENDATIONS

To promote the use and development of emerging technologies, governments should review their digitalization, innovation, and other related policies. Governments could promote emerging technology development and increase innovation capacity using financial, legislative, or knowledge-based support instruments. At the same time, they could encourage emerging technology development by creating a local market within the public sector. To develop local strengths and specialization in particular emerging technologies such as AR/VR, it is important to focus on promotion in both the public and private sector. Considering the risk inherent to emerging technologies, government support measures should balance uncertainty with policies that support innovations in both the public and private sectors. Finally, a robust public procurement system is one of the main technical reasons for the lack of innovation in the public sector. To promote AR/VR solutions in the public sector, governments should adapt public procurement systems by creating a space for experimentation and iteration.

Explore the Use of AR/VR Solutions for Key Activities in the FDI Attraction Process

The FDI attraction promotion process is a highly suitable public service to embrace AR/VR solutions in the public sector. The FDI attraction process represents a complex set of activities carried out at different time scales. Investment profiles are different, which requires a custom approach to every case. To increase efficiency and flexibility in the FDI attraction and promotion process, IPAs should use emerging technologies such as AR/VR. As mentioned, using new technologies has multiple spillovers, so IPAs should try to adapt AR/VR solutions within the FDI attraction process.

IPAs should explore the possibility of introducing immersive technologies into their activities, considering the types of investments they are pursuing, existing investment policy and economic development priorities, and the potential value added for the domestic economy and innovation ecosystems. There are four main FDI attraction stages in which IPAs could integrate AR/VR solutions to enhance FDI attraction and retention strategies:

- **Image building:** Create immersive and interactive marketing materials, base media campaigns on AR/VR solutions, use VR/AR web XR solutions, host virtual events "on-site," or create virtual exhibitions and messes.
- **Investment generation:** Create virtual meeting places to host different occasion meetings (e.g., meeting rooms, R&D labs, a cabinet of officials), create a reach-out strategy based on AR/VR solutions and stories, use VR environments to create space

for all kinds of events, or create virtual twins for most impressive spaces to develop exclusive experiences.

- **Investment facilitation and retention:** Prepare high-quality datasets to present within a virtual environment, present investment possibilities through AR/VR solutions (projections and timelines), develop digital twins for use by public sector organizations as well as investors, or create multidimensional virtual spaces and events to engage stakeholders across a country's business and policy ecosystems.
- **Policy advocacy:** Develop virtual surveys to engage more respondents, transform national bureaucracy requirements in AR/VR learning spaces, develop VR/AR-based policy analyses to visualize data, projections, and processes, or use virtual meeting spaces and policy analyses to develop FDI attraction policy.

Build Domestic Capacity for AR/VR Innovation Across Sectors

To successfully deploy AR/VR technologies in FDI attraction strategies and reap the full extent of spillover benefits, countries will need to have strong local capacity for AR/VR innovation. Indeed, one of the conditions for successful implementation of AR/VR solutions is a country's ability to produce content within the domestic economy. The FDI attraction process includes many promotion and marketing activities that are good for local content production—but without the requisite skills, knowledge, and resources within the domestic economy, countries will need to rely entirely on foreign suppliers to meet this demand.

Prepare the Public Sector Workforce for an Immersive Future

New technologies such as AR/VR can bolster countries' economic development, but only if they have a workforce that can develop and use them. This includes not only a specialized private sector workforce but also public sector capacity for innovation. To tap into the potential of AR/VR technologies, countries should focus on upskilling public sector workers to develop and implement immersive technology solutions (e.g., by training existing public sector web developers and designers on how to create apps and content using immersive technologies) while balancing innovation with important considerations such as safety and cost. This will better equip public sector workers to utilize these technologies going forward, and also increase overall digital skills and literacy, which will further contribute to economic development efforts.

There should not be a knowledge and skills gap between public and private sector employees with similar types and levels of work. To increase public sector capabilities to promote digital advancement, governments should invest in both workforce development and infrastructure. Public agencies should invest in the necessary resources to develop and implement AR/VR solutions, including requisite technologies such as headsets and filming or scanning equipment, and ensure public sector workers can utilize them effectively. Using this technology routinely—such as in outreach activities and internal collaboration and communication—helps develop greater awareness and understanding, which will support innovation-oriented policy development in the future.

Specifically in the context of FDI attraction, IPAs should establish in-house innovation teams to identify and evaluate opportunities to adapt them using new technologies. Even if the team is not creating AR/VR solutions for the FDI attraction process itself, they should understand the technology and oversee the creation and implementation process. To reach such capacity, IPAs

should provide regular training and resources to upskill their employees. Policymakers could also use such an approach to create dedicated and highly skilled teams for innovation promotion based on local industry. From an economic development perspective, the public sector could then share such solutions and skills to transfer knowledge to start-ups or other economic actors to "plug and play," which could lead to new ideas and business.

Invest in Local AR/VR Innovation Ecosystems

Because both use cases and best practices are still in their early stages, emerging technologies such as AR/VR come with higher uncertainty than more established solutions and require more frequent experimentation and iteration. To promote greater innovation in both the public and private sectors, public sector actors should support programs for emerging AR/VR industries. Dedicated support instruments and regulatory environments that allow for greater innovation in emerging industries such as AR/VR would lower barriers to entry in the industry—a key objective for innovation policy.

Technologies such as AR/VR can change such important public services as education and health, but to do that and add value to the domestic economy, public sector actors have to promote this industry in order to build local capacity. To do this, governments should also create spaces for more dynamic experimentation and iteration to promote AR/VR innovation in the public sector, which will subsequently build a new or expanded market for locally developed AR/VR solutions. For example, public sector institutions could allow for flexibility and iterative solutions in their public procurement processes or establish dedicated entities to promote AR/VR innovation within key public sector activities.

Create Opportunities for Cross-Sector Collaboration

To capitalize on public investment in AR/VR development, IPAs should identify private and public players to create an ecosystem around these technologies. Such an ecosystem is necessary to access a broad range of capabilities, the ability to scale quickly, and flexibility and resilience.[54] Most importantly, a robust AR/VR innovation ecosystem could also generate new ideas and partnerships. In this way, knowledge and capabilities could more easily transfer among companies, research organizations, and government entities. Governments should support new initiatives and promote the AR/VR sector's development through support programs, overall awareness, and enabling policies.

The first step in building this cross-sector ecosystem is to map the companies and R&D capacities within a country's AR/VR sector. The second step is to find out what they are doing and what they plan to do. The third is to bring them together and let them know about each other and their plans and projects. And the fourth step is to create possibilities for joint projects by supporting collaboration. The main thing within AR/VR ecosystem is to know each other and let others know what this ecosystem can do for different sectors. But first, they have to know what they can do by themselves. This approach could be outsourced by the government or implemented by IPAs. It is beneficial for local authorities to know about the domestic economy's strengths and weaknesses and be involved in ecosystems because national legislation is an essential enabling factor for innovation growth. The ecosystem can form around one specific project within the public or private sector—such as FDI attraction, manufacturing, health care, or education.

The main goal for a business ecosystem is to help companies create the value they cannot develop within a company's capacity alone. For example, suppose an IPA has an AR/VR project

for FDI attraction. In that case, they already know the companies and people who can create such solutions, which an excellent starting point to create a local AR/VR ecosystem.

CONCLUSION

It is a challenging time for global FDI flows. National investment agencies and governments must increase their efforts to raise interest and land foreign investments in the domestic economy. The FDI attraction process represents a complex set of activities to create interest and mitigate the entrance barriers for foreign investors. Because of this, the FDI attraction process is a highly suitable public service to take advantage of the unique capabilities of AR/VR technologies. The four key functions of IPAs (image building, investment generation, investment facilitation and retention, and policy advocacy) rely on interactions between two or more parties that could be enhanced by—or entirely carried out in—immersive environments.

Emerging technologies such as AR/VR provide an excellent opportunity for the public sector to promote long-term economic development. To gain economic advantages of emerging industries, including AR/VR, governments should identify potential investment opportunities and prioritize building local capacity. The market for AR/VR devices and applications is growing rapidly and in the future is expected to play a notable role in the global digital economy. To achieve this goal, public sector actors should promote overall awareness and understanding of technologies and channel investments directly via entrepreneurship support programs or implementing innovative solutions within public goods and services.

AR/VR environments can supplement or even fully replace in-person interactions. They offer a real-time sense of presence without the costs of travel, time, and resources. Within an immersive environment, IPAs can present complex information in a more engaging and tangible format. Collaboration within AR/VR could also offer a more flexible solution than in-person alternatives by creating spaces and tools for different project development, management, and evaluation activities. AR/VR solutions for the real estate industry could be easily adapted for site visits from the potential investor side. Also, the construction process could be monitored and coordinated through AR/VR solutions. There are many opportunities to use these technologies for the public sector. Using AR/VR in FDI attraction processes is a good entry point for more widespread use across public sector activities.

The main benefit of AR/VR solutions in the FDI attraction process is local capacity building for the private and public sectors. A critical component of identifying and developing AR/VR solutions is local content creation. Because a big part of the FDI attraction process consists of promotional materials, this is a good way for IPAs to start to be familiar with AR/VR technologies and their capabilities. Public sector demand-based local industry development will build capacity to produce AR/VR products and services. Further, country promotion events such as conferences, exhibitions, and messes could be transformed into AR/VR environments or enhanced with virtual elements. This could save time and resources, allow more local companies to be featured, and demonstrate a country's innovation capacity in AR/VR and other emerging technologies.

To promote emerging technology development, including AR/VR, governments should review their innovation policy and dedicate resources and initiatives to strengthen local capacity to develop and utilize these technologies. As part of this, governments should extend or implement AR/VR solutions within public activities.

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