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THE SDGS AS AN OPERATIONAL FRAMEWORK FOR POST COVID-19 RESPONSE AND RECOVERY[1]

LOS ODS COMO MARCO OPERATIVO PARA LA RESPUESTA Y RECUPERACIÓN POST COVID-19[2]

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ABSTRACT

Despite progress on a number of goals, the world was not moving fast enough towards achieving the Sustainable Development Goals in the pre-COVID era. The Decade of Action started with the hit of the COVID-19 crisis, which stressed the urgent need to tackle the root causes of vulnerabilities. This paper explores the roles of different critical actors towards achieving the sustainable development goals (SDGs), namely national governments; local and regional governments and local communities; and the business sector as well as the interactions among these actors that facilitate the implementation of the SDGs.

The paper also discusses how the SDGs provide an operational framework for building back better during the response and recovery phases from the crisis and how the COVID-19 pandemic has changed the policy scene to reimagine the roles played by the different actors.

Lastly, the paper elaborates on three critical factors that would shape the degree of progress in the next decade, namely dependable data, adequate finance and effective implementation of development policies.

KEYWORDS

COVID-19, Pandemic, Sustainable Development Goals (SDGs), Development Policies, Crisis.

RESUMEN

A pesar del progreso en una serie de objetivos, el mundo no avanzaba lo suficientemente rápido hacia el logro de los Objetivos de Desarrollo Sostenible en la era anterior a COVID. La Década de Acción comenzó con el impacto de la crisis de COVID-19, que enfatizó la urgente necesidad de abordar las causas profundas de las vulnerabilidades. Este documento explora los roles de diferentes actores críticos

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hacia el logro de los Objetivos de Desarrollo Sostenible (ODS), a saber, los gobiernos nacionales; gobiernos locales y regionales y comunidades locales; y el sector empresarial, así como las interacciones entre estos actores que facilitan la implementación de los ODS.

El documento también analiza cómo los ODS proporcionan un marco operativo para reconstruir mejor durante las fases de respuesta y recuperación de la crisis y cómo la pandemia de COVID-19 ha cambiado el escenario de las políticas para reinventar los roles desempeñados por los diferentes actores.

Por último, el documento desarrolla tres factores críticos que darían forma al grado de progreso en la próxima década, a saber, datos confiables, financiamiento adecuado y la implementación efectiva de políticas de desarrollo.

PALABRAS CLAVES
COVID-19, Pandemia, Objetivos de Desarrollo Sostenible (ODS), Políticas de desarrollo, Crisis

INTRODUCTION
Achieving the Sustainable Development Goals (SDGs) has been facing challenges even before the COVID-19 pandemic. The UN report on the SDGs progress highlights that despite progress in a number of domains, on some of the goals, progress has been slow or even reversed. Extreme poverty and child mortality rates continued to decline and incidence of certain chronic diseases has been reduced considerably and certain targets of gender equality have seen progress and many countries are taking actions to protect the environment. However, despite recording its lowest point since tracking, poverty rate was projected to be 6% in 2030. Hunger has been on the rise for the third consecutive year; biodiversity has been lost at an alarming rate and greenhouse gas emissions have continued to increase. The pre pandemic period also witnessed a lag in the required level of sustainable development financing and other means of implementation as well as an absence of strong and effective institutions to respond adequately to these massive and interrelated cross- border challenges (Gonzalez-Perez, Mahmoud, Hult & Velez-Ocampo, 2021; Mahmoud, Piedrahita-Carvajal, Velez-Ocampo & Gonzalez-Perez, 2021).

The path to the SDGs implementation has been witnessing heterogeneities within and across countries, thus slowing down any progress towards "leaving no one behind". There are substantial divergences across regions and among countries, with the most vulnerable and low-income developing countries lagging progress on SDGs and

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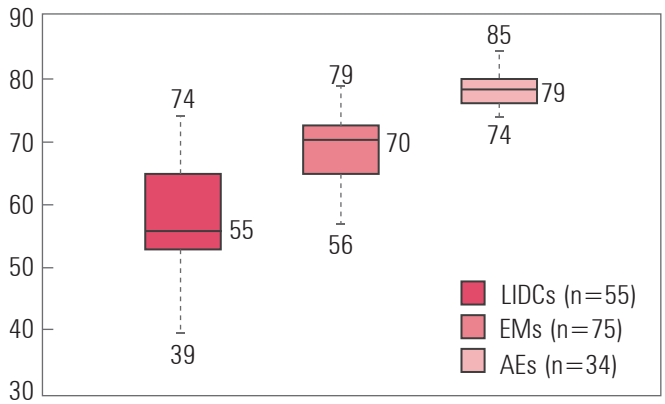
bearing the burden of the ongoing obstacles to the SDGs implementation as shown in (Figure 1). About 84.3% of multidimensionally poor people live in Sub-Saharan Africa and South Asia, the Arab Region witnessed the only increase in extreme poverty as a result of conflicts that plague the region and Africa remains largely off track on the 2030 Agenda (ESCWA, 2020; OPHI & UNDP, 2020; SDGCA, 2020).

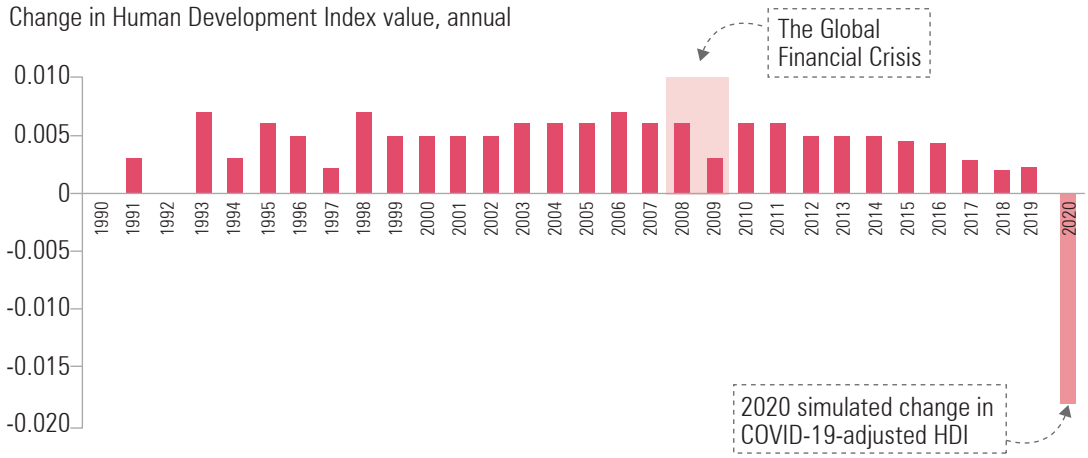
Figure (1): SDG Composite Index, 2020 (Range: 0–100)



Source: Benedek et al., *A Post-Pandemic Assessment of the Sustainable Development Goals*, 2021
Numbers are based on 2020 SDG Index; and Dashboard Reports. Note: The SDG Index aggregates data on individual SDGs into a composite index. The index is based on **pre–COVID-19 data**. Plots exclude extreme values for emerging markets (EMs) and advanced economies (AEs). LIDC = low-income developing country.

Even within the same country, rural and urban differentials are evident in areas such as poverty reduction, education and health care (UN, 2019). To demonstrate, of the over 400 million who are projected to remain poor in 2030 in Africa, two thirds are projected to be in rural areas (SDGCA, 2020). All of these facts combined underscore that as of 2019 the world was not moving fast enough towards achieving the 2030 Agenda. In 2020, the COVID-19 pandemic threatens to reverse a lot of the progress that has been achieved towards the SDGs. The Human Development Index (HDI) was estimated to suffer a "steep and unprecedented decline" in 2020 for the first time since the measure has been computed 30 years ago as reflected in figure 2.

Figure 2: COVID-19 impact on Human Development



a) The 2019 value is a provisional estimate

Source: UNDP, *COVID-19 and Human Development*, p.6, 2020

Preliminary estimates by the United Nations and the World Bank reveal that around 71 million to 115 million people are expected to be pushed back into extreme poverty, with revised new estimates showing the COVID-19-induced new poor in 2020 are expected to rise to between 119 and 124 million as shown in Figure 3. And while the 2021 estimates are still preliminary, the estimated COVID-19-induced poor is expected to increase between 143 and 163 million, highlighting that for millions of people this crisis will not be short-lived (World Bank, 20201).

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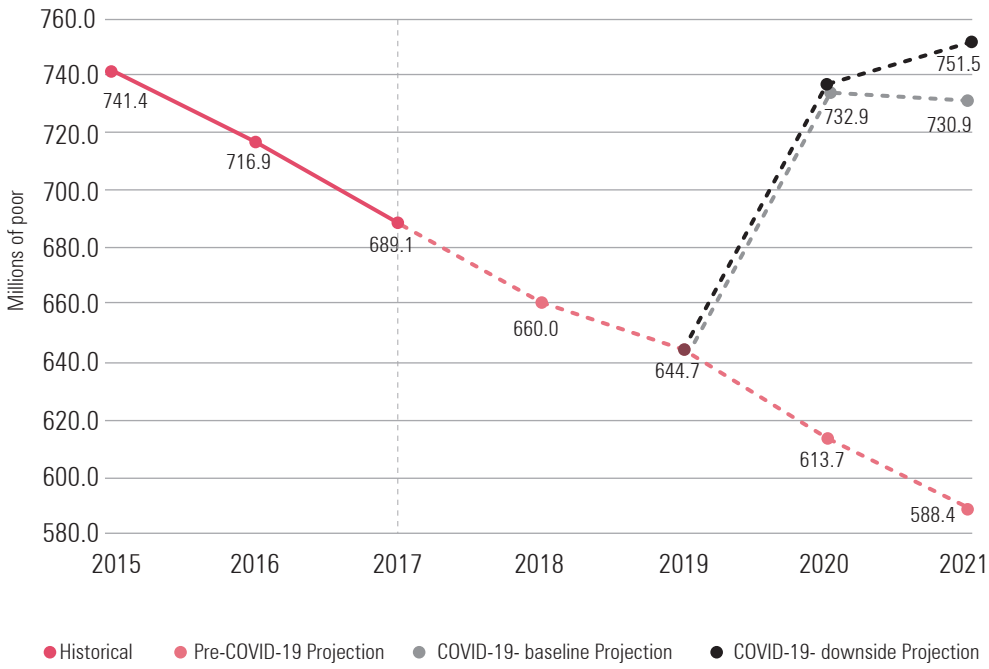
Figure 3. Number of people living in extreme poverty, 2015-2021

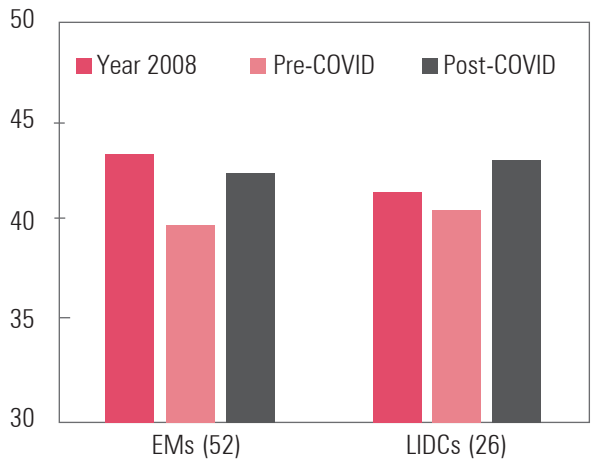


Source: World Bank, January 2021
https://blogs.worldbank.org/opendata/updated-estimates-impact-COVID-19-global-poverty-looking-back-2020-and-outlook-2021

This in turn marks the first rise in global poverty since 1998. As more families fall into extreme poverty, children in poor and disadvantaged communities are at much greater risk of child labor, child marriage and child trafficking, threatening to reverse global gains achieved in reducing child labor for the first time in 20 years (UN, 2020a). The effect of the COVID-19 pandemic is expected to be more acute to the most vulnerable communities. For instance, the more than one billion slum dwellers worldwide are at the highest risk of exposure to COVID-19 as a result of lack of adequate housing, running water and waste management systems along with limited access to formal healthcare facilities (UN, 2020a). The effect of the crisis is expected

to be aggravated because it is superimposed on and interacts with inequalities and global tensions: between people and technology, between people and nature, and between the haves and the have- nots (UNDP, 2020). Heterogeneities in the impact of COVID-19 are also expected across countries. Eight out of 10 people slipping below the extreme poverty line will be in middle-income countries (World Bank, 2020). The COVID-19 crisis has thus exacerbated inequality with the IMF estimates that the average Gini coefficient could increase by 2.6 percentage points for emerging market and developing economies, erasing equity gains since the 2008 global financial crisis figure 4. The COVID-19 pandemic has thus highlighted the need to tackle the root causes of vulnerability; an aspect stressed upon in the 2030 Agenda.

Figure 4: Change in Inequality due to COVID-19 (Gini coefficient, percent, estimate)



Source: : Benedek et al., *A Post-Pandemic Assessment of the Sustainable Development Goals*, 2021
Numbers are based on IMF, *World Economic Outlook*, 2020

Given this background, this literature review aims at looking at the literature that covers the role of the different actors towards achieving the SDGs, namely national governments; local and regional governments and local communities[5], and the business sector as well as the interactions required among these actors to facilitate the implementation of the SDGs. This analysis builds on the initial agreements among governments in the run-up to the 2012 UN Conference on Sustainable Development, where governments agreed to "establish an inclusive and transparent

5 In many cases, the term of local governments is used to talk about municipalities. Accordingly, in the literature review I use Local governments to highlight municipalities as the term local government is more widely used in the literature.

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intergovernmental process on sustainable development goals that is open to all stakeholders" (UN, 2012). The last part of the review goes on to highlight how the COVID-19 pandemic provides a new scope for new trends in sustainability and integrating the "building back better" notion in response to the pandemic.

I. THE ROLE OF GOVERNMENT

Implementation of the SDGs is a matter of governance and coordination among numerous actors, but in an original context where national governments were believed to be a key to success (Dalby et al., 2019). However, because national governments have different capabilities and priorities and face different challenges, it is impossible to generalize and speak of national governments as a uniform category (Monkelbaan, 2019, p.55). Still, studies analyzing countries' Voluntary National Reviews (VNRs) and national development plans find that establishing the structure of a governance system for the SDGs was one of the primary actions taken at the national level (Allen, 2018; Morita et al., 2020). This first step is believed to be crucial for the collective success of the SDGs, especially if the established national governance mechanisms are flexible, translate the global ambitions into national contexts, formalize the state's commitments and allow for stakeholder engagement (Biermann et al., 2017; Morita et al., 2020). However, a closer look at the countries' VNRs submitted so far reveal that developing a governance system for coordination and consultation on the SDGs is not enough per se. For instance, based on a review of 2016 VNRs, Allen et al. (2018) find that limited progress has been made at the national level in planning stages focusing on target setting, assessing interlinkages between targets and policy evaluation. The integrated nature of the SDGs necessitates carrying out these policy exercises to ensure that feedback loops among the targets are understood and managed (Allen et al., 2018). Even studies that analyze more recent VNRs find that only 43 countries report assessing policy coherence in their national governance systems and the lead is driven by European countries, which follow the Policy Coherence for Sustainable Development (PCSD) mechanism promoted by the OECD (Okitasari et al., 2019). This divergence also exists in the usage of indicator-based assessment and benchmarking. OECD countries were found to be more advanced in monitoring and reviewing arrangements which reflect their greater statistical data and capabilities; factors that map to potentially more effective SDGs tracking in implementation (Allen et al., 2018). Additionally, mainstreaming of the 2030 Agenda into National Frameworks up to 2018 lacks reference to key global agreements on climate change, disaster risk reduction, and the New Urban Agenda (Okitasari et al., 2019). Similarly, despite some positive trends in public participation and governments' involvement of broader stakeholders in the consultation processes for SDGs mainstreaming

at the national level, only few countries appear to be making concerted efforts to meaningfully enhance multi-stakeholder partnerships (Okitasari et al., 2019; UN DESA, 2020). Lastly, whereas most countries have made a commitment to identify public sources of funding, fewer have calculated the cost of implementing steps to achieve the SDGs, identified non-public finding opportunities, or developed a framework to boost private-sector financing for the SDGs (Biermann et al., 2017; Okitasari et al., 2019).

The studies mentioned earlier that look at the governance systems required or established for the SDGs especially on the national level appear to focus on the role of national government as an authority entrusted with articulating the issues faced by the society and then act to create an enabling environment for SDG implementation rather than being a monopolist and pure problem solver (Monkelbaan, 2019, p.55). Under this approach, national governments are responsible for developing robust vertical and horizontal governance mechanisms to address cross-cutting and complex sustainability issues. Such governance mechanisms should support a whole-of-government approach as well as cross-sector and multi-stakeholder partnerships that go beyond consultations (Okitasari et al., 2019). However, evidence suggests that the principal issue for national governments is how to align policies in practice given the breadth and complexity of the SDGs, the necessity for governments to work horizontally and the need to include an unprecedented range of public and private actors in both policy formulation and implementation, all of which are factors that hinder translating institutional arrangements into effective implementation strategies (de Mello, 2016; UN DESA, 2020). This is further complicated by the fact that immediate economic and social pressures and vested interests that often crowd out policy initiatives, especially when the benefits from the latter span elector terms (de Mello, 2016; Soto, 2015). Despite progress in establishing governance systems for SDGs and efforts to mainstream SDGs in national plans, evidence increasingly suggests that many national governments appear to be ineffective in the face of global challenges such as climate change, the refugee crisis and the persistent inequality even in many of the G20 countries, just to name a few (Dalby et al., 2019). The rise of the right-wing populist movements further complicates national governments' commitment to the 2030 Agenda because of administrations that view the context for policy as one for competing national states, thus oppose global initiatives (Dalby et al., 2019). This is aggravated by a discrepancy between expressed political support for SDGs and the integration of SDGs in strategic public policy processes, including national budgets (Dalby et al., 2019; UN, 2020b).

Other studies focus on the commitment of national governments to the SDGs through the channel of domestically focused mechanisms of public finance (Suttor-Sorel and Hercelin, 2020; Dasgupta, 2021, p.468-472). Public finance can affect the SDGs by providing incentives for more sustainable production or consumption pattens or generating revenues that can be harnessed to finance the SDGs. For example, if we focus on the environmental SDGs, we find that across countries the

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majority of public finance for enhancing domestic natural assets is allocated via domestic budgets and tax policies, with around 229 biodiversity-relevant taxes, of which 206 are in effect (Dasgupta, 2021, p.469). Other instruments used by public finance in biodiversity preservation are biodiversity-relevant subsidies along with other mechanisms such as payments for ecosystems (PES), biodiversity offsets, raising finance through sovereign and green bonds where funds invested in these bonds are devoted for financing projects that are deemed climate responsible or environmentally friendly (Dasgupta, 2021, pp.470-471). Additionally, governments can increase revenues from other non-tax sources by stronger management of government assets. According to 2018 estimates, potential average revenue gain from better can reach 3% of GDP a year, which provides a space to finance shortfalls in SDG financing (IMF, 2018). Besides, national governments are in charge of providing the adequate mix of regulations, macroeconomic stability, and improved governance and business climate to attract business investments in the SDGs (Zhan et al., 2021). In many contexts, governments step up to overcome SDGs-private investment barriers and mobilize sources of private funding via different mechanisms and initiatives; the famous of which is blended finance. In blended finance, governments provide catalytic capital to increase private sector investment in sustainable development. This happens usually through both grants and guarantees to cover or decrease the risks related to loans and equities. By their structure blended finance mechanisms can communicate to investors the potential financial returns of a project, de-risk it and develop proof-of-concept for innovative projects (Suttor-Sorel and Hercelin, 2020; Dasgupta, 2021, p.478-479).

Despite some progress on public finance mobilization for SDGs, government efforts are still limited and small in size compared to capabilities and the progress required. For instance, the total amount of resource collected from biodiversity-relevant taxes is still small. LIDCs are plagued with inefficient public investment management. Estimates reveal that the average LIDC loses about 53% of the returns on its investments to inefficient public investment management (IMF, 2015; Shwartz et al., 2020). Moreover, in some areas public financial flows that are detrimental to SDG progress dwarf those flows devoted to enhancing the 2030 goals. For example, in many countries most of public finances directed towards subsidies goes to activities that are detrimental to ecosystems and biodiversity (Dasgupta, 2021, p.468-470). Recent estimates have shown that the true environmental cost of some subsidies is much larger than their monetary cost. When accounting for the negative externalities arising from fossil fuel subsidies, the resulting aggregate cost of such subsidies is estimated to be around USD 5.2 trillion annually (6.5% of GDP in 2017) (Coady et al., 2019). This provides an example of the failure of governments that tend to exacerbate market price distortions, coupled with their failure to fully internalize externalities through fiscal measure and standards and regulations setting (Dasgupta, 2021, p. 467).

II. ROLE OF LOCAL AND REGIONAL GOVERNMENTS AND COMMUNITIES

The degree of success of national governments in providing the required policy frameworks for stakeholders' engagement can be assessed by looking at the role played, and challenges faced by the other actors. For instance, cities and local communities are becoming increasingly important in making progress towards the SDGs. Scholars highlight that the 21st century will not be dominated by nation states but by cities which are becoming the islands of governance as well as catalysts of almost every aspect of the global system (Fenton & Gustafsson, 2017; Khanna, 2010). The SDGs themselves emphasize the importance of cities and human settlements for implementing these universal objectives, indicating the need for local action that serves global interests and aligns with local profiles (Fenton & Gustafsson, 2017; Valencia et al., 2019). It is estimated that at least 105 of the 169 SDG targets cannot be reached without proper engagement of sub-national and regional governments (OECD, 2020). However, despite the importance of cities and human settlements to the SDGs as well as the existence of Goal 11, some scholars suggest the 2030 Agenda is more explicit concerning proposed approaches at the international and national levels than for the local level (Fenton and Gustafsson, 2017).

To reach general conclusions about local governances for the SDGs, scholars either review various studies to identify the potential challenges and opportunities focusing on municipalities (Fenton and Gustafsson, 2017) or draw insights from studying certain cities from different countries (Gustafsson and Ivner, 2018; Krellenberg et al., 2019; Valencia et al., 2019). For example, Valencia et al. (2019) use a five-aspect approach in looking into localizing SDGs. The five aspects are: delimitation of urban boundary, integrated governance, actors and the importance of local champions, synergies and tradeoffs and the use of indicators. The study focuses on these five aspects in studying seven cities in four continents, ranging from large metropolitan areas to intermediate and small-sized cities across the Global North and South. The study concludes that political will, coherent governance, and strong formal partnerships between public sector, private sector and civil society actors are key ingredients in achieving the SDGs. Analyzing four cities across Europe, Russia and the United States, Krellenberg et al. (2019) focus on the aspects of planning, implementing and monitoring sustainability strategies that cities struggle with in SDGs context. Similar approach is followed in Gustafsson and Ivner (2018) who examine the Östergötland region in Sweden to identify the roles of municipalities in the SDGs implementation process and provide recommendations to organizations adopting the SDGs.

Evidence from various initiatives highlight the importance of cities in filling some of governance gaps that have been caused by the failure of national governments. Examples include unilateral reduction of GHG at the municipal level and Emissions Trading Schemes (ETS) at the subnational level (e.g. California ETS), British Columbia's carbon tax, Melbourne's goal to become carbon neutral by 2025 and Tokyo's ETS. Similarly, the "We Are Still In" Alliance includes cities

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and states along with universities and corporations which voluntarily declared their continuation to support climate action to meet the Paris Agreement after the United States' withdrawal (Monkelbaan, 2019, p.50). More than 10,000 local and regional governments (LRGs) from 135 countries have committed themselves to take measurable actions to reduce GHG emissions, highlighting the leading role played by LRGs in dealing with climate change (UCLG, 2020). Hundreds of cities have also embedded the SDGs in their local strategies and medium-term planning objectives and sought to strengthen their partnerships with local stakeholders (UCLG, 2020). Cities have also been taking the lead in SDG 17 by building close networks with local, governmental and international bodies, the private sector and the civil society. Diverse cross- border networks of global cities are also seen as the future of global governance.

Global initiatives like Cities for Climate Protection (CCP) program, the Covenant of Mayors, the C40 along with other initiatives focused on sustainable development seek to establish and improve linkages between local and international governance levels, sometimes bypassing the national level (Monkelbaan, 2019, p.54; OECD, 2020). It is also claimed that national and transnational municipal networks play a dual role in horizontal and vertical governance, thus promoting governance by diffusion between municipalities and thereby contributing to intra-municipal transformations. These networks also represent the sum of intra-municipal and inter-municipal actions vertically into national and international debates, thus transcending municipal boundaries (Benz et al., 2015; Fenton & Gustafsson, 2017). Another example for the willingness of local and regional governments to engage in the global agenda is the emergence of Voluntary Local Reviews which can be used to strengthen the localization of the SDGs by helping spread awareness about the SDGs and monitor their implementation at the grassroots level, where accelerated actions can often have the most positive aspects (OECD, 2020; ULCG, 2020, UN DESA, 2020). This is further strengthened by the efforts of some cities to localize the SDGs by measuring progress at the subnational level, with Bonn and Kutakyushu providing examples where indicators have been contextualized.

Despite the role played by local and regional governments towards achieving the SDGs, LRGs still face a lot of challenges in carrying out their tasks as well as being neglected in national consultations. For instance, while the local and regional governments' involvement in the VNR processes has increased to 55% in 2020, up from 42% in 2016-2019, their involvement in most national coordination mechanisms is still very low (UCLG, 2020). According to UCLG, regular consultation has only been acknowledged in 31% of the countries that have reported since 2016. In many different regions, there is a critical mismatch between the increased responsibilities and the revenues allocated to LRGs (Krellenberg et al., 2019; UCLG, 2020; UN DESA, 2020). Although cities account for 80% of global GDP, many fast-growing cities fail to capture such wealth leading them to suffer from having insufficient budgets, infrastructure deficits, informal economies-which reduce the revenue base and

substandard services. Cities' local autonomy is further restricted by constrained institutional frameworks, overlapping power allocations, strong oversights from higher tiers of government and intergovernmental transfers; all of which are factors that are acutely pronounced especially in developing economies where borrowing is still constrained for the majority of LRGs (UCLG 2020). This lack of funds highlights that most states miss the type of integrated national financing framework required to support SDG implementation strategies that are called for in the Addis Ababa Action Agenda. Variation across municipalities' capacities is another challenge LRGs face. Small municipalities naturally have fewer human resources capacity to monitor the SDGs and often need support from national governments, which tend to be reluctant (OECD, 2020). These challenges have become increasingly critical with LGRs on the forefront of dealing with the immediate effects of the pandemic.

Localizing the SDGs also highlights the crucial role that the civil society and community-based organization play as localization calls for an inclusive approach that utilizes local knowledge to tailor the global-development agenda to specific local circumstances (Corella et al., 2020; DDP, 2016; IISD, 2017). The key areas in which Civil Society Organizations (CSOs) work to implement the SDGs locally can be categorized as follows: representation, realization, serving as agents of accountability, monitoring progress through data collection and reporting, and acting as transmission mechanisms (Corella et al., 2020; DDP, 2016; IISD, 2017; Long, 2018). Firstly, CSOs contribute to the implementation as being representatives of disadvantaged, vulnerable and marginalized groups as well as various causes such as the interests of future generations, environmental conservation, among others. CSOs thus contribute to the 2030 Agenda underlying principle of Leaving No One Behind and ensure the participatory quality of SDGs implementation that guarantees that national priorities reflect people's lived realities, with examples including the Disability Alliance on SDGs in Bangladesh and the Liberia CSOs against female genital mutilation (DDP, 2016; Long 2018; UN DESA, 2020). CSOs can also develop partnerships with the local and national governments to ensure that local resources are mobilized for those who are most vulnerable and that their needs are reflected in local development plans and national public policies (DDP, 2016). The second area CSOs contribute to is as one of several agents who directly contribute to achieving the outcomes envisioned in the 2030 Agenda. This contribution to realization can be direct through CSOs capacity in service delivery and expertise in designing and employing means of implementation as well as indirectly by removing obstacles to implementation (DDP, 2016; Long, 2018). In some countries, civil society is integrated more thoroughly into larger, open structures of national implementation like in Finland which has an open portal through which CSOs can register their commitments to contributions to "the Finland we all want by 2050" (Long, 2018).

The role of CSOs as service delivery agents become particularly relevant in areas affected by conflict and characterized by elevated levels of poverty and lack of access to basic services where CSOs are often more flexible and can identify creative and

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innovative alternatives to development (DDP, 2016). This is the case in Somalia where CSOs have filled the vacuum of service provision left by the collapse of the Somali State and thus play a role in providing vital services as well as preparing policy proposals to influence the national and local policy making processes (SIDRA, 2020).

Thirdly, CSOs play the role of monitoring and reviewing to hold states and other actors to their commitments and highlight poor practice. Moreover, some CSOs produce independent or alternative or shadow reports at national level, reacting to governments and providing different perspectives when needed (Corella et al., 2020; DDP, 2016; Long, 2018). The role of CSOs as agents of accountability aligns with the increase in citizens' worldwide demand for transparency, participation and accountability in government operations (Bhargava et al., 2019). Fourthly, CSOs play a role in the needed Post-2015 Agenda data revolution. The 2030 Agenda comes with the imperative of innovating data collection systems that are low-cost and ensure that data are accurate, timely and immediately available to the policymakers and the public as well as disaggregated to reflect the status on the local levels. In their capacity of being connected to the people, CSOs can both participate in collecting the data as well as encourage people to use any new platforms established to keep up with the data requirements (Corella et al., 2020; DDP, 2016). "Localizing the SDGs in Colombian cities" led by the Cómo Vamos Cities Network (CVCN) and its main partner Fundación Corona is an example of an initiative that supports city level Sustainable Development Goal strategy and achievement efforts by developing data tools that can be adapted to cities' varying contexts, including a common list of city-level SDG data indicators and targets and an open data platform (TRENDS, 2019). Lastly, CSOs function as transmission mechanisms for ideas and information between the empowered space of decision making and the wider public sphere. By bringing public interests into decision-making processes and by circulating information outwards, CSOs enhance public awareness and engagement with the SDGs which loops back to higher public pressure on governments to commit to the SDGs (Corella et al. 2020; Long, 2018).

Despite the proliferation of the role of civil society towards achieving the 2030 Agenda, the literature also highlights the challenges CSOs face. First off, the CSOs usually operate in spaces that are defined by the state. The state can enable or constrain the space in which CSOs organize and operate and thus determine the ways in which CSOs can engage with the sphere of decision-making (Corella et al., 2020; Long, 2018). Additionally, although all the 193 UN states committed to involving Civil Society in the 2030 Agenda, analysis of the VNRs submitted between 2016-18 as well as accounts given by CSOs contribution to the HLPFs suggest that few governments have encouraged informed collaboration and few opportunities have emerged for CSOs to participate in official national conversations thus highlighting that CSOs have not been appropriately involved thus far (Bhargava et al., 2019; Corella et al., 2020). Even when the VNRs highlight the contributions of CSOs, they do so in a manner that tend to spotlight success stories rather than taking a critical analysis

approach (Corella et al. 2020). In addition, evidence suggests that CSOs can be directly contributing to the SDGs, for example through service delivery, but fail to map their outcomes to the goals or targets, thus raising the issue of the importance of CSOs reporting (Long, 2018). In many cases, such as Costa Rica, maintaining Civil Society participation momentum in government-led initiatives has proved to be hard because it is challenging to unite members under a shared agenda and the proliferation of forums, spaces and platforms sometimes surpasses the civil society capacities (Corella et al., 2020; UN DESA, 2020). Lastly, financial stability and sustainability continue to be critical issues for CSOs particularly in several middle-income countries where donors tend to pull out. This leaves the CSOs financial sustainability vulnerable to the financial swings and donor interest (Corella et al., 2020).

III. ROLE OF THE BUSINESS SECTOR

The business sector is a key actor because it is where most of the innovation occurs along with its capacity to create jobs and conditions for people to fulfill their potential if provided with the right incentives as highlighted by Pietro Bertazzi[6] (Martinuzzi & Schönherr, 2019, p.10). Additionally, businesses that go beyond corporate social responsibility and invest seriously in sustainable development have an essential role in supporting the 2030 Agenda when it comes to financing. Current levels of public spending will not be sufficient to catalyze the USD 6.3 trillion required to meet the 2030 Agenda infrastructure demands, and thus, innovative financing sources are instrumental (OECD, 2020). In developing economies, the private sector generates 90% of the jobs and 60% of all investments as well as providing 80% of government revenues (IMF, 2020a). It appears that businesses' awareness of the SDGs is high with 92% of respondents to a 2015 PwC survey indicating that they were aware of the SDGs (PwC, 2015). Nevertheless, there is a discrepancy between commitment and action where in a 2017 KPMG survey, only 43% of Global Fortune 250 companies refer to the SDGs in their sustainability reports (KPMG, 2017). Recently, more CEOs are seen to be engaging with the goals with 72% of the companies considered in a 2019 survey publicly mentioned the SDGs in their reporting publications and 95% of companies have a policy commitment to act on climate change (PwC, 2019; BCG & WEF, 2020). However, there is still a relative lack of integrating the SDGs in the business strategy where only 25% of the companies mentioned the SDGs in sections of their reporting that discussed business strategy and only 40% of 332 companies studied have incorporated climate change risks and opportunities in their strategy (PwC, 2019; TPI, 2020). Additionally, there is lack of identifying key SDGs targets and effective measurement of performance against those targets[7], suggesting that the SDGs are yet to occupy an urgent place in most CEOs' agendas (PwC, 2019). Nevertheless, findings highlight that every company has a unique sustainability

6 Head of Sustainable Development at the Global Reporting Initiative
7 For instance, only 1% of the companies surveyed reported their progress against their quantitative ambitions for mentioned SDGs targets.

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profile and the advancement of sustainable business practices within companies is irregular across industries, geographies, and company size (MIT & BCG, 2016). For instance, on the climate issue, a number of companies have developed ambitious plans to decarbonize their operations and supply chains, realizing the beneficial business case of taking action early (BCG & WEF, 2020). However, of the millions corporations worldwide, around 7000 only disclosed climate-related data via the Carbon Disclosure Project (CDP), of which only 1600 set any type of emission reduction target and close to less than 1000 actually reduce their year-on-year emissions (BCG & WEF, 2020). The firms that managed to reduce their emissions are typically those for which it is easiest, with financial firms lowering their emissions by 34% in 2018, compared with just 9% in the transport sector (BCG & WEF, 2020). Similarly, the track record of the highest polluting industries is the worst with only 18% of energy, industrial and transport firms are taking actions to align with the 2°C benchmark in 2030/50 (TPI, 2020). Even when companies report targets, most lie below the requirements set in the Paris Agreement where only 31% of 238 companies analyzed are, or will be, aligned with the Paris/International Pledges benchmark in 2030/50 (BCG & WEF, 2020; TPI, 2020). Around 65% of all company targets reported to CDP are short term with an end date of no more than five years and on average both short-term and long-term targets are about half of what is needed for a 1.5°C world (BCG & WEF, 2020). These variations and gaps reveal that if businesses are to contribute to the achievement of the SDGs, there is an urgent challenge to move beyond the pioneers to ensure that sustainability criteria are embedded into the core business strategies and practices of all companies (Nelson, 2018).

But for businesses to integrate the SDGs into their core business strategies, they firstly need to overcome the challenges that hinder such a progress. To bring businesses into the picture, governments need to change policies and put in place a SDGs implementation roadmap and regulations that will incentivize business behavioral changes with the necessity of including the private-sector perspective early on in the development plan, especially with the most recent VNRs indicating that in many countries private sector engagement is still in its embryonic stage (OECD, 2020; PwC, 2019; UN DESA, 2020). Companies also need to go beyond a corporate responsibility approach to SDGs which is unlikely to achieve the change required (PwC, 2019; Martinuzzi & Schönherr, 2019, p.3). Companies should as well realize the need to go beyond Environmental, Social and Governance (ESG) records and use the SDGs as a roadmap and a measurement benchmark. This should facilitate the companies' tracking their sustainable activities and their progress through a uniform framework that is understood by multiple stakeholders (PwC , 2019; Martinuzzi & Schönherr, 2019, p.9). This is becoming increasingly important as more consumers, employees and investors consider the sustainability profile of the companies they deal with; a fact that many businesses start to acknowledge (Schönherr et al., 2019, p.116). For instance, leading companies on cutting CO2 emissions state that consumers are demanding greener products; a finding supported by a survey by

Yale University and aligns with environmental-based company boycotts (Renouf et al., 2016). The issue of climate consciousness is also driven by the fact that many companies come to acknowledge that governments' decisive response to climate change is inevitable and that the longer the delay in enacting such policy responses, the greater the transition shock would be for businesses. For instance, forecasts reveal that the transition shock will be concentrated with the worst-performing 100 firms losing 43% of their value and the best performers gaining 33% (Vivid Economics and ETA, 2019). This is why more corporations are becoming purpose-driven to ensure a stronger revenue growth by attracting socially conscious customers along with better worker recruitment, retention and motivation and gaining competitive edge in responding to inevitable climate policy responses (Deloitte, 2020; McKinsey, 2020 ; Vivid Economics and ETA, 2019). Similarly, only 7 percent of Fortune 500 CEOs believe their companies should "mainly focus on making profits and not be distracted by social goals" (McKinsey, 2020). These findings highlight that shareholder capitalism is not contradictory to social and environmental goals and other stakeholders' benefit (Rajan, 2020).

Figure 5: Categories of Finance

Source: Dasgupta, *The Economics of Biodiversity: The Dasgupta Review,* p.477, 2021

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The category of private investment that covers the approaches to investments that consider non-financial factors, such as environmental and diversity ones, coupled with financial considerations, such as profits, is called sustainable investing. Green investment comes as a subcategory of the sustainable investing agenda and is concentrated on nature and the environment. Green finance incorporates a range of mechanisms and instruments such as green bonds and equity investment funds in environmental projects. Private financial investments in natural capital are usually viewed as a subset of the two previous categories (Figure 5; Dasgupta, 2021, p. 476-477). Private finance actors can also influence the broader adoption of sustainable processes through stakeholder or corporate engagement. Evidence suggests that investors' engagement with businesses in relation to sustainability issues tend to influence business activities and processes (Dasgupta, 2021, p.482). To ensure prudent SDG finance, it is necessary for the banking sector to develop standardized assessment tools that consider the sustainability impact of the financial products and services along with their financial risks and opportunities through embedding SDG-related criteria into financial decision-making. Weber (2019) suggests at least three ways that the financial sector can support the SDGs, namely impact investment, socially responsible investment and sustainable banking. Although impact investment and sustainable banking take a more proactive stance in promoting investments that help achieve SDGs, socially responsible investment is currently bigger and adopts a more passive stance vis- à-vis the SDGs.

IV. SDGS AND THE COVID-19 PANDEMIC

The COVID-19 pandemic presents a unique opportunity to build back better. Crises and breakdowns can be the primary source of transformation as they remove barriers and institutional rigidities that previously stood in the way of sustainability. Through engaging in the second phase of crisis leadership, namely the adaptive phase, the underlying causes of the crisis are supposed to be tackled and the capacity to thrive in a new reality needs to be built (Monkelbaan, 2019, p. 183). The fight against COVID-19 has largely become a fight against poverty and structural inequality. Consequently, responding effectively to the COVID-19 crisis should permit the change of mentality required to address the cracks in the system and the root causes of vulnerabilities, thus allowing for building back better in the context of implementing longer-term policies that can bring about meaningful structural changes. This entails moving beyond "responses based on short-term economic fixes" and concentrating on enacting long-term policies (OECD 2020b; UCLG, 2020; UN DESA, 2020). The response to COVID-19 should take into consideration past, present and future experiences. For instance, COVID-19 gives us a glimpse of a 2030 world where the SDGs are failed as most of the vulnerabilities highlighted by the pandemic are incorporated and addressed in the SDGs (Deloitte, 2020). This fact underscores the urgency to follow a coherent multidimensional, systematic

approach rather that a sector by- sector sequential approach in responding to the crisis to address its interconnected dimensions (OECD 2020b; UNDP, 2020). This becomes imperative with revised estimates that show that 132 million people will be pushed into extreme poverty by climate change by 2030 and the increase of zoonotic diseases as a result of biodiversity loss and shifting of wild animals' habitats (Deloitte, 2020; Jafino et al., 2020). Additionally, the response should be framed through an equity lens as the countries, communities and groups already lagging along various dimensions are the ones particularly affected and leaving them further behind will have long-term impacts on human development (UNDP, 2020). Taken altogether, the complexity of the required response should benefit from previous experiences such as mechanisms used in fighting diseases like Ebola, bird flu and MERS and in tackling the 2008 financial crisis. Establishing a greener world economy after the COVID-19 pandemic for instance dictates learning from what worked and what failed from past efforts to adopt green stimulus during the 2008-9 Great Recession, especially given the large size and range of countries' fiscal responses to the crisis that would shape the climate for decades (UNEP, 2020; IMF, 2020b).

One important factor that should be considered in designing recovery policies is the fact that the concept of sustainability is not limited to dealing with climate change and biodiversity loss. While fighting the climate crisis has become imperative, it is crucial to think of it as one of the 17 SDGs and design policies that build on the interdependency across multiple SDGs (Barbier et al., 2020; Mohieldin, April 2021). If the world, especially Emerging Markets and Developing Countries (EMDCs), focuses on climate and biodiversity at the cost of people, economic, partnerships and governance SDGs, we might end up with a two-tier system; one that would involve a fast track towards achieving SDG 13 and a slower second track for the remaining SDGs (Mohieldin, March 2021). This would entail a waste of the advantages that come from integrating the SDGs and the unity of their financial implementation framework (Mohieldin, April 2021). Additionally, the cruciality of other SDGs, as exposed by the COVID-19 crisis, makes it imperative to transcend the idea of co-benefits. While climate action and environmental preservation are expected to have significant indirect effects on human development and economic growth, it is dangerous to leave such critical areas to the chances of co-benefits. In that regard, in the recovery phase, combating climate change and preserving the environment should be within the operational framework of governance and international partnerships to guarantee solid and coherent efforts on the economic, social and environmental aspects to reach a better performance in poverty and inequality (See Figure 6).

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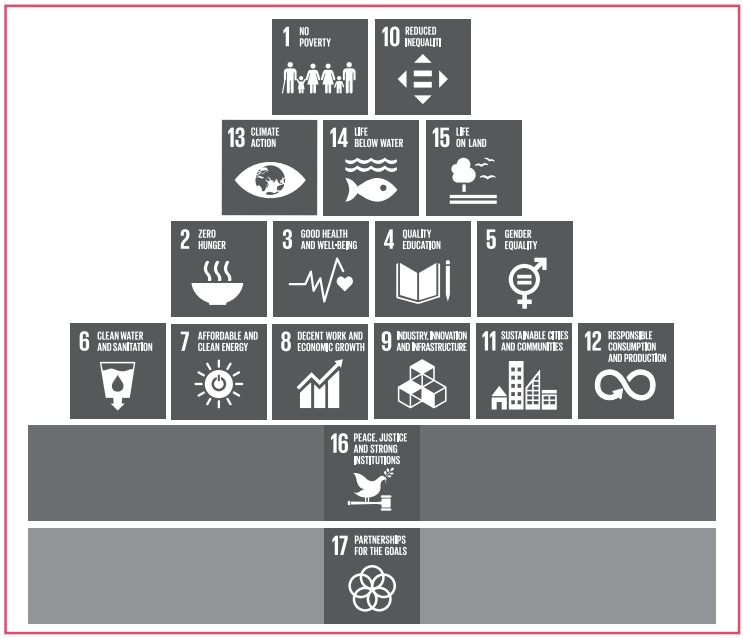
Figure 6: SDGs Framework for Building Back Better



Source: Presentation by Mahmoud Mohieldin, ERF, May 2021

The COVID-19 has also provided a new lens to reimagine the roles played by the different actors in achieving the SDGs. Many national governments have climate action at the heart of their stimulus plans. For instance, the EU's $750 billion stimulus plan and its $1.1 trillion 2021-2027 budget earmark 30% for climate-friendly investments and $17.5 billion to cut reliance on fossil fuels (Council of the European Union, July 2020). In November 2020, the United Kingdom announced its 'Ten Point Plan for a Green Industrial Revolution', which will mobilize more than $13 billion of government investment to create and support up to 250,000 highly-skilled green jobs and spur over three times as much private sector investment by 2030 (UK Prime Minister's Office, November 2020). Following the same path, in July 2020, the South Korean Government announced its $133 billion 'Korean New Deal' stimulus, of which $94.6 billion will be financed by the treasury with $35.4 billion are directed to Korea's 'Green New Deal' that aims to strengthen climate

action and realize a green economy through investments that focus on green infrastructures, renewable energy, and fostering green industry (Government of the Republic of Korea, July 2020). Equally important is the US President-Elect Joe Biden's commitment to put the United States on an irreversible path to achieve net-zero emissions, economy-wide, by no later than 2050 with a plan to make a $2 trillion accelerated investment (Joe Biden, 2020).

Efforts of some national governments to build back better have gone beyond incorporating climate action in their stimulus packages. With the start of the decade of action, some governments have pioneered and introduced mandatory climate-related financial disclosures requirements in line with the TCFD recommendations. For instance, New Zealand announced in September 2020 that it will implement mandatory climate risk reporting in line with the TCFD recommendations. Businesses covered by the requirements will have to cover governance arrangements, risk management, and strategies for mitigating any climate change impacts in their annual disclosures (New Zealand, 2020). In a similar vein, the United Kingdom announced on 9 November 2020 that it will require large companies to disclose climate risks by 2025, with a significant portion of mandatory disclosure requirements taking place in 2023 (HM Treasury, 2020). Other countries like Australia, Canada, France, Japan, and the European Union are all working towards some form of climate risk reporting for companies, thus highlighting governments' tendency to include climate risk and resilience into the core of financial and business decision making.

The change in the policy scene compounded by the pandemic and the rise of stakeholder activism entails a change in the environment in which businesses are required to operate. Taken altogether, the COVID-19 provides a unique opportunity for companies that act responsibly to make a long-lasting positive impact on stakeholder's perceptions. Compromising with the SDGs and the achievement of a sustainable development agenda, even in times of crisis, is a powerful vehicle for companies to prove their sustainability case and it will position them ahead of competition (WEF, 2020). By presenting an opportunity to take actions and the imperative to show leadership and solidarity, the COVID-19 pandemic presents companies with the chance to prioritize the right global goals in their strategy agenda. Consequently, companies which act are not just able to anticipate the disruption that is possible to appear in the future, but also to shape the direction of the disruption to their competitive advantage (Van Tulder, 2018; WEF, 2020).

V. A FORWARD LOOK TOWARDS ACHIEVING THE SDGS":

Less than ten years are remaining before reaching the deadline of achieving the SDGs by 2030. Five precious years were lost from the day of launching the SDGs in 2015 before the eruption of the pandemic in 2020 which had its toll on the critical indicators of SDGs. We cannot blame it all on the pandemic as a reason for lack of

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progress, and there is still an opportunity to accelerate the progress towards attaining the SDGs. However, this warranted acceleration will depend on the progress of three critical factors: dependable data, adequate finance and effective implementation of development policies and programs including the delivery at the last mile.

1. Better Data to guide Policy

The one common denominator that cuts across the 2030 agenda is the presence of adequate, timely and comparable data as shown in the left panel of Figure 7 (Mohieldin, August 2020). The significance of timely, quality, open and disaggregated data and statistics has never been as clear as during the COVID-19 pandemic.

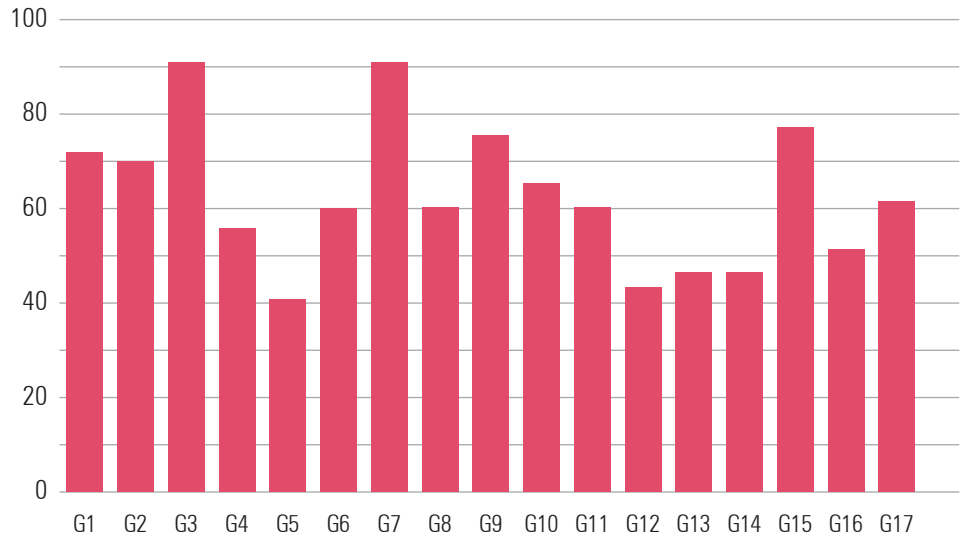
Figure (7): What will the SDGs require? Data, Finance and Effective Implementation

Source: Presentation by Mahmoud Mohieldin, Durham University, August 2020

The availability of such data is crucial in understanding, managing, and responding to the multidimensional effects of the pandemic as well as in designing accelerated actions towards achieving the SDGs. Many of the data challenges and gaps encountered during the first half decade of the SDG implementation are themselves limiting effective COVID-19 responses (UN, 2020a). Despite the progress that has been made in increasing the availability of internationally comparable data for SDG monitoring and growing evidence of using satellite imagery and other innovative techniques, persistent data gaps and lags remain in many countries. For instance, on average, as of 2019 countries in Africa and Asia have available data to monitor only 20% of SDG indicators, and only 35% of sub-Saharan African countries have poverty data collected since 2015 (SDSN TRENDS, 2019). There are still struggles to track the estimated 25.4 million refugees that are missing from national statistics worldwide (SDSN TRENDS, 2019). More generally, based on an analysis of the indicators in the

Global SDG Indicators Database, for 4 out of the 17 goals, less than half of the 194 countries have internationally comparable data (Figure 8; UN 2020a). And even for countries with available data, only few observations are recorded, and a large number of SDG indicators are available only with a significant time lag, thus preventing policymakers to monitor progress and identify trends (Figure 9; UN 2020a).

Figure (8): Data coverage



Source: UN, *The Sustainable Development Goals Report,* p.4, 2020
Note: Proportion of countries or areas with available data (weighted average across indicators), by goal (percentage)

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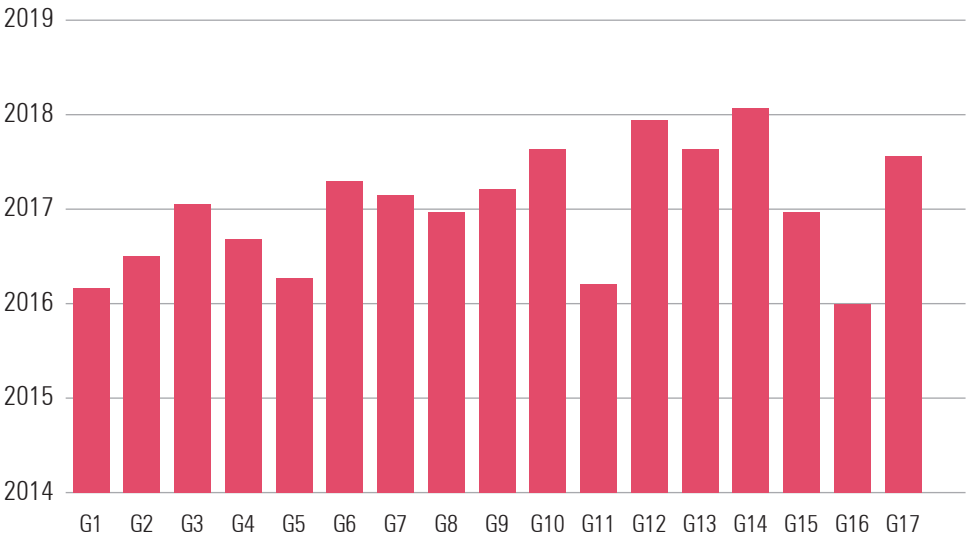
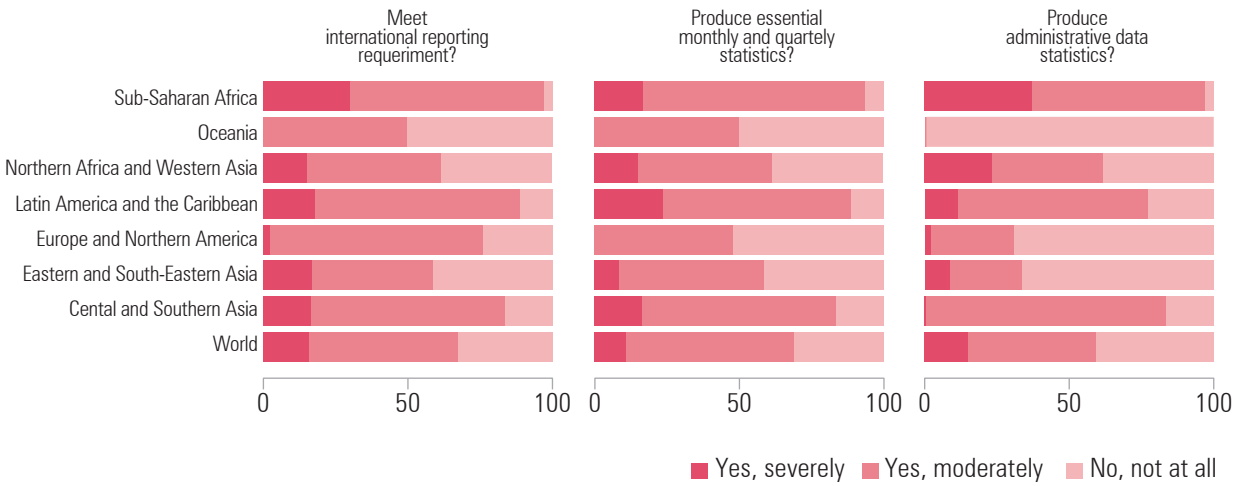
Figure (9): Data timeliness



Source: UN, *The Sustainable Development Goals Report*, p.4, 2020 Note: The most recent year available (weighted average of the median country by indicator), by goal

The COVID-19 crisis has come to exacerbate global data inequalities. Based on a survey conducted by the United Nations and the World Bank, 97% of the countries surveyed in sub-Saharan Africa indicated that the production of regular statistics was affected by the pandemic and 88% of the countries in Latin America and the Caribbean indicated that they encountered difficulties meeting international data reporting requirements. Moreover, the survey shows that 9 in 10 national statistical offices in low-and lower-middle-income countries have witnessed funding cuts and are struggling to maintain regular operations (Figure 10; UN 2020a).

Figure 10: COVID-19 impact on international reporting, producing essential regular statistics and administrative data statistics



Source: UN, *The Sustainable Development Goals Report,* p.5, 2020

It has become imperative to invest in data and statistics capacities to maintain adequate coverage of all population groups as well as of natural resources. This would require finding innovative techniques to augment traditional statistical methods that have been disrupted by the pandemic (SDSN TREND, 2019; UN, 2020a). For example, multiple countries should start to fully digitalize their data collection through telephone and web-based surveys, along with using administrative data with newer data sources to produce official statistics. Countries should also integrate geospatial with statistical information to enhance the ability of policymakers to tailor responses to local circumstances across geographic space and time (UN, 2020a). Building and maintaining robust, inclusive and national data systems is only possible through: right governance, strong legal and policy support, incentive for innovation and partnerships, and finding the fiscal space to ensure long-term production (SDSN TRENDS, 2019).

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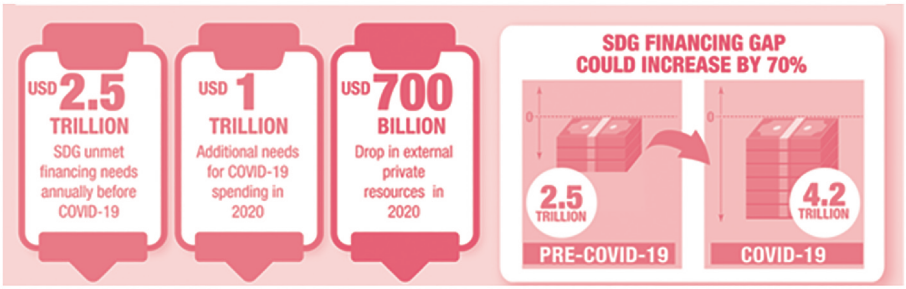
2. Better Financing

Figure (11): COVID-19 impact on SDG Financing for Developing Countries

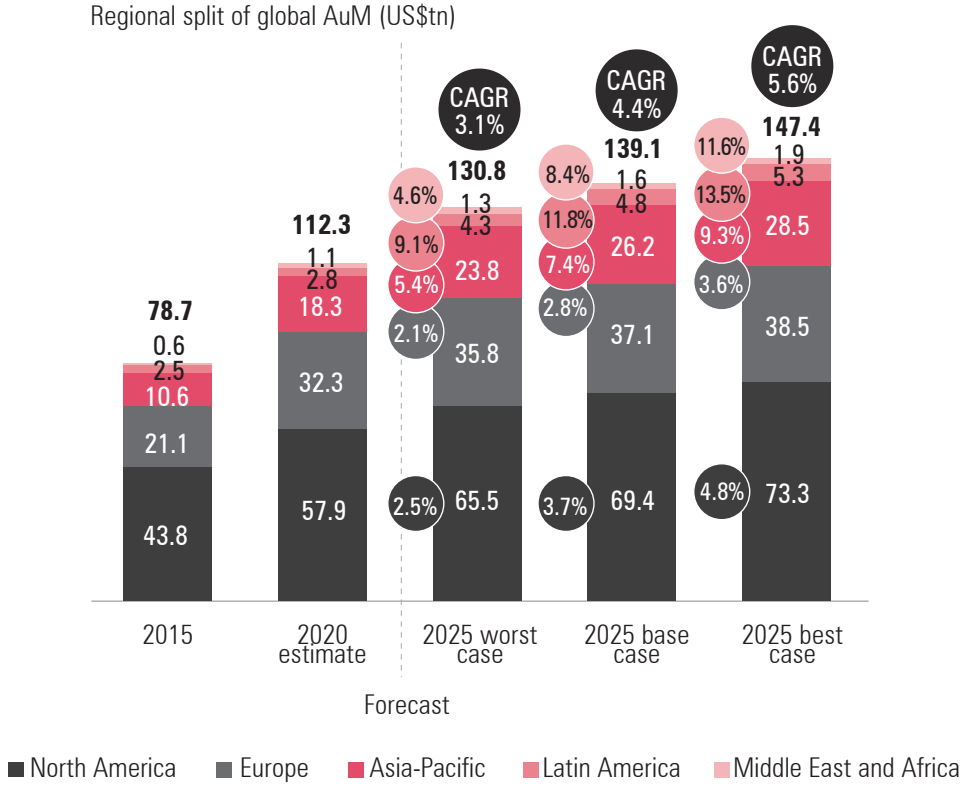


Source: OECD. *Global Outlook on Financing for Sustainable Development 2021: A New Way to Invest for People and Planet,* 2020

As mentioned earlier, prior to the COVID-19 pandemic, SDGs financing levels were insufficient. The pandemic is expected to widen the financing gap. Estimates shows that developing countries are set to witness a USD 700 billion dollar drop in external private finance along with a gap of USD 1 trillion in public spending on COVID-19 recovery measures compared to advanced economies (OECD, 2020b). The SDG Investment Trends Monitor further shows that the drop in SDG-related investments was much greater in developing and transition economies compared to developed ones. Moreover, the public support packages in developed countries are set to fuel asymmetric effect on global SDG investment trends, leading to gains in investment in renewable energy and digital infrastructure as a first sign (UNCTAD, 2020). The whole outlook is estimated to bring the SDG financing gap to USD 4.2 trillion in the developing economies (Figure 11; OECD, 2020b). This outlook comes at an instant where global financial assets are at their highest value since before the global financial crisis and estimates showing that the global assets under management stand at more than USD 110 trillion (Figure 12; PwC, 2020). However, the trillions available in the financial system are asymmetrically distributed, with only 20% of the financial assets held in developing countries where 80% of the population

live. Also, despite a significant growth in sustainable development instruments, the growth is not fast enough to catch up with the financing gap and most of the funds circulating in developed economies that are devoted to the SDGs focus climate change mitigation and renewable energy (Figure 13). Additionally, the trillions in the financial system continue to fuel inequalities and unsustainable investments as the lack of universally accepted criteria impedes knowing their sustainable development impact and opens the door for increased risk of SDG washing and threatening the long-term value of assets (OECD 2020b, UNCTAD 2020).

Figure (12): Global Assets Under Management (AuM)



Source: PwC. *Asset and wealth management revolution: The power to shape the future*, 2020

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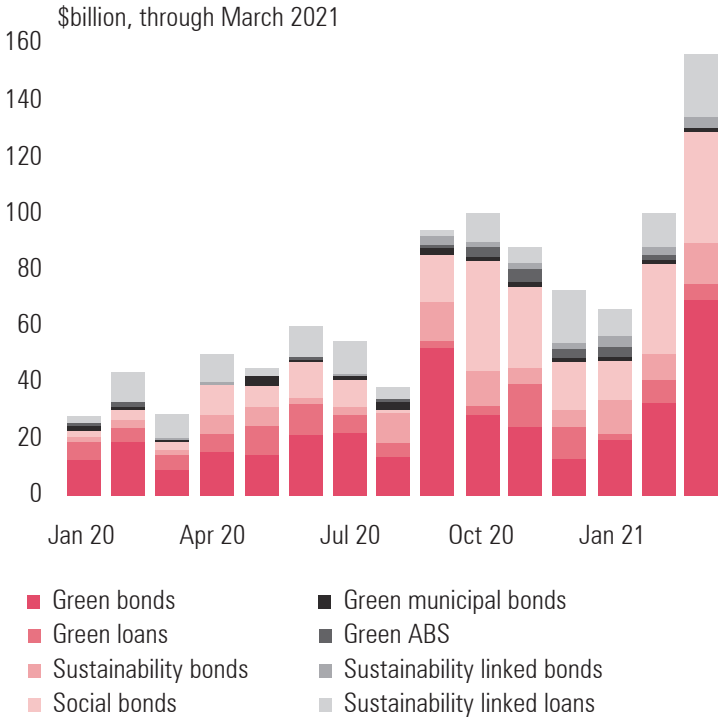
Figure (13): Global Sustainable Debt Issuance by Asset Class, monthly



Source: Presentation by Mahmoud Mohieldin, ERF, May 2021.

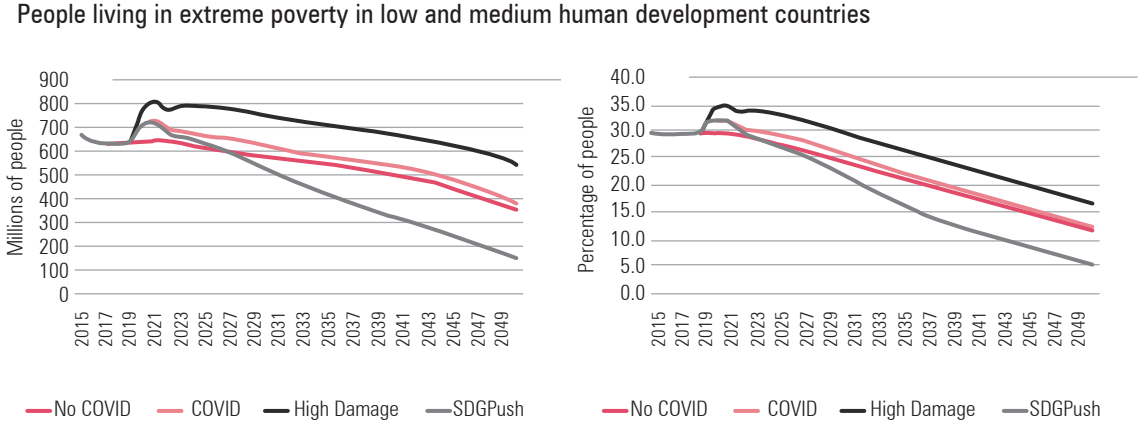
Numbers are based on data from the International Institute of Finance, April 2021

The biggest challenge that faces SDG financing is how to attract the financial assets in the system towards SDG financing and finding a mechanism for channeling funds to the developing economies. Governments in all countries should work to provide better incentives to guide financing and attract the trillions available in the system. This should be coupled with efforts to increase the transparency and accountability of finance flows which would result from a direction to make sustainability reporting mandatory for financial and non-financial institutions, based on globally harmonized standard disclosure requirements (GISD, 2020; OECD, 2020b; Zhan et al., 2021). Developed economies can also facilitate the flow of funds, especially sustainable ones, to developing economies through sovereign guarantees and support. However, this should be accompanied with efforts from

developing countries to enhance their business environments, increase the clarity of their investment policies and lay a strong foundation for regulations, all within the adoption of a holistic and comprehensive policy framework. The widening of the financing gap also raises the necessity of focusing on new innovative products, apply creativity to market solutions and innovate towards structures that will accelerate and scale funding, especially in developing countries where risks pose significant barriers to private sector investing (GISD, 2020; Zhan et al., 2021).

The fruit of targeted, ambitious and comprehensive set of SDG investments can surpass pre-COVID-19 progress in many areas, especially poverty. In that regard, the UNDP and the Frederick S. Pardee Center for International Futures propose a "SDG Push" investment scenario which consists of targeted interventions in inclusive green growth, which is based on integrated policy choices in governance, social protection, green economy and digitalization (Abidoye et al., 2021). The simulations of the SDG push scenario, in low and medium human development countries, show that this set of investments can exceed the pre-pandemic pace of fighting poverty (Figure 14; Abidoye et al., 2021). Furthermore, an SDG push can reduce the number of people living in extreme poverty in these countries by more than 100 million relative to the COVID-19 baseline scenario, with up to 50 million women and girls potentially lifted by 2030. The benefits of this scenario also apply to other SDGs in the People's pillar, with 70-million reduction in malnutrition and improved health outcomes, educational completion and water and sanitation access (Abidoye et al., 2021).

Figure 14: People living under 1.90 USD a day in low and medium human development countries under different scenarios



Source: Abidoye et al., *Leaving No One Behind: Impact of COVID-19 on the Sustainable Development Goals (SDGs)*, 2021

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3. Smarter and greener Implementation

Pre-COVID-19 the route towards 2030 was characterized by slow, unharmonized progress on many dimensions and reversed progress on others. As mentioned earlier, the SDGs offer a blueprint for a better recovery through full integration of environmental, social and economic impacts and trade-offs. The gaps inherent in the global system, the underfunding of public goods, the failure of markets and the unequal distribution of vulnerability across countries and individuals can be tackled by the holistic approach of the 2030 Agenda (OECD, 2020b; UN DESA, 2020; Mohieldin, April 2021). Combined with the results from SDG push scenario simulations, decision makers should be looking towards recovery and beyond as we approach 2030. This entails making choices and managing complexities and uncertainties in four main areas, as proposed by the UNDP and the Frederick S. Pardee Center for International Future, namely green economy, digitalization, governance and social protection (Figure 15; UNDP, 2020b).

Figure (15): Areas of effective implementation

Source: Adapted from UNDP. *Assessing impact of COVID-19 on the Sustainable Development Goals*, 2020

The first area of green economy focuses on rebalancing nature, climate and the economy through designing and de-risking nature-based solutions, transforming agriculture systems and consumption patterns, cultivating sustainable public-private partnerships in areas such as ecotourism and green transport systems, aligning the financial system with the broader energy transition requirements, among other mechanisms (IRENA, 2018; UNDP, 2020b; Mohieldin, May 2021). This comes in the light of research that shows that the value of decarbonizing the global economy by 2050 would be eight times the cost, accounting for health and education benefits (IRENA, 2018). Digital disruption and innovation is the second area and it incorporates investments in digital transformation that target increased spending on research and development and closing the internet gap to catch up with the surge in tele-schooling, tele-medicine and remote work (UNDP, 2020b; UNDP, 2020c). These targeted investments come in the light of estimates showing that divides in access to online schooling has resulted in 86% of children in primary education being effectively out-of-school in low human development countries compared to only 20% in high human development countries (UNDP, 2020a). The third area of effective implementation is governance through building a new social contract to advance cohesion and gender equality while promoting human rights and upholding the rule of law (UNDP,2020b; UNDP, 2020c). The last area is strengthening social protection with the aim of uprooting inequalities that plagued the system even before the onset of the pandemic. Building resilient social protections systems that are capable of weathering shocks, designing a new generation of green jobs to support youth-led entrepreneurship and finding strategies for the informal sector workers should be areas of partnerships between the public and the private sectors (UNDP, 2020c).

To conclude; reflecting on the contribution of the different actors in using the SDGs to develop long- term plans to address the root causes as well as the impacts of the pandemic using country experience should be an area of active research. Additionally, reconciling the need for immediate and quick short-term response to the immediate effects of the pandemic with the longer-term plans to build back better should be tackled as new strains of the pandemic continue to hit and with the uneven rates of vaccinations across countries. The shape of the decade of action and the roles played by the different actors in placing the SDGs at the heart of the recovery from the pandemic is to be shaped by multiple factors. These factors include the change in the policy environment dictated by and upon national governments, accompanied by a shift in citizens' values and expectations, an accelerated momentum for the roles played by local governments and communities and the imperative to go beyond business pioneers in incorporating the SDGs in the businesses core strategies.

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SAUDI ARABIAN 2030 VISION AND ENTREPRENEURIAL INTENTION AMONG UNIVERSITY STUDENTS

VISIÓN E INTENCIÓN EMPRENDEDORA DE ARABIA SAUDITA 2030 ENTRE ESTUDIANTES UNIVERSITARIOS

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ABSTRACT

The purposes of this study are to report the degree of the Kingdom of Saudi Arabian 2030 Vision's (KSA 2030 Vision) awareness among students, and to examine the association of entrepreneurial intention with the awareness of the KSA 2030 Vision in College of Business Administration at the Northern Border University. Using data from a self-administered survey, with a final sample of 266 students, the descriptive and Simple Regression results show that there is a low degree of awareness towards the KSA 2030 Vision among the students, and the entrepreneurial intention is negatively associated with the KSA 2030 Vision awareness. The results of this study give an alarming view as to the current low level awareness of the College of Business students towards the KSA 2030 Vision, and how this low degree of awareness can influence negatively the achievement of the country's long-term vision. The results of this study should be useful to policy makers in Saudi Arabia at the country, ministry of education the university and elsewhere, as the KSA is aiming to achieve the ambitious KSA 2030 Vision.

KEYWORDS

Entrepreneurial intention, KSA 2030 Vision, Northern Border University

RESUMEN

Los propósitos de este estudio son informar el grado de conocimiento de la Visión 2030 del Reino de Arabia Saudita (Visión KSA 2030) entre los estudiantes, y examinar la asociación de la intención empresarial con el conocimiento de la Visión KSA 2030 en la Facultad de Administración de Empresas en el Universidad de la Frontera Norte. Utilizando datos de una encuesta autoadministrada con una muestra final de 266 estudiantes, los resultados descriptivos y de Regresión simple muestran que existe un bajo grado de conciencia hacia la Visión KSA 2030 entre los estudiantes, y la intención emprendedora se asocia negativamente con la KSA. 2030 Conciencia visual. Los resultados de este estudio dan una alarma al bajo nivel actual de conciencia de los estudiantes de la Facultad de Negocios hacia la Visión KSA 2030, y cómo este bajo grado de conciencia puede influir negativamente en el logro de la visión a largo plazo del país. Los resultados de este estudio deberían ser útiles para los responsables políticos de Arabia Saudita en el país, el ministerio de educación y la universidad y en otros lugares, ya que la KSA tiene como objetivo lograr la ambiciosa Visión 2030 de la KSA.

PALABRAS CLAVE

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INTRODUCTION

There is great evidence from research to support the positive impacts of entrepreneurship on economic growth (Medina et al., 2019; Navarro et al., 2019; Khajeheian, 2017; Dastourian et al., 2017). The value of entrepreneurship as a powerful force that shapes economies lies in its ability to overcome unemployment which is a major problem facing countries in both the developed and emerging economies (Ndofirepi, 2016; Ahmad & Xavier, 2012). According to the evidence provided by Sternberg and Wennekers, (2005) higher entrepreneurial activities and innovation are both crucial to economic growth. Quillas et al. (2020) documented a positive relationship between the quality of formal institutions and the level of human development in the country.

In Saudi Arabia, entrepreneurship is developing to become an important determinant of economic growth as outlined in the country's vision 2030. The KSA 2030 vision plans to minimize the country's overdependence on oil, diversify the economy and improve the public sector especially the health, education, infrastructure, recreation and tourism sectors. The goals of the 2030 vision plan are to reinforce economic and investment activities in the country, improve the oil industry trade with other countries and increase the government spending on military, manufacturing and ammunition. The focus of the 2030 vision plan is also to increase the entrepreneurial activities in the country which would contribute significantly to economic growth.

Given the importance of entrepreneurship in building national economies, Gelard and Saleh (2011) recommend that governments and schools should prioritize the entrepreneurial intentions of their students. Even though there is a large amount of research on entrepreneurship education, evidence to support its effects is scarce and the effects are poorly understood. Most of the available research has not been conducted in Saudi Arabia. Therefore, as a field of study, it is clear that more research is needed and should be conducted on the effects of entrepreneurship education. Supporting students' entrepreneurial intentions would help achieve KSA vision 2030 plan. The KSA vision 2030 plan awareness among business administration students at Northern Border University are not well known. As such, this study seeks to report the degree to which BA students at the Northern Border university are aware of the KSA 2030 plan and also to examine the entrepreneurial intention of these students in relation to the plan.

The significance of this study is that it will allow policy makers in the ministry of education and other parties at the Northern Border University to understand and translate the outcomes from the study into real life situations. Activities within the institutions would be transformed positively in support of entrepreneurial intentions thus helping the country achieve 2030 vision. Not only would the information in the study help in solving real work problems or challenges but would also promote availability of opportunities in the KSA environment. These opportunities may include;

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i. Improving the contribution to Small and Medium Sized Enterprises (SMEs) to GDP
ii. Reducing the gap between outputs from the higher education sector and the needs of the job market
iii. Developing appropriate skills and talent among youths, strengthening their futures and increasing their chances of creating employment and contributing to national development.

Through these opportunities, supporting entrepreneurial intentions among students would be playing a wider role in supporting the KSA 2030 vision. The findings from this study would also interest researchers and the academic community; the research would shed more light into research attempts to examine issues of entrepreneurship in KSA universities. The findings from the research would also provide information that is customized to the context of KSA thereby contributing significantly to the pool of information and knowledge on entrepreneurial intentions of students and its future role in supporting economic growth of the country and achievement of KSA 2030 vision.

This study is organized as follows: Section 2 reviews the literature, section 3 highlights the research methodology, section 4 addresses the results and discussions, and the final section illustrates the conclusion.

LITERATURE REVIEW

Saudi Arabian Context

Saudi Arabia or the Kingdom of Saudi Arabia (KSA) is the largest country in the Arabian Peninsula, bordered to the north by Iraq, Jordan and Kuwait, and to the east by the United Arab Emirates, Qatar and the Persian Gulf, Oman to the southeast, and Yemen to the south. Saudi Arabia is the Muslims' religious destination. There are religious sites sacred to Muslims, such as the Holy Mosque and the Kaaba, the honourable Qibla of Muslims, in Makkah and the Prophet's Mosque in Medina. Saudi Arabia's economy ranks among the most powerful economies in the world as a member of the G20. The Kingdom of Saudi Arabia possesses 18.1% of the proven reserves of oil in the world, ranking second in the world, and it has the fifth largest proven reserves of natural gas, and it is a member of OPEC. It comes in third place after Russia and the United States in terms of natural resources, which are estimated to be worth about 35 trillion US dollars, seventh among the G20 countries and 26th globally in the global competitiveness standard, according to the Global Competitiveness Yearbook, 2019 report, issued by the International Institute for Administrative Development, which measures the competitiveness of 140 countries worldwide, depending on the state's ability to benefit from its available resources.

With its economy based on being the largest oil exporter, Saudi Arabia, since 2016, has sought to carry out economic reforms that reduce dependence on oil as a major economic activity, and has developed strategies to diversify non-oil income sources within the so-called Saudi Vision 2030. These reforms have raised the expected economic growth rate from 1.8% in 2019 to 2.1%. 2020. The reforms implemented by the Kingdom, represented in the establishment of the one-stop-shop system for company registration, the introduction of a secured transactions law, a bankruptcy law, improved protection for minority investors, and measures to include more women in the workforce, contributed to its advancement of 30 ranks for the year 2019 in the Doing Business 2020 report issued by the World Bank. It has become the most advanced and reformed country among 190 countries around the world, achieving first place in the world in business environment reforms among the countries covered by the report in the Ease of Doing Business Index.

Entrepreneurship in Saudi Arabia

As part of its revised approach to economic diversification and to achieving Saudi Vision 2030 aims, the government of Saudi Arabia has implemented several policies and adopted a variety of supporting mechanisms and policies instituted for entrepreneurs as well as formed many entities, such as the General Authority for Small to Medium Enterprises Authority (SMEs' Authority), Saudi Arabian General Investment Authority (SAGIA) and The Human Resource Development Fund (HRDF). In addition, there are 28 different chambers of commerce, under the umbrella of the Council of Chamber of Commerce and Industry, which support entrepreneurs in various capacities. These services include staging counselling, funding, education and training programs with local entrepreneurs (Ashri, 2013; Shirzai, 2017).

Saudi Arabia is ranked as the 29th most competitive economy among the 138 economies in 2016. Its national economy ranks relatively high in all pillars, but scores low on innovation and business sophistication (Shirzai, 2017). As part of Saudi Vision 2030 to provide high-quality education to its citizens, entrepreneurship education in particular and increased emphasis on embedding entrepreneurship in higher education institutions, has been carried out by the government of the Kingdom of Saudi Arabia, through Saudi universities, has established a number of entrepreneurship centers nationwide for providing consultations, feasibility studies, and follow-up projects in the areas of entrepreneurship, and facilitating procedures for obtaining loans and financing for project owners and financing necessary to start projects.

KSA 2030 Vision and Education

Undoubtedly, education plays an integral role in the economic growth of a country. Primarily, the Kingdom of Saudi Arabia has identified education to be one of the key factors in achieving its Vision 2030. As such, the Kingdom aims to eliminate the existing correlational gap between completing higher education and meeting the job requirements in the market. Therefore, the Kingdom of Saudi Arabia will engage

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students in career choice seminars to assist them to make wise career decisions and explore educational pathways that will maximize their potentials. Notably, the Kingdom hopes that this will enable it to achieve its target of having at least five local universities among the top 200 internationally. Thus, the Kingdom will place a high priority in assisting its scholars to attain higher performance results as per the global education indicators.

Correspondingly, the Kingdom of Saudi Arabia will formulate and implement a modern education program which will principally focus on values that enhance the learners' character development, skills, and numerical abilities. Moreover, besides offering an array of courses to students, the Kingdom will track the students' annual performances to enable it to evaluate the system's improvement trends. Further, the Saudi Arabian Kingdom will involve the private sector to ensure that its higher education programs conform to the needs of the current market employment requirements.

Markedly important, the Kingdom will work on developing job specifications on all the courses offered in its various vocational and higher learning institutions. To facilitate this, the Kingdom will largely be engaged in strategic partnerships with private organizations, apprenticeship providers, and industry skill councils. Ultimately, the Saudi Arabian Kingdom will establish a contemporary database tracking system, which will be used to trace the students' performance from early childhood to the moment they will complete their higher learning education. The data will be essential in enhancing the Kingdom's agenda to improve education and economic growth as it will enable it to effectively plan, monitor, and assess the performance progress of students.

Northern Border University

Northern Border University, a Saudi university, was founded by the Custodian of the Two Holy Mosques King Abdullah bin Abdulaziz during his historic visit to the Northern Border region in 1428 AH - 2007 AD. The College of Science in Arar, which was affiliated with King Abdul Aziz University, was included and then the College of Teachers (Education and Arts now) and several other colleges in the governorates of Rafha, Turaif and Al-Uweqila, to form together the Northern Border University. After the university was announced, a number of colleges were established with specific specializations such as: medicine, engineering, computer technologies, pharmacy, nursing, administration, medical sciences and community sciences. The university administration headquarters is located in the city of Arar, the administrative centre for the northern border region, and the university has three branches in the governorates of Rafha, Turaif and Al-Uweqila.

College of Business Administration

The College of Business Administration at the University of Northern Borders was established by virtue of the decision of the Higher Education Council at its forty-

ninth session on 7/9/1429 AH - where the approval of the Custodian of the Two Holy Mosques, Prime Minister and Chairman of the Higher Education Council, was issued to establish it to be within the colleges of the Northern Borders University.

North Entrepreneurship Centre

The Center provides consultations, feasibility studies, project follow-up in the areas of entrepreneurship, and facilitates procedures for project owners and innovations to obtain loans and financing needed to start projects. The importance of the Center for North Pioneers, is acquiring a topic of great importance, through its earnest endeavour to direct the university towards a societal partnership and a shift towards a knowledge economy by strengthening the relationship and communication between the society's institutions by mixing scientific frameworks with practical experiences. In addition, it aims to ensure the quality of the educational process, and achieving learning goals. The goal of this applied practice is to produce productive students who have gained sufficient knowledge, skills, creativity, and successes with productive project management.

The Vision:
Leadership and excellence in creating the appropriate environment conducive to innovation and practicing entrepreneurship in the northern border region.

The Mission:
Raising the University of Northern Borders to the ranks of regional universities, both regionally and globally, in the areas of leadership and innovation, by supporting entrepreneurial ideas and developing the spirit of innovation, with the aim of transforming ideas into value-added products.

Objectives:

1. Support the transformation of the Northern Border University into a creative, innovative university.
2. Creating a culture of entrepreneurship among the university's employees.
3. Qualifying students and providing them with the knowledge competencies and skills to put forth innovative ideas and new creations that invest in launching their entrepreneurial projects.
4. Provide distinctive educational and training programs to develop the capabilities of community members and enable them to establish and manage entrepreneurial projects in cooperation with the relevant authorities.
5. Providing organizational and technical support, economic consultations and feasibility studies for owners of innovations and small projects.
6. Work with government and private funding agencies to support promising projects and monitor their growth and development in the local market.

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7. Contribute to the transfer of promising innovations from the university to various commercial and economic sectors.
8. Motivating creators and investing in their innovations and talents in order to serve the community.
9. Marketing productive projects, support and property rights for distinctive innovations.
10. Providing job opportunities for innovators and creators.
11. Building strong strategic partnerships with entities related to entrepreneurship and small projects in order to support all forms of innovation.

RESEARCH METHODOLOGY

Research Design

The choice of an appropriate research design and methodology is crucial to ensuring that research objectives and questions are addressed appropriately. Based on the purpose of this research, a quantitative research approach would be the most appropriate. For this research, a quantitative research approach was preferred since the study would collect data using survey research. The following research questions were identified for this study, and would be examined using a questionnaire survey method;

i. What is the level of the KSA 2030 Vision awareness among College of Business Administration students at Northern Border University?
ii. To what extent does the entrepreneurship intention associate with the awareness of the KSA 2030 Vision among students in the College of Business Administration at Northern Border University?

The methodological approach preferred in this study was adopted from previous studies that can fit in the Saudi environment (Aneizi, 2009; Luthje & Franke, 2003; Ajzen, 1992, 2002; Nabi & Holden, 2008; Kolvereid 1996; Scholten, et al., 2004; Fayolle, et al., 2006; Shapero & Sokole, 1982; Davidsson, 1995; Kolvereid, 1996). The questions included in the questionnaire are designed to investigate the following:

(1) The degree of KSA 2030 Vision awareness among students in College of Business Administration at Northern Border University. An exploratory analysis is done to report the degree of KSA 2030 Vision awareness among the students. The degree is then ranked as low, medium or high awareness.

(2) The association of entrepreneurial intention with the KSA 2030 Vision awareness among students in College of Business Administration at Northern Border University. The degree of entrepreneurial intention is, empirically, tested with the level of KSA 2030 Vision awareness in order to identify the extent to which the entrepreneurial intention is associated with the KSA 2030 Vision awareness. The dependent variable for the model (1) is the KSA 2030 Vision awareness and the independent variable is the entrepreneurial intention.

Hypothesis Development

Entrepreneurial intention and KSA 2030 Vision awareness

A significant amount of literature has been published to support the positive effects of entrepreneurship on economic growth (Navarro, et al., 2009; Acs & Szerb, 2007; Audretsch & Thurik, 2001; Marchesnay, 2011; Kasseeah. 2016; Ahmad & Xavier, 2012). Most of these studies acknowledge the fact that entrepreneurship can be a powerful tool for improving the economy especially because it significantly reduces the rate of unemployment which is a major problem facing countries across the world including both the developed and developing (Ndofirepi, 2016; Ahmad & Xavier, 2012).

Higher levels of entrepreneurship activities coupled with effective innovations are considered to be major ingredients to economic growth (Sternberg and Wennekers, 2005). Through entrepreneurial activities and entrepreneurship, it has become easier for the progress, quality and future expectations of economies or nations to be estimated. Through entrepreneurship activities or actions SMEs promote economic growth and help nations develop a strong economic base (Goedhuys & Sleuwaegen, 2000; Ruiz et al., 2016). Entrepreneurs are expected to show greater creativity and innovation that may be used for creating change in the society, especially from a macroeconomic perspective (Wennekers et al., 2002; Wyness et al., 2015; Shamsudin et al., 2017). In Saudi Arabia, the government has developed major developmental policies that support entrepreneurship. These efforts are evidenced by the many supporting mechanisms and policies that are currently ongoing and are implemented by the government.

After recognizing the value of supporting and developing entrepreneurship, Saudi Arabia has made significant progress in supporting upcoming entrepreneurs. Being the largest economy in the Middle East, implementation of entrepreneurship policies is a huge step towards economic success in the region. The country recognized the fact that supporting entrepreneurship was the among the most appropriate methods for achieving its vision 2030 plan. Part of the vision 2030 is to minimize the country's overdependence on oil, diversify the economy and develop the public sector. Since one of the major focus areas of the vision 2030 is reduction of unemployment, promoting entrepreneurship is one of the most effective ways the government can use to reduce the unemployment rate. Saudi universities and especially business schools and entrepreneurship centers have been supported fully by the government in efforts to increase entrepreneurship levels among the young people in the country. These educational institutions have a wider role to play in promoting entrepreneurial activities and education. Thus, the following hypothesis is developed to be tested by this study:

H_1: Entrepreneurial intention is associated with the KSA 2030 Vision awareness.

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Questionnaire Design

It was noted earlier that this study focused on quantitative methodology that is based on a questionnaire survey approach. The questionnaire was adopted from other studies done previously (Aneizi, 2009; Luthje & Franke, 2003; Ajzen, 1992, 2002; Nabi & Holden, 2008; Kolvereid 1996; Scholten et al., 2004; Fayolle et al., 2006; Shapero & Sokole, 1982; Davidsson, 1995; Kolvereid, 1996). To facilitate data collection, the survey was developed in the Arabic language and distributed to the sample chosen for the study. The rationale for choosing the survey instrument was to allow easier study of the students and to increase the response rates.

The study questionnaire was grouped into two sections; A and B. In section A of the questionnaire, the researchers focused on collecting demographic information from the respondents including gender, age, specialization and level of study. However, the section B of the questionnaire focused on collecting data related to the research questions and was further subdivided into two parts. Part 1(question 1) is used to measure the student intention to become entrepreneurs after school while part 2 (question 2) measures the level of student's awareness and knowledge with regards to the KSA 2030 Vision.

Instrument of Measurement

Section B, part 1: Measurement of entrepreneurial intention

A major concern for the study is entrepreneurial intention. This variable is a 1-item variable measured by a four-point Likert scale. The variable explored the extent to which the participants have the intention to become entrepreneurs in the future. The four-point Likert scales varies from 1 (very improbable), indicating to the lowest entrepreneurial intention, to 4 (very probable), indicating to the highest entrepreneurial intention. The scales use for collecting the data can be grouped into four groups: "1" (very improbable) indicates to the very low entrepreneurial intention, "2" (quite improbable) indicates a low entrepreneurial intention, "3" (quite probable) indicates a high entrepreneurial intention, and "4" (very probable) indicates a very high entrepreneurial intention. In addition, an item was developed to measure whether the respondents agreed to start an entrepreneurial project in the future. The item was asked in the form of the following statement, "I plan to become self-employed in the foreseeable future after graduation." If a significant level of the given item "entrepreneurship" is at 0.05 or low, it is considered a significant relationship, otherwise it is not.

Section B, part 2: Measurement of the KSA 2030 Vision awareness

The variable "KSA 2030 Vision awareness" consists of 12 items to measure the extent to which the students are aware of the KSA 2030 Vision. In specific, the extent to which opening more entrepreneurial projects would contribute to achieving the

KSA 2030 Vision. A score index is used to measure the level of awareness towards the specific-country issues that would be influenced by the entrepreneurial projects. The score index is a composite measure that sums the value of the 12 dichotomous items of the KSA 2030 Vision awareness to create a KSA 2030 Vision awareness that takes a score bounding by 0-1, revealing that a higher score is an indicator of a higher KSA 2030 Vision awareness. The 12 items that are included in this measurement are: decreasing the level of unemployment and creating more jobs, increasing the contribution of the national income, increasing the participation of women in businesses, increasing the governmental non-oil revenues, increasing the individual's income growth, achieving economic growth, achieving social benefits, attaining political stability, developing male and female youth's talent innovation and productive capabilities, enhancing the country's Global Competitiveness Index, increasing foreign investment, and increasing the university's rank. These 12 binary items are ranging from 0-12. If a significant level of the given items and for the overall category entrepreneurial education and support is at 0.05 or lower, it is considered a significant relationship, otherwise it is not.

Models Specifications and Analyses

This study applies two Simple Regression (SR) models. Nominal and continuous values were assigned to measure the value of the independent variables. In particular, Model 1 can be expressed as follows:

$$SR\ (Y) = \beta_0 + \beta_1 X_1 + e \quad \ldots\ldots (1)$$

Where the dependent variable is:

SR (Y) = KSA 2030 Vision awareness (significance at level 0.05).

Where the independent variables are:

X1 = entrepreneurial intention

E = Error term.

The analyses of data were completed using the SPSS version 20 for Windows. A descriptive statistical analysis using frequencies and percentages were used to describe the demographic variables. Research questions were addressed using descriptive statistical analysis and simple regressions.

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Data Collection

With regards to sampling, simple random sampling is preferred. The rationale for choosing simple random sampling is based on the fact that it allows the most suitable sample to be used for collecting the data for the study. The study sampling approach is ideal because it allows the researchers to collect data from a sample that is a good representation of the wider population under study. The electronic survey is developed and designed in Google forms, which are easy to distribute to the respondents, and can reach out to a large number of people. The student and faculty members are allowed to access the link for the electronic survey so that it can be distributed to as many students as possible. The distribution technique resulted in sample of 1,400 respondents. These sample was regarded as the most appropriate for providing data about the constructs being examined in the study. The target population for the sample include students specializing in accounting, finance, marketing, human resources and law. The sample was collected from students taking different courses at the College of Business Administration at Northern Border University, for the academic year 2019-2020. A response rate of 23% was recorded meaning 326 questionnaires were completed and returned (Table 3.1)

Table 3.1. Sample selection

	Male section	Female section	Totals
Department of Law	271	170	441
Department of Accounting	85	164	249
Department of Human Resource Management	206	299	505
Department of Finance	39	102	141
Department of Marketing	26	38	64
Totals	627	773	1400
Returned respondents	151	175	326
Invalid surveys	(24)	(36)	(60)
Final sample	127	139	266

Approximately 6% of the surveys were reported as uncompleted surveys by the respondents. So that these survey were distracted from the analysis process.

Results and Discussions

Profile of Respondents

A total of 266 questionnaires were gathered from the survey. As shown in Table 4.1, the majority of the respondents (52.3%) were male, and (47.7%) were female.

Table 4.1. Profile of respondents

Demographic information	Frequency (n = 266)	Percent %		
Panel A: Nominal variables				
Gender				
Male	127	47.7		
Female	139	52.3		
Specialization				
Accounting	105	39.5		
Law	121	45.5		
Human resources	27	10.2		
Finance	12	4.5		
Marketing	1	0.4		
Study level				
First level	10	3.8		
Second level	7	2.6		
Third level	43	16.2		
Fourth level	206	77.4		
Panel B: Continuous variable				
	Mean	Minimum	Maximum	St. Devation
Age	22	19	39	

In terms of the age, the average of the students is 22 with a minimum of 19 and a maximum of 39. With regard to specialization, the largest group (45.5%) was law students, (39.5%) accounting students, (10.2%) human resources students, (4.5%) students, and (0.4%) marketing students. Regarding the level of study, the majority of the students (77.4%) was the fourth level, (16.2%) the third level, (3.8%) the first level, and (2.6%) the second level.

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Entrepreneurial Intention

The study also asked the participants about their future plans. Specifically, the participants were asked whether they planned to become self-employed in the future after graduation. A large number of the respondents (50%) indicated that they will be probable while 46.6% noted that they are very probably likely to become entrepreneurs after graduation. However, only 3% noted "improbable" while 0.4% noted that they were very improbable and were not thinking of becoming entrepreneurs in the future.

Table 4.2. Entrepreneurial intention (I plan to become self-employed in the foreseeable future after graduation)

Scale	Frequency (n = 266)	Percent %
Very probable	124	46.6
Probable	133	50
Improbable	8	3
Very improbable	1	0.4
Total	266	100

As illustrated in Table 4.2, a majority of the respondents had high levels of intentions to become entrepreneurs in the future after graduation. These findings provide a positive cue towards the value of entrepreneurship and its importance in supporting economic growth. The high number of people hoping to enter into entrepreneurship is a positive signal for economic growth (Sternberg & Wennekers, 2005; Navarro et al., 2009; Acs & Szerb, 2007; Audretsch & Thurik, 2001; Marchesnay, 2011; Kasseeah. 2016; Ahmad & Xavier, 2012). In addition to the importance of entrepreneurship in supporting economic growth, it has also been linked to increasing employment opportunities for people (Ndofirepi, 2016; Ahmad & Xavier, 2012).

KSA 2030 Vision Awareness

Respondents were asked to rate different items of KSA Vision awareness in order to document the degree of KSA 2030 Vision awareness among students in the College of Business Administration at Norther Border University as depicted in Table 4.3:

Table 4.3. KSA 2030 Vision awareness

Statements		Frequency	percent %
1	decreasing the level of unemployment and creating more jobs	124	47
2	increasing the contribution of the national income	60	25
3	increasing the participation of women in the businesses	88	33
4	increasing the governmental non-oil revenues	36	14
5	increasing the individual's income growth	107	40
6	achieving economic growth	62	23
7	achieving social benefits	90	34
8	attaining political stability	32	12
9	developing male and female youth's talent innovation and productive capabilities	60	25
10	enhancing the country's Global Competitiveness Index	29	11
11	increasing the foreign investment	16	6
12	increasing the university rank	48	18
	Overall	752	24

As illustrated by Table 4.3 that the highest degree of KSA 2030 Vision awareness was given to the item "decreasing the level of unemployment and creating more jobs" (47%) and the lowest degree was given to the item "increasing the foreign investment" (6%). The overall score for the 12 items was 24%, indicating a low degree of awareness among the College of Business Administration's students towards the impact of the entrepreneurial project on the achievement of the KSA 2030 Vision. This gives an alarming warning to the policy makers at the university and the college levels to consider spreading the awareness of the KSA 2030 Vision and how opening new ventures can contribute to the attaining of the vision.

Hypotheses Testing

Entrepreneurial Intention and KSA 2030 Vision

The objective of this study is to examine the degree of entrepreneurial intention with the KSA 2030 Vision awareness to identify the extent to which the entrepreneurial intention is associated with the KSA 2030 Vision awareness. The dependent variable is the KSA 2030 Vision awareness and the independent variable is the entrepreneurship intention. The dependent variable "KSA 2030 Vision awareness" consists of 12 items to measure the extent to which the students are aware of the KSA 2030 Vision. A score index is used to measure the level of awareness towards the specific-country issues that would be influenced by the entrepreneurial projects. The score index is a composite measure that sums the value of the 12 dichotomous items of the KSA 2030

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Vision awareness to create a KSA 2030 Vision awareness that takes a score bounding by 0-1, revealing that a higher score is an indicator of a higher KSA 2030 Vision awareness. The dependent variable is the "entrepreneurial intention." This variable is a 1-item that is measured using a four-point Likert Scale and is used to measure the extent of the students' intention towards entrepreneurship. The four-point Likert Scale is ranging from 1 (very improbable), indicating the lowest entrepreneurship intention, to 4 (very probable), indicating the highest entrepreneurial intention. In specific, the four-point Likert Scale and the measured data have been transformed into four categories: "1" (very improbable) indicates to the very low entrepreneurship intention, "2" (quite improbable) indicates a low entrepreneurship intention, "3" (quite probable) indicates a high entrepreneurship intention, and "4" (very probable) indicates a very high entrepreneurship intention.

Simple Regression (SR) was used to evaluate the level of association of entrepreneurial intention with KSA 2030 Vision awareness. As shown by Table 4. 4, the R^2 is 0.066 which means that this model has explained 6.6% of the total variance in the KSA 2030 Vision awareness.

Table 4.4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.256	.066	.062	.22060

Table 4.5 depicts that the *F*-value for the model is statistically significant at the 1% level which means that the overall model can be interpreted.

Table 4.5. ANOVA Analysis

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.904	1	.904	18.586	.000b
	Residual	12.848	264	.049		
	Total	13.752	265			

A summary of the regression results is shown in Table 4.6. A significant negative association is present between entrepreneurial intention and awareness about KSA 2030 vision ($\beta = -.256$, $t = -4.311$, $P = .000$, one-tailed significance). Thus, hypothesis H1 is accepted. Therefore, even though the students have a high degree of entrepreneurial intention, it is evident that they do not have lower levels of awareness about KSA 2030 Vision. The findings highlight the need for policy makers to develop strategies to increase awareness about the KSA 2030 Vision among the university students.

Table 4.6. Simple Regression (n = 266)

Variables	Coeff.	*t*	*p*-value
(Constant)		2.551	.061
Test variable			
EI	-0.256	-4.311	0.000

Conclusion

The objectives of this study are to explore the degree of KSA 2030 Vision awareness among students in the College of Business Administration, and to examine empirically the association of entrepreneurial intention with the awareness of KSA 2030 Vision. The first objective of the study has been attained by carrying out descriptive statistics. The objective deals with the documentation of the degree of KSA 2030 Vision awareness among students in the College of Business Administration. The results indicated that there is a low degree of KSA 2030 Vision awareness among the College of Business Administration's students towards the impact of the entrepreneurial project on the achievement of the KSA 2030 Vision. The third objective of the study has been achieved by conducting the Simple Regression. The objective deals with examining the association of entrepreneurial intention with the awareness of KSA 2030 Vision among students in College of Business Administration at the Northern Border University. The result indicates that entrepreneurial intention relates negatively with KSA 2030 Vision awareness.

It is worth noting that the students in the College of Business Administration at Northern Border University have a low level of awareness of the KSA 2030 Vision in terms of the impact of the entrepreneurial project on the achievement of the KSA 2030 Vision. Furthermore, entrepreneurial intention of the students relates negatively with KSA 2030 Vision awareness. The students seem to have a low degree of awareness of the KSA 2030 Vision. If awareness campaigns have been conducted to spread awareness of the concept, aim and consequences of the KSA 2030 Vision among students, the level of entrepreneurial intention would further increase within the context of achieving the KSA 2030 Vision.

This study contributes to the entrepreneurship literature by providing an initial empirical link between the entrepreneurial intention with the awareness of KSA 2030 Vision among students in the College of Business Administration at the Northern Border University in several ways: First, this study adds to the recent literature by investigating and associating entrepreneurial intention and the awareness of the KSA 2030 Vision. To the best of the researcher's awareness, no empirical evidence is available that has linked entrepreneurial intention and the awareness of the KSA 2030 Vision. Second, as a methodological contribution, the present study addresses the KSA Vision as a dependent variable, which has not been examined empirically within the framework of entrepreneurial intention.

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Results from this study have several implications related to the theory. First, the results of the descriptive statistics show that the students in the College of Business Administration at Northern Border University have a low degree of KSA 2030 Vision awareness (24%) among the College of Business Administration' students, and towards the impact of the entrepreneurial project on the achievement of the KSA 2030 Vision. This gives an alarming warning to policy makers at the university and college levels to consider spreading awareness of the KSA 2030 Vision as well as how opening new ventures can contribute to the attaining of the vision. Moreover, the Simple Regression results depict that there is a significantly negative association between entrepreneurial intention and KSA 2030 Vision awareness. This result demonstrates the fact that although students have a high degree of entrepreneurial intention, they have a low degree of awareness towards the KSA 2030 Vision. This result provides policymakers at the higher education and the university level an alarming signal regarding the policy of increasing the KSA 2030 Vision awareness among students. Therefore, the results of this study extends the previous studies related to entrepreneurship by adding new empirical evidence related to entrepreneurial intention, entrepreneurial education and support, and KSA 2030 Vision in the setting of Saudi Arabia. Further, studies may replicate this study to enhance the external validity of the results. Finally, it would be of interest to expand the research scope and models by using a more sophisticated technique such as structural equation modeling.

Similar to other studies, this study experienced several limitations. The results from the study are confined to the specific sample from which the data was collected (266 students from the college of Business Administration). As such, completely generalizing the findings from the study to wider populations may be challenging since it may yield different results. Therefore, it could be more beneficial to explore whether other colleges at the Northern Border University are significant predictors of entrepreneurial intention. Future studies might focus on other institutions such as the medical, engineering and humanitarian colleges. Future research could also focus on a comparative analysis to explore whether different campuses may have varying results with regards to entrepreneurial intentions. The study may be replicated in other universities within the KSA.

Implications for Management and Stakeholders

There are several implications for management and stakeholders. The fact that students have a lower degree of awareness towards the role of entrepreneurship in in the KSA 2030 Vision means that the government and other stakeholders have a lot to learn from these findings. There is a need for more awareness and educational campaigns about the KSA 2030 Vision and the role of new entrepreneurial projects in achieving these goals. Increased education and awareness can be achieved through the distribution of flyers, brochures, use of banners at strategic locations in the

institution, and use of speeches and workshops that focus on major components of the KSA 2030 Vision. Changes in the syllabus could be made to include KSA vision 2030 as part of the course. Specifically, books and articles named "KSA 2030 Vision" may be added to the course and taught within the wider entrepreneurship course. If this is not enough, a course on entrepreneurship can be included as an elective course in the syllabus of the College of Business Administration. Incorporating the vision 2030 as part of the course would increase the number of students who understand the country's plans, thereby increasing the role of entrepreneurship in building the national economy. However, those who fail to take the course may fail to get the opportunity to enhance their entrepreneurial intentions and knowledge. Adding the KSA vision 2030 plan to the relevant university requirement courses would allow students to understand concepts of entrepreneurship and KSA 2030 Vision at an early stage.

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RELACIÓN ENTRE LAS REDES DE MERCADO E INSTITUCIONALES Y LA INNOVACIÓN TECNOLÓGICA: ANÁLISIS DE LAS EMPRESAS PERUANAS DE MANUFACTURA

RELATIONSHIP BETWEEN MARKET AND INSTITUTIONAL NETWORKS AND TECHNOLOGICAL INNOVATION: AN ANALYSIS OF PERUVIAN MANUFACTURING FIRMS

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ABSTRACT

Firms strive to develop technological innovations. This study focuses on two main objectives: to identify the relationship between market and institutional networks and technological innovation; and to analyze the relationship between the obstacles that firms assess when developing innovations. The literature shows that there has been little interest in researching innovation in emerging economies, in which there is a greater presence of low-technology intensity firms that also develop technological innovations. Using data from 705 Peruvian manufacturing firms, a partial structural equation model was applied. The results showed that when firms are linked to networks, their capacity for technological innovation improves.

KEYWORDS

Manufacturing, innovation, networks, Peru.

RESUMEN

Las empresas se esfuerzan para desarrollar innovaciones tecnológicas. El presente estudio se enfoca en dos objetivos principales: identificar la relación entre las redes de mercado e institucionales y la innovación tecnológica; y analizar la relación entre los obstáculos que las empresas evalúan cuando desarrollan innovaciones. La literatura muestra que ha habido poco interés en investigar la innovación en las economías emergentes, en las cuales hay una mayor presencia de empresas de baja intensidad tecnológica que también desarrollan innovaciones tecnológicas. Usando los datos de 705 empresas peruanas de manufactura, se aplicó un modelo de ecuaciones estructurales parciales. Los resultados mostraron cuando las empresas se vinculan con las redes mejora su capacidad de innovación tecnológica.

PALABRAS CLAVE

Manufactura, innovación, redes, Perú.

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1. INTRODUCTION

Firms are facing environments that are increasingly competitive, which has forced them to develop innovations. However, when they do not have all the resources to innovate themselves, they find it necessary to associate with third parties so that these third parties can provide them with knowledge (Xie et al., 2013). In order to carry out the desired innovations, firms seek to develop market networks that are made up of many parties, including their customers, suppliers, competitors, consultants, and headquarters. At the same time, they also interact with institutional networks, whose actors are universities and research centers.

The connection between market networks and technological innovation has been studied from a variety of different angles, each leading to its own conclusions. Liu and Atuahene-Gima (2018) indicate that connections with customers encourage firms to promote product innovation. In a similar way, firms that connect with suppliers of technology are in a better state to develop process innovations (Najafi-Tavani et al., 2018), and Ozdemir et al. (2017) argue that firms seeking alliances with their competitors manage to deepen their knowledge and to improve their new product development processes; at the same time, they are abler to explore new market opportunities. Furthermore, when the headquarters becomes involved in the process of innovation that is carried out in the subsidiaries, these subsidiaries acquire the skills necessary to develop innovations (Ciabuschi et al., 2015). External consultants are also considered favorable for the development of firms' innovation capacity (Back et al., 2014). Firms that develop the ability to connect to collaboration networks are more likely to develop product innovations (Ghauri et al., 2016).

Meanwhile, research on institutional networks and their relationship with technological innovation has interested scholars. Kim et al. (2018) investigated Korean manufacturing firms and found that firms' alliances with universities and research institutes allow those firms to have access to external sources of knowledge that enhance their capacity for innovation. Additionally,, Seo et al. (2017), analyzing the information from the 2012 Korean innovation survey, verified how obstacles can influence the innovation capacity of low-tech firms, finding that there may be differences that are conditioned by the presence of a strong or weak appropriability regime. The obstacles firms face when they evaluate whether or not to carry out innovations fall mainly into four categories: knowledge, market, cost, and finances, as well as other factors (INEI, 2015).

This study contributes to the literature on innovation carried out by low-tech firms in an emerging economy (Del Carpio & Miralles, 2018). Manufacturing firms are classified according to an indicator that is calculated by dividing the research and development expenses made by firms by their sales, according to the OECD (Galindo-Rueda & Verger, 2016). Low-tech firms, according to Martínez et al. (2017), are characterized by the search for practical knowledge, and they acquire mature technologies and adapt them to their context. They depend on the acquisition of machinery and external knowledge.

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On the one hand, low-tech firms are forced to apply the open innovation approach, which, according to Bayona-Saez et al. (2017), is based on the search for external knowledge to improve their innovation capacity. On the other hand, Zouaghi et al. (2018) points out that low-tech firms that are highly dependent on external knowledge are always in search of connections with customers, suppliers, competitors, and universities, which will help improve their processes of innovation and overcome resource constraints.

It should be noted that there is little research on innovation in Latin American countries, especially Peru (Tello, 2017). Most research on this topic is carried out in the most developed countries (Hervas-Olivere et al., 2011), and it is clear that the results obtained from this research cannot be extrapolated to Latin American emerging economies (Crespi et al., 2019) due to the fact that they are in a different context, one that includes factors such as the presence of high levels of corruption; economies with a sizable informal sector, which discourage formal firms from developing innovations (Pérez, 2015); and the lack of financial resources destined for the development of innovations (Fernández, 2017).

In recent years, interest in research on innovation has been raised in manufacturing firms in Peru. Thus, Huang et al. (2019) point out that these firms face, among others, the following obstacles: little access to advanced technology, scarce financial resources, poor resource management and few qualified workers. Pérez et al. (2019) propose a theoretical model, which allows one to analyze what factors favor the development of the innovation capability of Peruvian manufacturing firms. Also, Cabrera & González (2019) specify that manufacturing firms interact with external sources of knowledge to improve their capacity for innovation; meanwhile, Heredia et al. (2019) sustains that the managers of manufacturing firms develop strategies that are oriented towards reducing costs. Likewise, Ortigueira-Sánchez et al. (2020) investigate what factors favor the development of the innovation capacity of Peruvian manufacturing firms. Meanwhile, Seclen-Luna, Regalado & Cordova (2020) indicate that the Peruvian government is financing innovative projects that improve the innovation capability of Peruvian manufacturing firms.

The structure of this study is as follows: after this introduction, the theoretical framework is presented, and the hypotheses are formulated. The third section deals with methodology and gives a description of the data, the definitions of the variables, and an explanation of the statistical procedures that were conducted. The fourth section shows the results so that the fifth section can present the discussion of the results. Finally, the conclusions, limitations of the study, and future issues to research are stated.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Low-tech firms carrying out their activities in Latin American economies face financial resource limitations that hinder them from carrying out innovation activities (Fernandez, 2017). For this reason, these firms often implement the open innovation approach, which forces them to develop stronger connections with customers, suppliers, competitors, and universities (Bayona-Saez et al., 2017).

On the other hand, Sarpong and Teirlinck (2018) conducted an analysis of small businesses in Belgian firms that were facing enormous obstacles. They found that these firms are more likely to seek out connections with their market networks, that is, with customers, suppliers, or competitors, as well as with their institutional networks, made up of universities and research institutes.

2.1. The relationship between market networks and product innovation in low-tech firms

The literature includes diverse studies that show how firms connect with their customers, suppliers, competitors, consultants, and headquarters and how they carry out product innovations. Estrada et al. (2016) analyzed Flemish firms that collaborated with competitors and found that this helped them improve their ability to innovate products, when knowledge protection mechanisms were assured. Additionally, Xie and Li (2017) found that Chinese vehicle manufacturers that export and face a competitive domestic market are more likely to carry out product innovations, and Najafi-Tavani et al. (2018) found that, for Iranian manufacturing firms, collaborative networks improve product innovation capacity, especially when the firm has developed absorptive capacity.

On the other hand, Sheng et al. (2015), who analyzed Asian firms, developed a theoretical framework to show the positive relationship between the subsidiary firm's tacit knowledge and the ability of the headquarters to develop product innovations. The hiring of external consultants allows firms to improve their innovation capability, even when they do not invest much in research and development, which is one of the characteristics of low-tech firms (Bianchi et al., 2016).

Furthermore, Jajja et al. (2017) researched how firms, through the development of very close relationships with their suppliers, were thus able to generate more knowledge; this had a strong impact on their ability to develop product innovations. Niammuad et al. (2014) show that product innovation is a fundamental activity for recently-formed firms that have had the help of an incubator, which exposes incubated firms to market networks to be able to develop product innovations. Finally, Ghauri et al. (2016) make the case that if firms develop the ability to connect to networks, it is easier for them to develop product innovations.

Latin American firms also link up with market networks to develop technological innovations. In that line, Solleiro & Castañón (2005) analyzing the competitiveness of the Mexican economy, found that firms develop innovations through vertical

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relationships with customers and suppliers. Also, Goedhuys & Veugelers (2012), studying Brazilian manufacturing firms, found that firms that develop technological innovation establish collaborative links with clients, suppliers, or universities.

Regarding innovation studies in Peruvian manufacturing firms, it has been identified that Nuruzzaman & Singh (2019) analyzing the information of firms from several South American countries, including Peru, that the interaction between firms and their customers increases quality of product innovations. On the other hand, Córdova-Aguirre & Ramón-Jerónimo (2021) analyzing Arequipa firms dedicated to the plastics industry, confirmed findings that these firms develop product innovations to meet the needs of their customers.

As can be seen, manufacturing firms that collaborate with their customers, suppliers, competitors, consultants, and headquarters will be enabled to develop product innovations. These arguments allow the following hypothesis to be proposed:

H1: There will be a positive association between market networks and product innovation in low-tech firms.

2.2. The relationship between institutional networks and product innovation in low-tech firms

Institutional networks made up of universities, public research institutes, and private research institutes promote the development of product innovation. The literature includes many studies that demonstrate this relationship. For example, Vega-Jurado et al. (2017) analyzed how the relationships between firms and universities favor the firms' acquisition of knowledge, which leads to a focus on open innovation. This generated knowledge encourages firms to develop product innovations.

Additionally, Tang et al. (2019), analyzing a sample of 166 Chinese manufacturing firms, found that firms that partner with universities are more likely to develop either radical or incremental product innovations. Physical proximity of the firms to the universities is a fundamental aspect in said collaboration, as is these universities' willingness to partner with the firms. More directly, Kobarg et al. (2018) examined the relationships established between firms and universities and noted that universities, through their technology transfer offices, conduct research whose results favor the development of product innovations in firms. Also, Medda (2020) found that interactions between firms and universities favored the development not only of product innovations, but also of process innovations.

In the same vein, Robin & Schubert (2013) analyzed data from a community innovation survey in Germany and France and found that the relationship between firms and public research institutions promoted the development of product innovations. More recently, Szucs (2018) argued that the academic quality of the university is a determining factor when a firm seeks to partner with it in order to improve its innovation capability.

If the emerging economies are considered, it can be found that Bustamante (2018) analyzing a sample of more than 5000 Chilean firms that participated in the national innovation survey, found that firms that are linked to universities are more likely to innovate. Also, Guerrero, Urbano & Herrera (2019) analyzing the alliances between Mexican universities and firms, found that these collaborations favor the development of product and process innovations.

When Peruvian manufacturing companies are analyzed, mixed results were found. Thus, López-Mendoza & Mauricio (2020) analyzed how universities seek to interact with firms to carry out technology transfer projects, allowing them to improve the satisfaction of the firm's customers, by receiving better products. While Carvache-Franco et al. (2020), analyzing Peruvian firms, found a contradictory result, that is, firms that interact with their consultants are less likely to develop product innovations.

Therefore, the following hypothesis can be presented:

H2: There will be a positive association between institutional networks and product innovation in low-tech firms.

2.3. The relationship between market networks and process innovation in low-tech firms

Market networks, which include customers, suppliers, and competitors, promote the development of process innovation. Many studies show how market networks are related to process innovation, including a study by Najafi-Tavani et al. (2018), who researched Iranian manufacturing firms and found that collaborations in innovation networks, especially those connections between firms and their customers, suppliers, and competitors, favor the development of process innovations. In that same line, Aliasghar and Chetty (2019) analyzed the importance of process innovations for a manufacturing firm, pointing out that its development allows the firm to improve product quality, reduce costs, and improve the long-term competitiveness of the firm.

Furthermore, Tomlinson and Fai (2016) evaluated the impact of the firms' connections with their suppliers, finding that these interactions favor the development of process innovations. Likewise, Ayoub et al. (2017), analyzing the interactions between the members of a supply chain, found that these interactions favor firms' process innovation. Customers and suppliers can contribute ideas and knowledge, and, in this way, the firms can improve their product design, their production process, and product delivery. The long-term development of interactions between the firm and its customers and suppliers favors the development not only of product innovation but also process innovation.

Meanwhile, Ciabuschi et al. (2015) argue that when the headquarters is involved in the innovation process that is being carried out at the subsidiaries, the subsidiaries acquire the competencies necessary to develop innovations, while Back et al. (2014)

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state that, in an emerging market, external consultants are important to helping generate innovation initiatives. Simon et al. (2012) state that innovation helps a firm satisfy its customers; this customer satisfaction provides all the more motive for firms to develop process, organizational, and marketing innovation. Finally, Un and Asakawa (2015) analyzed how cooperating with suppliers in research and development made for a greater impact when firms carried out their process innovations.

Collaboration between market networks and manufacturing firms improve its innovation capability. In that line, Corredor, Forero, & Somaya (2015), analyzing the Colombian manufacturing companies that participated in the innovation survey year 20024, found that companies that are linked with customers, suppliers and competitors are more likely to develop innovation. On the other hand, Pereira, Borini, & Oliveira Jr (2019) investigated how Brazilian firms link with suppliers, customers, and competitors to improve their capacity for innovation in processes, especially with suppliers, to exploit new technologies.

When Peruvian manufacturing firms are analyzed, mixed results were found. Thus, Carvache-Franco et al. (2020), analyzing Peruvian firms, found that firms that interact with their customers, suppliers and competitors are more likely to develop innovations in process. And, on the other hand, Nolazco (2020) studied Peruvian manufacturing firms, finding that interactions with customers, suppliers and competitors favor process innovations.

Based on the aforementioned, the following hypothesis can be proposed:

H3: There will be a positive association between market networks and process innovation in low-tech firms.

2.4. The relationship between institutional networks and process innovation in low-tech firms

Institutional networks made up of universities and public and private research institutes promote the development of process innovation. Institutional networks have captured the attention of scholars, including Ueasangkomsate and Jangkot (2017), who analyzed small and medium-sized food manufacturing firms in Thailand and found that when universities collaborated with the firms, carrying out technology transfers or joint research and development projects, or offering training to the firm's workers, it benefited the firm by improving its capacity for product and process innovation. Furthermore, Un and Asakawa (2015) argue that when universities collaborate with firms to develop product innovations, they can also develop process innovations along the way, especially when the firms are commissioned by the universities to research a technology that will allow those firms to improve their production processes.

Tsinopouloset et al. (2018) analyzed community surveys carried out in the United Kingdom between 2004 and 2010 and found that although it is true that universities'

main economic activity is the training of future professionals, it can also be stated that when universities interact with firms, they are more likely to discover innovations in process. Moreover, Aliasghar et al. (2019), analyzing the Iranian auto industry, found that universities can help firms develop process innovations through the transfer of knowledge.

González-Pernía et al. (2015) indicate that the universities' partnering role with firms is not clear but that this relationship stimulates product and process innovation. In this same sense, Maietta (2015) states that firms in the food and beverage industry seek out partnerships with universities and public research institutes in order to receive transfers of experience and knowledge that then allow them to improve their process innovation capability.

Relations between firms and universities are not very frequent in emerging economies. Those being studied by Araneda-Guirriman, Pedraja-Rejas & Rodríguez Ponce (2015) analyzing Chilean firms, conclude that universities play an important role in the training of qualified personnel, and generation of knowledge, that helps firms improve their capacity for innovation in products and processes. Thus, as also by de Moraes Silva, Furtado & Vonortas (2018), investigating Brazilian firms, identified that firms that carry out innovations in the process are more likely to link with universities and research institutes to develop projects that solve problems of a technological nature.

With regard to Peruvian firms, it is important to point out that universities are generators of technological knowledge that helps firms develop innovations (Arenas & González, 2019). While Carvache-Franco et al. (2020) analyzing Peruvian firms found a contradictory result, that is, firms that interact with their consultants are less likely to develop process innovations.

According to the aforementioned, the following hypothesis can be proposed:

H4: There will be a positive association between institutional networks and process innovation in low-tech firms.

2.5. Obstacles and their relationship to technological innovation in low-tech firms

Community innovation surveys of the manufacturing industry have always asked questions regarding the level of importance of the obstacles that firms face while attempting to carry out innovations (Leoncini, 2016). Ng and Kanagasundaram (2017), analyzing Malaysian furniture manufacturing firms, found that these firms face obstacles such as excessive risks, the excessive expense of carrying out innovation activities, lack of qualified personnel, uncertainty regarding demand, lack of infrastructure, and more. These factors discourage firms from developing technological innovations.

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Blanchard et al. (2013) analyzed the fourth French community innovation survey; they focused on financial and non-financial obstacles in order to evaluate their impact on the propensity for firms to innovate, and they found that non-financial obstacles dissuaded firms from innovating while financial obstacles inhibited firms from implementing their innovations.

As can be seen, obstacles to innovation and their relationship with firms' innovation capability have attracted attention. Indeed, Pellegrino and Savona (2017) studied how firms in the UK face a series of obstacles, including those of a financial nature, the lack of qualified personnel, and market entry barriers, which make it more difficult for firms to carry out activities that allow them to introduce product or process innovations. Research along these lines has been carried out in emerging economies, too, including a study by Karahan and Karhan (2013), who researched obstacles that impeded Turkish firms from carrying out innovations. Also, Santiago et al. (2016) analyzed Mexican firms to determine which financial and non-financial obstacles limited these firms' innovation capability and suggested that policymakers focus on those factors that affected firms' interest in innovating.

Manufacturing firms in Latin America also face obstacles to making innovations, in this vein, Vega-Jurado, Juliao-Esparragoza, Paternina-Arboleda & Vélez (2015) analyzing a case study of a Colombian agroindustrial company, found that its employees faced obstacles, such as the lack of resources and qualified personnel, when they carry out innovations. Moreover, Pérez, Geldes, Kunc & Flores (2019) made a study of the innovative behavior of manufacturing firms in Chile and Peru, finding that Chilean firms faced greater financial barriers to make innovations than Peruvian firms.

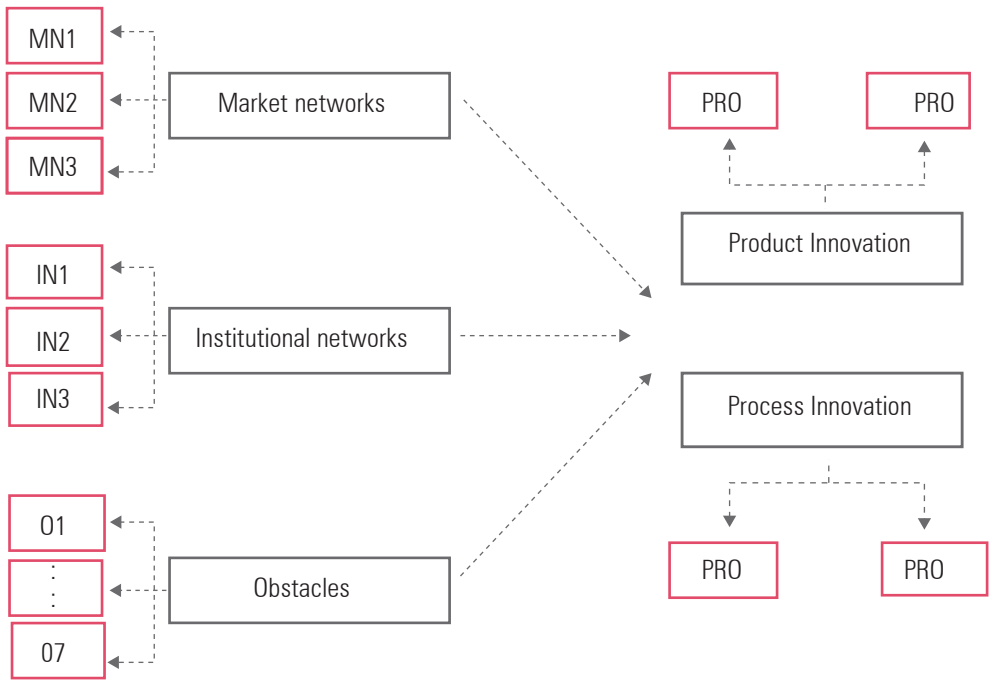
In relation to Peruvian firms, we will mention that Huang et al. (2019) that Peruvian manufacturing firms face, among others, the following obstacles: little access to advanced technology, scarce financial resources, poor resource management, and few qualified workers. Meanwhile, Tello (2021) maintains that Peruvian manufacturing firms face some obstacles, which are complementary to each other, affecting the firm´s innovation capability.

Keeping in mind the aforementioned, the following hypothesis is posited:

H5: There is a significant relationship between the obstacles (that firms face when making innovations) and technological innovation in low-tech firms.

The figure 1 shows the proposed theoretical model and the causal relationships among the variables.

Figure 1. Proposed theoretical model



Source: Own elaboration

3. METHODOLOGY

Next, the methodology used in this study is given. It consists of the description of the dataset; the definition of the dependent, independent, and control variables; and, finally, the methods used to analyze the data.

3.1. Data

The population in this study is comprised of low-tech Peruvian manufacturing firms. The units of analysis were the Peruvian manufacturing firms that participated in the 2015 National Survey of Innovation in the Manufacturing Industry. This survey was carried out by the National Institute of Statistics and Informatics (INEI). The fieldwork produced1,452 surveys carried out over a period of three consecutive years (from 2012 to 2014). The analysis used information that belongs to year 2014. In the survey, 720 firms are classified as low-tech firms (See Table 1). It was considered a sample of 705 manufacturing firms, where the remains present missing values. These firms were considered low-tech, which means that they invested less than 1.0 percent of their sales revenues in research and development (Organization for Economic Cooperation and Development, OECD, 2007). These firms belong to the following industries: Manufacturing, recycling; wood, pulp, paper, paper products, printing and publishing, food products, beverages, and tobacco, textiles, textile products, leather, and footwear

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Table 1 presents the descriptive statistics of the firms included in the sample. They have been classified according to their age and size.

Table 1. Number of firms according to their technological intensity.

Technological Intensity	Number	Relative frequency
High	54	3.7%
Medium-high	271	18.7%
Medium-low	407	28%
Low	720	49.6%
Total	1452	100%
Firm age		
Old (≥ 44 years old)	63	9%
Young (25 years old)	552	78%
Intermediate (from 26 to 43 years old)	90	13%
Total	705	100%
Firm size		
Small (50 employees)	245	35%
Medium (51 to 250 employees)	271	38%
Large (≥251 employees)	189	27%
Total	705	100%

Source: INEI, 2015

3.2 Variables

There are two dependent variables: product innovation and process innovation. Product innovation is a continuous variable and occurs when a firm declares that it has introduced completely new goods or services or those with important modifications. Applying factor analysis two variables were obtained. The first one for the following items: (1) new good, (2) new service. And, for the second variable, the following items: (3) significantly improved good, and (4) significantly improved service. Applying factor analysis this variable is obtained.

Process innovation is also a continuous variable. It occurs when the firm indicates that it has introduced some significant modifications to the process of production, marketing, logistics, or distribution. Applying factor analysis two variables were

obtained. The first one for the following items: (1) new production method for goods or services; (2) new method for the logistics, distribution, or delivery of supplies, goods, or services; (3) new activity that supports production, like maintenance, acquisition, accounting, or IT systems. And, for the second variable, the following items: (4) significantly improved production method for goods or services; (5) significantly improved method for the logistics, distribution, or delivery of supplies, goods, or services; and (6) significantly improved activity that supports production, like maintenance, acquisition, accounting, or IT systems.

Next, the independent variables are listed, which are market networks, institutional networks, and obstacles. To operationalize market and institutional networks, the criteria established by Laursen and Salter (2004, 2006) are followed; these researchers based their operational variables on a communitarian innovation survey in the United Kingdom. Regarding the obstacles, the criteria established for the questionnaire of the 2015 innovation survey of the Peruvian manufacturing industry were followed; this questionnaire analyzed 7 obstacles that had been grouped into four categories: obstacles related to knowledge, to the market, to expenses and finances, and to other factors (INEI, 2015). For both market and institutional networks, dichotomous variables consisting of 5 items and 3 items, respectively, were used. On the other hand, obstacles were measured on a Likert scale according to degree of importance by using the following scale: 1=none, 2=low, 3=medium, 4=high.

The control variables used are firm size and age. The size and age of the firm can influence how product and process innovation are carried out. Firm size (expressed as a logarithm) is measured by the number of employees each firm has (Schoenmakers & Duysters, 2006; Laursen & Salter, 2006), and firm age (Thornhill, 2006) is measured as the number of years (expressed as a logarithm) that have passed from the firm's foundation up until the year the data was collected from the firm (2014). See table 8 in the annexes.

3.3. Analysis methods

SmartPLS 3 estimates the process of the structural equation model (SEM) through the two-step PLS technique, according to Chin et al. (2003). First, the measurement model is estimated when the relationship between the indicators and the latent construct are determined. Second, the estimation of the structural model is carried out, and the relationships between the constructs are obtained through the path coefficients and the level of significance. The application of structural equations is justified, according to Hair et al. (2019), for one main reason: because the information comes from a secondary database.

4. RESULTS

The results are presented in three stages: first, the results of the factorial analysis; then, the results of the measurement model; and finally, the results of the structural model.

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4.1. Factorial Model

SPSS software was used for the analysis of the three independent variables: market networks, institutional networks, and obstacles. An Exploratory Factor Analysis (EFA) was used to determine which items measure each factor using certain statistical criteria, like the Kaiser-Meyer-Olkin (KMO) test for sampling adequacy and Bartlett's test of sphericity, obtaining the factorial structure for an easy and significant interpretation (Pando et al., 2016). The results are shown in Table 2. According to Jiménez et al. (2016), to verify reliability and validity, the percentages of the total variance explained are given: 51.17%, 55.70%, and 52.05% for institutional networks, market networks, and obstacles, respectively.

Table 2. Percentage of variance explained

Variable	Indicator	Standard loads	Goodness of fit
Product innovation	ProdI1	0.730	KMO: 0.500
	ProdI2	0.720	Bartlett: 3.55 (p=0.060)
	ProdI3	0.730	KMO: 0.500
	ProdI4	0.733	Bartlett: 3.88 (p=0.049)
Process innovation	ProcI1	0.747	KMO: 0.647
	ProcI2	0.752	Bartlett: 241.58 (p=0.001)
	ProcI3	0.768	
	ProcI4	0.751	KMO: 0.651
	ProcI5	0.755	Bartlett: 277.86 (p=0.001)
	ProcI6	0.791	
Market networks	MN1	0.873	KMO: 0.530
	MN2	0.845	Bartlett: 323.07 (p=0.001)
	MN3	0.443	
Institutional networks	IN1	0.709	KMO: 0.611
	IN2	0.748	Bartlett: 138.57 (p=0.001)
	IN3	0.688	
Obstacles	O1	0.623	KMO: 0.848
	O2	0.776	Bartlett: 1792.56 (p=0.001)
	O3	0.758	
	O4	0.749	
	O5	0.756	
	O6	0.662	
	O7	0.714	

Source: IBM SPSS Statistics Software.

4.2. Measurement model

The research data were analyzed using indicators of internal consistency reliability, including Cronbach's alpha (CA) and the composite reliability (CR) index, whose values should be greater than 0.7; convergent validity through the average variance extracted (AVE), whose value should be greater than 0.5; the analysis of the multicollinearity measured by the variance inflation factor (VIF), whose values should be under 5; and the coefficient of determination (R2).

Table 3 shows the values of the reliability and convergent validity indicators, the multicollinearity analysis, and the coefficient of determination for the model with product innovation as the dependent variable. According to Wong (2016), when the focus of the partial structural equations is applied, the composite reliability index is a better indicator than Cronbach's alpha. For convergent validity, the indicators possess reasonable values. For the multicollinearity analysis, the variance inflation factor exceeds 5 for none of the variables. The coefficients of determination are 0.33 (product innovation) and 0.31 (process innovation) which show a moderate relationship between the dependent and independent variables.

Table 3. Reliability and validity indicators

Latent variable	CA	CR	AVE	VIF	R^2
Product innovation	0.502	0.801	0.667		0.33
Process innovation	0.652	0.852	0.742		0.31
Obstacles	0.845	0.879	0.509	1.018	
Market networks	0.573	0.767	0.525	1.087	
Institutional networks	0.522	0.757	0.510	1.088	
Referential values	**>0.7**	**>0.7**	**>0.5**	**<5**	

CA, Cronbach's alpha; CR, Composite reliability; AVE, Average variance extracted; VIF, Variance inflation factor.

Source: Smart PLS 3 Software.

Regarding discriminant validity, the Fornell-Larcker criterion (1981) establishes that the values of the square root of the variance extracted (AVE), shown in the diagonals of Table 4 in bold, should be greater than the correlations between the latent variables. Both in the product innovation model (Table 5) and in the process innovation model (Table 6), it can be appreciated that the requirements for discriminant validity are met.

Table 4. Discriminant validity

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	Product innovation	Process innovation	Obstacles	Market networks	Institutional networks
Product innovation	0.817				
Process innovation	0.522	0.861			
Obstacles	0.117	0.095	0.714		
Market networks	0.247	0.265	0.075	0.724	
Institutional networks	0.157	0.259	0.055	0.266	0.714

Source: Smart PLS 3 Software.

4.3. Structural model

After evaluating measurement methods, a structural model was estimated for product and process innovation. Tables 5 and 6 show the coefficient values and the p-values of the models for product and process innovation, respectively, which helped to determine the hypotheses' statistical significance, according to Hair et al. (2014). The bootstrapping method was used, with 2000 resamples.

Table 5 shows the results of the structural model of product innovation. The relationship between market networks, institutional networks, obstacles, and product innovation can be appreciated. The coefficients are positive and statistically significant.

Table 5. Results of the product innovation structural model

Hypothesis	Coefficient	P-value	Is the hypothesis confirmed
H1: MN->PRODI	0.211***	0.001	Yes
H2: IN->PRODI	0.098**	0.032	Yes
H5: OBS->PRODI	0.109**	0.003	Yes

Note: MN: Market Networks; IN: Institutional Networks; OBS: Obstacles; PRODI: Product Innovation. Note: *p<=0.1; **p<=0.05; ***p<=0.001
Source: Smart PLS 3 Software.

Table 6 shows the results for the structural model of process innovation. For all three relationships between market networks, institutional networks, obstacles, and process innovations, the coefficients are positive and statistically significant.

Table 6. Results of the process innovation structural model

Hypothesis	Coefficient	P-value	Is the hypothesis confirmed
H3: MN->PROCI	0.198***	0.001	Yes
H4: IN->PROCI	0.194***	0.001	Yes
H5: OBS->PROCI	0.085**	0.017	Yes

Note: MN: Market Networks; IN: Institutional Networks; OBS: Obstacles; PROCI: Process Innovation. Note: *p<=0.1; **p<=0.05; ***p<=0.001
Source: Smart PLS 3 Software.

The model also met the goodness of fit index (GoF) (Tenenhaus et al., 2005). This index varies between the values of 0 and 1. Although there is no minimum threshold, a value greater than 0.36 is recommended (Wetzels et al., 2009). The GoF index reaches a value of 0.48 for the proposed theoretical model, which is greater than the minimum recommended to guarantee the goodness of fit for the model studied. Moreover, the model fits through the standardized root mean square residual (SRMR) (Hu & Bentler, 1998, 1999). A model is considered to have a good fit when values are less than 0.08. Therefore, an SRMR value of 0 would indicate a perfect fit, but a recent simulation study shows that a specified correct model would have SRMR values greater than 0.06 (Henseler et al., 2016). The structural model has adequate SRMR values of 0.076.

Table 7 shows the coefficients of the control variables for each dependent variable. In the case of product innovation, both coefficients are not statically significant, whereas for process innovation, firm size has a positive and statistically significant coefficient. In other words, larger firms have more resources to carry out process innovations.

Table 7. Control variable coefficients

Dependent variable	Control variable	Coefficient	P-value
Product innovation	Age	0.052	0.180
	Size	0.010	0.818
Process innovation	Age	0.006	0.801
	Size	0.081**	0.042

Note: *p<=0.1; **p<=0.05; ***p<=0.001
Source: Smart PLS 3 Software.

4.4. Analysis of the common method variance

According to Podsakof (2003), the criterion to evaluate the common method variance is Harman's single-factor test, which is shown in Table 9. If the percentage

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of variance is less than 25%, it shows that the skew of the common method variance does not affect the model (Ylitalo, 2009). Therefore, in the study the items could be grouped to create the latent variables in the analysis. The variance explained is 17.48%, showing that the common method variance does not affect the model. The calculations were carried out using IBM SPSS Statistics software, and the results are shown in Table N° 9 the annex.

DISCUSSION

This research examines technological innovation capability in low-tech firms in emerging countries. The perspective of this study focuses on the role that market and institutional networks can have on technological innovation capability. With a SEM model the data of 705 Peruvian firms have been analyzed to verify if there is statistical support for the five hypotheses. The SEM model hypotheses relate firms' technological innovation capability, divided into two types: product and process innovation, (the dependent variables) to the connections that firms have with market and institutional networks and, additionally, to the possible obstacles that the firms could encounter when trying to carry out innovation activities (independent variables). The study also uses control variables, like firm age and number of employees.

This study seeks mainly to analyze the influence that market and institutional networks have on product and process innovation in low-tech firms. The results obtained regarding the relationship between market and institutional networks and product innovation are similar. On one hand, market networks have a positive and statistically significant (Hypothesis H1, coefficient 0.212, $p \leq 0.001$) relationship with product innovation. These results coincide with those of previous studies (Ghauri et al., 2016), which show that firms that forge connections with market networks: suppliers, customers, competitors, etc., are able to develop product innovations. On the other hand, this study provides support for the relationship between institutional networks and product innovation in low-tech firms (Hypothesis H2). The hypothesis is accepted. This last result is consistent with the results of Robert and Schubert (2013), who found that firms that form relationships with universities and public research institutions are more likely to develop product innovations.

For process innovation it can be confirmed, with statistical significance, that higher levels of involvement in market networks are related to more process innovation activity, in accordance with Hypothesis H3 (coefficient 0.199, $p \leq 0.001$), and, in the same way, higher levels of involvement in institutional networks are related to more process innovation, in accordance with Hypothesis H4 (coefficient 0.195, $p \leq 0.001$). These results agree with those obtained by Un and Asakawa (2015), who found that firms with connections to suppliers (market networks) are able to implement process innovations. Moreover, the connection of low-tech firms with universities and public or private research institutes (institutional networks) is related to process innovation, in accordance with Maietta's (2015) results.

Furthermore, there is broad interest in determining how firms have been able to

innovate despite obstacles to commercial activity (Karahan & Karhan, 2013). This present study shows that obstacles can be related both to product innovation and to process innovation (Hypothesis H5 and H6), and, therefore, low-tech firms are capable of overcoming these obstacles. These results are in agreement with those obtained by Blanchard et al. (2013), who analyzed communitarian innovation surveys in France, and Santiago et al. (2016) and Pellegrino and Savona (2017), who analyzed the situation in emerging countries; the aforementioned researchers all found that overcoming financial obstacles allowed for innovation capability improvement.

Finally, the results of this study of the influence of the control variables on process innovation coincide with the results of previous studies (Huang & Rice, 2012). The analysis shows that there is a positive and statistically significant relationship between firm size and process innovation; this coincides with the results of Huang and Rice (2012), aligning with evidence that large firms have more resources to carry out innovation activities.

5. CONCLUSIONS, LIMITATIONS, AND FUTURE RESEARCH

One of the main challenges faced by emerging economies is their firms' innovation capacity. Although this is a problem that has been thoroughly studied in relation to high-tech firms, there have not been studies on low-tech firms' innovation behavior. Low-tech firms make up an important percentage of the gross domestic product of emerging countries and, therefore, their innovation capacity has an important influence on the wealth of those emerging economies. This study contributes by providing evidence of the relationship between market and institutional networks and product and process innovation in emerging economies like Peru. These results should help policymakers promote legislation to increase the competitiveness of low-tech firms in Peru and in other emerging economies.

In this sense, the academic results of our work may confirm that for these group of firms, low-tech in emerging countries, the connection between the low-tech firm and market and institutional networks aids in the development of product and process innovations. These results contribute to better understanding of how low-tech firms can afford technological innovation. This is peculiar to these firms because they are not able to develop strong R&D units and deploy R&D plans. Higher-tech firms in developed countries are more used to these initiatives than the others. And most of the literature on implementing innovation initiatives comes from different contexts. This, in turn, means that specific studies are needed to help stimulate and promote innovation in these firms from the new perspective of being part of a set of networks in an open setting, and an innovative ecosystem.

This study tries to contribute to the literature of management of low-tech firms from emerging economies. As it has been said, most of the studies on innovation have focused on high-tech firms in developed countries. This study starts a new line of research in this group of firms. Low-tech firms are not inclined to develop technological innovation activities. This study provides a specific action line to start

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innovation activities in low-tech firms in emerging countries. This action line can provide new insights to managers and policymakers to promote innovation activities in this segment of firms. On the one hand, low-tech firms are not considered pioneers in the development of technological innovations, and they try to replicate what innovation leaders do. This study gives some clues as to how low-tech firms can start acquiring a better position in the innovation scene. Firstly, low-tech firms can start forming their market and institutional networks to get new sources for innovation opportunities. Secondly, it is not necessary to have strong R&D departments to innovate. Innovation opportunities can be obtained from the networks that come with each firm. On the other hand, a set of specific cultural traits are necessary to manage an open innovation approach. Firstly, an open innovation approach needs a fluent relationship with the members of the firm's network, but also an attitude to accept what comes from outside the firm. This implies establishing a new cultural setting within the firm. Secondly, open innovation is a not a new R&D department, as it requires a comprehensive vision within the strategic settings of the firm.

This study allows for some managerial implications to be identified. First, managers of low-tech firms should foment connections with customers, suppliers, and competitors and also with universities and research institutes in order to develop the greatest number of technological innovations. Second, this cannot be an isolated initiative, building connections should be related to changing the cultural settings within the firm. That means, at least, two different things. On the one hand, to create a culture of innovation, on the other hand, to prepare all members of the firm to participate in an open context where innovation is going to be part of the activities to develop new products and services. Also, managers of low-tech firms should evaluate the obstacles they face and, in this way, develop technological innovations.

How is this approach connected to the current situation of the pandemics? As far as we understand the trends behind the results of this work have been emphasized by the pandemics. Interacting with the members of firm's networks and being an active part of an open innovation ecosystem is needed in order to have a sound infrastructural support form telecommunications networks and software applications. The current pandemics have accelerated the deployment and the use of this infrastructure. In this sense, to remain competitive, firms should be able to adapt to these new features to enhance their innovation efforts.

Most of the countries in the Latin American region have a similar economic structure. At the same time, all these countries differ from developed countries. Although this study has been based on a sample of firms in Peru, the trends behind the results obtained could be expected to have some replicability in other countries. In any case, further research should be necessary to better understand how these results can be used in other emerging economies.

This study is not exempt from limitations, which were as follows: the first limitation has to do with the fact that the study used information obtained from the national innovation survey of the Peruvian manufacturing industry in 2015. In

other words, it is a cross-sectional study that faces two problems: the bias generated by the fact that each questionnaire was answered by one single person and the fact that this type of study does not allow for the establishment of a causal relationship between constructs (Rindfleisch et al., 2008). It is suggested that a longitudinal study or comparative studies using innovation surveys from other Latin American countries be carried out.

The second limitation has to do with how the constructs referred to as "market networks" and "institutional networks" have been measured; these constructs reflect connections to customers, suppliers, or competitors and to universities and public or private research institutes, respectively. It is suggested that research be carried out that identifies specific connections, for example, those with customers, with suppliers, or with universities, and that shows how these individual relationships favor the development of product and process innovations.

A final limitation has to do with how obstacles to innovation were measured. Four categories were formed: obstacles related to knowledge, obstacles related to the market, obstacles related to expenses and finances, and obstacles related to other factors, but then a single score was obtained. It is suggested that the way each category of obstacles is related to the development of technological innovations be examined individually.

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ANNEXES

Table 8. Definitions of the variables in the study

Variable	Product innovation
Type and scale	Quantitative and continuous

Conceptual definition	The firm has produced an innovation in its product.
Operational definition	Composed of four dichotomous items: New good. New service. Significantly improved good. Significantly improved service.
Variable	**Process innovation**
Type and scale	Quantitative and continuous
Conceptual definition	The firm has produced an innovation in its process.
Operational definition	Composed of six dichotomous items New production method for goods or services. New method for the logistics, distribution, or delivery of supplies, goods, or services. New activity that supports production, like maintenance, acquisition, accounting, or IT systems. Significantly improved production method for goods or services. Significantly improved method for the logistics, distribution, or delivery of supplies, goods, or services. Significantly improved activity that supports production, like maintenance, acquisition, accounting, or IT systems.
Variable	**Market networks**
Type and scale	Quantitative and continuous
Conceptual definition	The firm has connected with market networks.
Operational definition	Composed of five dichotomous items, according to their connection with: Suppliers Customers Consultants and experts
Variable	**Institutional networks**
Type and scale	Quantitative and continuous
Conceptual definition	The firm has connected with institutional networks.

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Operational definition	Composed of three dichotomous items, according to their connection with: Universities Public research institutes Private research institutes
Variable	**Obstacles**
Type and scale	Quantitative and continuous
Conceptual definition	The firm has experienced obstacles to innovation.
Operational definition	Composed of 7 items, according to their level of importance, on a Likert scale: Contracted size (O1) Lack of funding from the firm or group of firms (O2) Lack of funding from sources outside of the firm (O3) The innovation comes at too high a price (O4) Perception of excessive financial risk (O5) Insufficient flexibility of rules and norms (O6) Inadequate physical infrastructure (O7)
Variable	**Firm age**
Type and scale	Quantitative and continuous
Conceptual definition	Age of firm, from the date of its founding
Operational definition	Expressed as a logarithm of the number of years.
Variable	**Firm size**
Type and scale	Quantitative and continuous
Conceptual definition	Size of firm, according to the number of employees.
Operational definition	Expressed as a logarithm of the number of employees.

Table 9. Total variance explained as a factor

Factor	Initial eigenvalues			Sums of the saturations of the square root of the extraction		
	Total	% variance	% accumulated	Total	% variance	% accumulated
1	4.021	17.482	17.482	4.021	17.482	17.482
2	3.260	14.175	31.657			
3	1.593	6.926	38.583			
4	1.385	6.023	44.606			
5	1.203	5.229	49.836			
6	1.081	4.700	54.536			
7	.944	4.102	58.638			
8	.877	3.813	62.451			
9	.827	3.596	66.046			
10	.782	3.401	69.447			
11	.745	3.240	72.687			
12	.700	3.045	75.733			
13	.680	2.957	78.689			
14	.665	2.892	81.582			
15	.637	2.769	84.351			
16	.591	2.570	86.920			
17	.535	2.328	89.248			
18	.511	2.220	91.468			
19	.492	2.137	93.606			
20	.451	1.961	95.567			
21	.390	1.697	97.265			
22	.332	1.445	98.709			
23	.297	1.291	100.000			

Source: IBM SPSS Statistics software.

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RESPONSIBLE PATTERNS OF PRODUCTION AND CONSUMPTION: THE RACE FOR THE ACHIEVEMENT OF SDGS IN EMERGING MARKETS

PATRONES DE PRODUCCIÓN Y CONSUMO RESPONSABLE: LA CARRERA POR EL LOGRO DE LOS OBJETIVOS DE DESARROLLO SOSTENIBLE (ODS) EN MERCADOS EMERGENTES

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ABSTRACT

Since the end of the 20th century, the role of private multinational enterprises (MNEs) has been recognized as critical in implementing increased sustainable production and consumption patterns. Particularly after the creation of the Sustainable Development Goals (SDGs) and the Agenda 2030, this role has increased. In this sense, this paper aims to analyze the measures and actions taken by companies in their contribution to the achievement of the SDG 12. Through the identification of more than 52 metrics in sustainability reports of 854 firms, findings suggest that direct greenhouse gas emissions and indirect greenhouse gas emissions are the most often reported corporate metrics to measure their impact on specific SDGs. This reveals the importance of sustainability actions in emerging market firms as a mechanism to gain legitimacy when operating in foreign markets and as an opportunity to create more sustainable production models.

KEYWORDS

Business ethics; Corporate sustainability; CSR; Environmental responsibility; Reporting; Responsible Consumption; Responsible Production; SDG 12; Sustainability, Sustainable Development Goals (SDGs); WikiRate.

RESUMEN

Desde finales del siglo XX, se ha reconocido que el papel de las empresas multinacionales (EMN) privadas es fundamental en el proceso de implementación de patrones de producción y consumo más sostenibles. Especialmente, tras la creación de los Objetivos de Desarrollo Sostenible (ODS) y la Agenda 2030, este papel ha aumentado. En este sentido, este trabajo tiene como objetivo analizar las medidas y acciones tomadas por las empresas en su contribución al logro del ODS 12. Mediante la identificación de más de 52 métricas en los informes de sostenibilidad de 854 empresas, los hallazgos sugieren que las emisiones directas de gases de efecto invernadero y las emisiones indirectas de gases de efecto invernadero son las métricas corporativas con más información para medir su impacto en ODS específicos. Esto revela la importancia de las acciones de sostenibilidad en las empresas de mercados emergentes como mecanismo para ganar legitimidad al operar en mercados externos y como oportunidad para la creación de modelos de producción más sostenibles.

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PALABRAS CLAVE
Consumo responsable; Ética de negocios; Objetivos de Desarrollo Sostenible (ODS); ODS 12; Producción responsable; Reportes; Responsabilidad ambiental; RSE; Sostenibilidad, Sostenibilidad corporativa; WikiRate.

INTRODUCTION

Against the background of the impacts that the ecological crisis (climate change, biodiversity loss, air pollution, COVID-19, etc.) generates in both the economy and society, the need for a change in the way that businesses use and transform natural resources becomes imperative. Firms are key actors in the quest for sustainability due to their capacity to innovate, to create jobs and to support the 2030 Agenda through financing (Gonzalez-Perez et al. 2021; Mohieldin & Shehata, 2021). In a broad sense, they are expected to ensure that their operations maintain healthy ecosystems while providing the means that enable people to thrive (which might mean playing an active role that goes beyond corporate social responsibility). Thus, sustainable consumption and production (SCP) patterns have found a special place on the international agenda. For example, through the 10-year framework of programs on sustainable consumption and production patterns (10YFP), the Sustainable Development Goals (SDGs), and many other efforts that preceded them, the pivoting role of the private sector in the construction of sustainable societies has been publicly recognised.

Among the many SDGs to which private companies can be linked, SDG 12 "ensure sustainable consumption and production patterns" can be considered one of the most relevant and directly connected. Therefore, responsible management education should place a greater focus on SDG's. As this article seeks to demonstrate, different initiatives have provided guidance for companies, orienting their operations towards sustainability, while also sharing their practices and making them accountable for their actions. For instance, by following specific metrics and criteria for issues such as direct and indirect greenhouse gas (GHGs) emissions, recycling, or total wastes sent to landfill, among other variables; companies leverage their chances to improve their performance in terms of sustainability.

This is important for businesses from all economic sectors, at all levels, but given the influence that multinational enterprises (MNEs) have in development challenges and discourses, MNEs hold a unique place. Furthermore, there exist platforms that focus on assessing what companies declare, sharpening control and enhancing several mechanisms for monitoring, accuracy, and transparency. These kinds of collaborative platforms are also useful to encourage participation of business schools, for example regarding ethical issues linked to transparency and accountability, as ethical leadership has gained relevance and recognition as a phenomenon that influences the results of the organisation (Correa Meneses, et al., 2018). Students can reflect on transparency issues to develop ethical competencies, which are considered important for business administrators, as shown for the case of Colombia (Rangel, et al., 2019). Furthermore, these platforms provide both managers and policymakers

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with comparative information, useful for deeper understanding of the challenges and potential contributions that businesses (both local and multinationals) embody in terms of sustainability.

This paper seeks to enrich academic and policy discussions around the importance of emphasising responsible management education, and the contributions that businesses make to SDG 12. As such, we analyse data input by students in WikiRate, an online collaborative database that collects data on corporate impacts on sustainable development.

To elaborate further, the materials and methods section explains the metrics that were included in the study, and the way they relate to SDG 12. The following section offers the background and literature covering the topic of sustainable development (with a focus on the role business management), while the results section exposes the analyses of the metrics using WikiRate data. Finally, management education implications, conclusions, and limitations regarding the contribution of businesses towards the achievement of the SDGs are explained, while in the last section, the paper presents some ideas for further research.

LITERATURE REVIEW

In recent years, the impacts that business management and their actions reducing adverse environmental and social impacts, have received growing attention. For example, Gladwin and Walter (1976), in one the earliest academic publications about the connections between social responsibilities of firms, proposed a framework for analysing the environmental accountability of a businesses. McNulty and Cheeks (1978) also explored the linkages between social responsibility of companies by arguing that global society and managers (not only local firms) were facing multiple charges related to the environmental and social implications of their decisions. The "World Commission on Environment and Development: Our Common Future" (WCED, 1987) recognized the vulnerabilities of the environment and suggested that every nation should define their economy, either market-oriented or centrally planned, in terms of sustainability. Furthermore, in the 1960s, the United Nations Conference on Trade and Development (UNCTAD) was created to emphasize the critical influence of trade in terms of quality of life and development of poor and developing countries in the global south.

Since these early acknowledgements, several initiatives have been proposed and implemented to address the concern regarding how business can maximize its positive contribution to social, economic, and environmental development. The establishment of the United Nations Global Compact in 2000 was a critical milestone highlighting the decisive role of multinational companies towards the achievement of global sustainable development. At the proposal of the Global Compact in January 1999, CEOs of large MNEs were invited to act under universal principles (human rights, labour, and environment) aspiring towards sustainability and social

responsibility, considering all people, the planet, and prosperity for all; instead of only profits for corporations. Later, the principle that business should work against all forms of corruption was added (Gonzalez-Perez & Leonard, 2015).

Furthermore, since the UN launched the Sustainable Development Goals (SDGs) in September of 2015, the private sector has become a central pillar, playing an increasingly important role towards the achievement of these objectives by 2030 (Oldekop et al., 2015; Kolk, et al., 2017). This expanding role implies that private businesses should complement and even assume specific governmental responsibilities (which in many cases they already have), and fund development-related projects (under public-private partnerships, and other financing schemes).

Growing importance also requires greater accountability of their governance practices and outputs; including more complete assessments of their social and environmental impacts, throughout all jurisdictions where they operate, and all the value chains in which they participate aiming, to create shared value (Borda, et al., 2021). This also implies the incorporation of broader corporate social responsibility (CSR) considerations when internationalizing (Gonzalez-Perez, 2013; Gonzalez-Perez et al., 2018; Kolk and Van Tulder, 2010; Kolk, 2016; Pisani et al., 2017). Hence, the whole set of SDGs represents an opportunity to assess the real commitment of multinational enterprises with sustainability practices (Donoher, 2017).

Since the beginning of the 1980s, different management, international business, marketing, and business ethics studies have been formulated to identify and measure the relationship between socially and environmentally responsible practices and firm performance. Results are not unequivocal. Although in the existing literature there are studies that confirm a positive correlation between incorporating sustainability dimensions and financial returns (i.e., Carter, 2005; Hasan et al., 2018; McGuire et al., 1988; McWilliams & Siegel, 2005; Tang et al., 2012) as well as risk mitigation tools (Gomez-Valencia et al., 2021). Specifically, social and environmental responsibility can be seen as an investment if the returns are measured by: employee satisfaction, productivity and positive perception by consumers of the firm or its corporate reputation (Becker-Olsen et al., 2006; Chamorro & Bañegil, 2006; Gomez-Trujillo et al., 2020; Hult et al., 2018; Klein & Dawar, 2004; Maignan et al., 1999; Mirvis, 2012; Opuku-Dakwa et al., 2018, Varadajan & Menon,1988).

Some studies demonstrate how investment in CSR and sustainable development improves relationships with local communities and host societies (Porter & Kramer, 1999, 2002; Scherer & Palazzo, 2011), and with local and host governments (Blecher, 2004; McGuire et al., 1988) leveraged by the implementation of digital technologies (Gomez-Trujillo & Gonzalez-Perez, 2021; Gomez-Trujillo et al., 2020). Also, the social and environmental performance of the firm can be seen as an indicator of strategic capabilities, and managerial competencies (Dunphy et al., 2003; Eilbirt & Parket, 1973; McAdam & Leonard, 2003; Gonzalez-Perez et al., 2020; Velez-Ocampo et al., 2021). Furthermore, it can also constitute a strategy to achieve financial goals (Crook, 2005; Freeman & Liedka, 1991; Friedman, 1970; Porter & Kramer, 2006).

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However, these studies are not unchallenged; other studies state that firms that consider CSR are at a financial disadvantage versus those that do not. (Aupperle et al., 1985; Chapple et al., 2005; Ullman, 1985; Vance, 1975). Thus, there is no consensus on the effects of sustainability practices on the financial performance of firms (Xiao, et al., 2018). However, the implementation of these practices can be financially beneficial for companies in countries with lower levels of social and environmental performance, while the financial results decrease as the social and environmental performance of the country increase (Pisani et al., 2017; Xiao et al., 2018).

For these reasons, the implementation of the SDGs outlined in the 2030 Agenda might eventually depend on political preferences and the contextual challenges that various governments face (Oldekop et al., 2015). Therefore, SDGs cannot be seen as mere guidelines that countries will adopt, they have to be analysed according to diverse businesses' strategies, and within the contexts of a changing power environment, which is shaped by national development challenges and structures (Horn & Grugel, 2018).

The whole set of SDGs, the Sendai Framework for Disaster Risk Reduction, and the Paris Agreement on Climate Change, all represent multi-actor's commitment towards the incorporation, enhancement and reinforcement of universal sustainable values, and the common agenda set for the year 2030. Nevertheless, studies that analyse how multiple actors respond to these SDGs, and to what extent the SDGs shape policies and business practices in middle-income countries, are so far limited (Horn & Grugel, 2018).

As SDGs are not legally binding, both local governments and companies in emerging markets are committing selectively to the goals and targets that match their priorities (Horn & Grugel, 2018). However, as several authors argue, SDG targets are not specific enough, as they do not provide a detailed set of recommendations for implementation and tracking (e.g. Brolan, 2016; Parnell, 2016; Sexsmith & McMichael, 2015). Therefore, the role of both companies and policymakers includes the analysis and prioritization of SDG's (Oldekop et al., 2015).

The fact that sustainable consumption and production imply multiple levels of analysis (Sarkis, 2012), involve different actors within the supply chain management, and diverse degrees of the legitimacy of public policies, complicates, even more, the assessment of businesses' contribution to SDG 12. Nevertheless, abundant arguments highlight the importance of the private sector to contribute to SDG 12. For instance, Witte and Dilyard (2017) invite multinational firms to adopt sustainable practices and to include sustainability issues into their corporate reports. This should influence producers to implement sustainable production processes, preference for green products and a change in their consumption patterns, which might result in the creation of a cycle of sustainable production and consumption (SCP). Moreover, the articulation of different stakeholders will assure a shared vision of SCP for future generations (Staniškis, 2012).

In this line, businesses (local and multinational) are considered a driving force not only for the achievement of the SDG 12 but also for the whole sustainability aspiration. Among others, multinationals can contribute to sustainable development in three different dimensions: products and services, operations and social contributions (Berning, 2019). For example, their international operations function as a driver of their sustainability initiatives (Gomez-Trujillo & Gonzalez-Perez, 2020). This goes in line with the proposal of Topple et al., (2017) who argue that commitments of MNEs towards international sustainability standards facilitate their implementation and appropriation of SDGs. These elements reveal the critical role of MNE in the achievement of SDGs, and more specifically, their commitment to SDG 12, especially when considered as a mechanism to avoid doing harm rather than doing good (Van Zanten & Van Tulder, 2018).

In terms of accountability mechanisms, SDG 12 requires the prioritisation of indicators that goes beyond the International Financial Reporting Standard (IFRS) or the Global Reporting Initiative (GRI). SDG 12 includes issues such as the reporting of activities that do not result in the displacement of local communities or spillages that can cause health problems (Okwuosa & Khalid, 2020). Likewise, the boost of disruptive business models, such as FinTech (Financial Technology) companies, the inter-organizational cooperation towards innovation (Arias-Perez et al., 2021), and their digitalisation and integration with green technologies, contribute to sustainable production and a profit's increase without additional use of natural resources or environmental degradation (Hinson et al., 2019).

Moreover, the notion of responsible consumption involves consumer preferences, which also has implications for product development. Concomitantly, this nurtures sustainable production behaviours (Marchand & Walker, 2008). Therefore, efficient progress in SCP requires turning the struggle of consumers and producers into synergetic exchanges, as well as the inclusion of other interest groups. Furthermore, a detailed model that integrates social, economic and environmental aspects of sustainability can guide companies in the selection of sustainable development tools to achieve its sustainability goals and the implementation of SCP (Jonkutė & Staniškis, 2016) as guiding principle.

This should be taken seriously, as the elimination of unsustainable production and consumption is one of the overriding objectives of sustainable development. Hence, SDG 12 is a priority for public and private actors to achieve the 2030 Agenda and the reduction of environmental worsening caused by previous consumption and production patterns (Barber, 2003). This demonstrates the need for strategic alliances between government, civil society and private actors; with a long-term vision that ensures resource efficiency and waste reduction from multiple perspectives.

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METHODOLOGY

This study articulates the theoretical inputs coming from a comprehensive literature review concerning the contribution of businesses towards the achievement of SDGs (in particular the contribution of companies to SDG 12), with empirical data extracted from the WikiRate platform.

Herein we scrutinize a wide array of data from companies' annual reports, concerning their action and advances towards sustainable consumption and production patterns. Considering the available metrics in the collectively-built database WikiRate, through descriptive statistical analysis, we have processed the companies' self-reported information. This procedure determines a key metric to evaluate a large sample of corporations in terms of responsible production.

Genuine implementation of SDG 12 demands a structural transformation of business management and reconfigurations of global value chains. The dataset for SDG 12 is composed of 8 targets and 13 indicators, all of which cover scattered areas: implementation of national action plans, efficient use of natural resources, reduction of per capita global food waste, chemical waste management, reporting sustainable practices, sustainable public procurement and information, and awareness of sustainable development compatible with nature (United Nations, 2018). Acknowledging the extensive scope and breadth of SDG 12, this manuscript intends to focus on the specifics of the private sectors' contribution towards achieving SDG 12, thus some of its targets were excluded from the analysis, particularly the ones related to responsible consumption. In this sense, table 1 introduces these targets and clarifies which elements were taken into consideration.

Table 1. Sustainable Development Goal 12: Targets measured in this study

SDG 12 Target	Measured in this study	Comments
12.1. Implement the 10-year framework of programs on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.	No	This goal and its associated indicator is oriented towards the inclusion of sustainable consumption and production national action plans as public policy, which is beyond the scope of this manuscript.
12.2. By 2030, achieve the sustainable management and efficient use of natural resources.	Yes	This target is included using emissions of direct greenhouse gas, indirect greenhouse gas emissions and emissions of ozone depleting substances as metrics.

SDG 12 Target	Measured in this study	Comments
12.3. By 2030, have per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.	No	This study does not include the Global Food Loss Index, especially because selected companies belong to different industries so indicators of both food losses and food waste are not applicable in most of them.
12. 4. By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	Yes	The percentage of water used by the company that was recycled or reused is one the metrics analysed in this study.
12.5. By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	Yes	This manuscript includes metrics directly linked to this goal and its associated indicators, such as total waste to landfill, total waste recycled and recycled input materials.
12.6. Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.	Yes	The indicator linked to this goal is "Number of companies publishing sustainability reports". At table 2, it is reflected in the count.
12.7. Promote public procurement practices that are sustainable, in accordance with national policies and priorities.	No	Analysing national policies and action plans is beyond the purpose of this manuscript.
12.8. By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.	No	Since this study focuses on the role of private sector connected to SDG 12, issues like education for sustainable development, rationalization of fossil-fuel subsidies and sustainable tourism policies, exceed the scope of this manuscript.

Source: Own elaboration

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Such as has been already shown, the WikiRate platform is used to source the data, profiting from its open and comprehensive compilation of historical and current environmental, social and governmental performance data, also covering private companies. WikiRate uses a crowdsourcing model in which individuals (students) input data on sustainability and CSR obtained from real corporate reports to the platform, conforming to specific metrics and categories. Between the years 2016 and 2018, more than 1500 students participated in WikiRate research (Perkiss et al., 2018; Wersun et al., 2020). Each student or group of students was required to choose one or more companies to investigate, using a project research page on WikiRate.org to add new data. As sources of information, students were instructed to inquire about CSR reports, Annual companies' reports or Communication on Progress (COP) reports submitted to the UN Global Compact (Perkiss et al., 2018; Anastasiadis et al., 2020). To enable meaningful analysis and comparison, each individual searched a company's activities spanning over two to four years where data were available.

Here, it is essential to highlight that WikiRate and the UN Global Compact PRME (Principles for Responsible Management Education) have a partnership that builds upon WikiRate's existing efforts to represent the SDG compass. This joint effort by the Global Reporting Initiative (GRI), Global Compact, and the World Business Council for Sustainable Development (WBCSD), intends to map standard indicators to report progress and SDG oriented actions. Synthetizing this information, WikiRate contributes by linking metrics with useful business data, which potentiates analyses of their performance across the whole spectrum of SDGs (Perkiss et al., 2018).

The metrics included in WikiRate are thus extracted from several sources, i.e.: (i) the GRI (Guidance, indicators on environmental, social and governance topics); (ii) the Poverty Footprint (People-centred metrics assessing business impacts on sustainable development); (iii) Amnesty International (Conflict Minerals metrics); (iv) the Electronic Frontier Foundation (Digital Rights metrics); and (v) the Walk Free Foundation (Modern Slavery Act -United Kingdom- legislation, which monitors and researches contemporary slavery and human trafficking in corporate supply chains) (Perkiss et al., 2018).

We downloaded from WikiRate, the data related to the SDG 12, which offers 52 metrics from sustainability reports belonging to 854 firms from different industries. After examining the consistency and validity of the data, we selected six representative metrics on sustainable production, i.e.: direct greenhouse gas, mono nitrogen oxides (NOx emissions), total waste to landfill, total waste recycled, percentage of total waste recycled, and energy consumption outside the organization. These metrics were adopted and reported in different moments by organizations, in the period ranging from 2002 to 2018.

RESULTS

The findings of this study include a wide range of different metrics used to analyse businesses' contributions to SDG 12: Ensure Responsible Consumption and Production. It is important to underline that this study corresponds to the input data of companies whose sustainability reports and known figures are available at the WikiRate database summarized in table 2. Corporate metrics with unknown values were not considered for the analysis.

Table 2: Metrics on SDG 12 available in Wikirate

Metric	Unit of measure	GRI code
Water volume recycled	Cubic meters	G4-EN10-a
Water recycled or reused	Percentage	G4-EN10-b
Ozone-Depleting Substances (ODS) emissions	Metric tonnes of CFC-11 equivalent	G4-EN20-a
Hazardous air pollutants (HAP) emissions	Metric tonnes	G4-EN21-a
Hazardous waste recycled	Metric tonnes	G4-EN23-a
Hazardous waste created	Metric tonnes	G4-EN23-a
Waste generated	Metric tonnes	G4-EN23-a
Non-hazardous waste created	Metric tonnes	G4-EN23-a
Waste recycled	Metric tonnes	G4-EN23-a
Non-hazardous waste recycled	Metric tonnes	G4-EN23-a
Waste to landfill	Metric tonnes	G4-EN23-a
Hazardous waste handled	Metric tonnes	G4-EN25-a
Hazardous waste shipped internationally	Percentage	G4-EN25b
Environmental protection expenditures and investments	US dollars	G4-EN31
Sustainable sourcing initiatives and quantitative outcomes of sustainable sourcing initiatives	Category Yes/No	G4-EO9
Fuel consumption from non-renewable sources	Gigajoules (GJ)	GRI 302
Fuel consumption from renewable sources	Gigajoules (GJ)	GRI 302-1-b
Energy consumption	Gigajoules (GJ)	GRI 302-1-e
Energy consumption outside of the organization	Gigajoules (GJ)	GRI 302-2

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Metric	Unit of measure	GRI code
Energy intensity ratios	:1	GRI 302-3
Reduction of energy consumption	Gigajoules (GJ)	GRI 302-4
Reduction of energy requirements of products and services	Percentage	GRI 302-5
Direct greenhouse gas (GHG) emissions	Tonnes of CO2 equivalent	GRI 305-1
Indirect greenhouse gas (GHG) emissions	Tonnes of CO2 equivalent	GRI 305-2
Volatile Organic Compounds (VOC) emissions	Tonnes	GRI 305-7
Mono-nitrogen oxides (NOx) emissions	Tonnes of NOX	GRI 305-7
Particulate matter (PM) emissions	Tonnes	GRI 305-7-a
Persistent organic pollutants (POP) emissions	Metric tonnes	GRI 305-7-a
Indirect greenhouse gas (GHG) emissions	Tonnes of CO2 equivalent	GRI-305-3
Sulphur oxide (SOx) emissions	Metric tonnes	GRI-305-7
Total water discharge	Cubic meters	GRI-306-1
CEO Water Mandate Endorsement	Category Yes/No	
Company pledge depth - SDG 12	US dollars	
Actions that contribute to achieving SDG 12: Responsible consumption and production	List. Free text	
Annual energy consumption	Gigawatt/hour (GWh)	
Natural and renewable gas use per year	Cubic meters	

Data source: WikiRate

Table 3 summarizes some of the companies' metrics, reporting their contributions to sustainable production. Deep analysis of our selection of some of the metrics for measuring SDG12 available at WikiRate, reveals that the data presented in Table 3 is far from homogenous. For instance, among the findings, the "emissions of direct greenhouse gas" –GHG- (with a potential negative impact on animal and human life), emerges as the most widely reported indicator of corporate contribution to SDG 12. However, data on metrics such as "percentage of total waste recycled" and "mono nitrogen oxides -NOx- emissions" is not available for the companies.

Table 3: Some of the metrics used to analyse businesses' contributions to SDG 12

Year	Direct greenhouse gas (GHG) emissions (in tonnes of CO2 equivalent)		Mono Nitrogen Oxides (NOx) Emissions (metric tonnes)		Water recycled (percentage)		Total waste to a landfill (in metric tonnes)		Total waste generated (in metric tonnes)	
	Count	Average	Count	Average	Count	Average	Count	Average	Count	Average
2012	6	1,267,895					1	1,115	3	44,893
2013	10	1,528,444	4	587	1	11.1	0		1	5,760
2014	91	2,185,551	44	23,383	7	40.8	5	139,465	12	2,758,260
2015	56	1,287,525	20	9,498	18	36.1	21	1,222,137	34	50,052,892
2016	97	2,999,417	25	67,528	23	33.5	31	275,960,686	95	41,895,688
2017	158	5,883,432	51	45,795	41	38.6	39	313,857	121	32,947,892
2018	260	14,624,557	59	41,210	46	28.5	82	6,919,798	136	2,794,993
2019	63	2,110,884	7	17,204	16	44.1	24	21,951	29	648,472
Total	**741**	**7,354,622**	**210**	**37,127**	**152**	**35.0**	**203**	**45,129,730**	**431**	**23,435,610**

Data source: WikiRate

This level of available data makes the GHG emissions metric a key proxy in measuring the contribution of companies to the SDG 12 of the United Nations. The available data on highest emissions overall were reported in the year 2014 by the company DuPont de Nemours, an U.S. company dedicated to different branches of the chemical industry, known as DuPont. In the second place, Sodexo (French company in the food services industry) reported the highest emissions for 2015. In 2016, Shell Midstream Partners LP (American company in the crude oil industry) reported the most direct greenhouse gas emissions, followed by Royal Dutch Shell plc (British-Dutch oil and gas company). Regarding the year 2017, the available data suggests that the highest emissions were reported by Vedanta Resources plc (British metals and mining company), followed by BP plc (British oil and gas company). Here it is essential to mention that there is a high variability of measurement results in different industries. Furthermore, accounts must be contextualized and considered from the varied perspectives of diverse sectors, and the size of the companies.

The GHG emissions metric is of high importance as it was included in the agenda of the United Nations Framework Convention on Climate Change and the Kyoto Protocol, and it contributes to measuring the impact and role of companies on climate change (WikiRate, 2018). However, as companies operate in different regulatory and institutional systems, their commitment to reducing GHG emissions could be influenced by external issues like stakeholders' demands, host government

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regulatory systems, and even corporate reputation and position in industrial networks (Gomez-Trujillo et al., 2020; Velez-Ocampo & Gonzalez-Perez, 2019).

Another metric related to the SDG12 is the NOx (nitrogen oxide) emission, which could be used as a proxy to measure air emissions by companies. This is important for responsible production as air pollutants deteriorate the environment resulting eco-toxological to both animals and humans (Weldu et al., 2017). Improvement in this particular indicator can improve relations with affected communities and even allow the company to expand operations (Alcántara et al., 2017). As observed in Table 3, data on this metric is less abundant than data on GHG emissions, used water that is recycled or reused, or waste generated.

Additionally, the SDG 12 involves different strategies that aim to demonstrate the efforts businesses and the public sector are making in order to contribute to more responsible consumption and production patterns. These strategies include the proper management of waste and the responsible use of energy, considering that both are part of the total value chain and production cycle of companies.

The generation and recycling of waste are two issues that have gained international relevance, as waste generation can be linked directly to the income level of the country and its landfilling costs (Mazzanti & Zoboli, 2008). Different metrics have been created to measure the strategies companies use in this issue. In this sense "total waste generated" covers the total waste by type and, disposal method, and it measures the total waste in metric tons. Within the last few years, the circular economy has become a significant trend in different industries, which has urged companies to redesign production to reduce or eliminate waste while keeping products and materials in use.

Considering the available data, the companies with the highest quantity of total waste generated are Glencore International (Anglo-Swiss commodity trading and mining company); African Rainbow Minerals (South Africa mining company); and Teck Resources (Canadian metals and mining company). The company with the most reports on recycled is Assa Abloy (Swedish lock manufacturer company). A reduction of this metric's measurements reflects business efforts oriented towards waste reduction through more efficient production methods, which constitutes a fundamental requirement of responsible production related to the SDG 12. It is not surprising that the companies reporting the highest figures in waste and recycling belong mostly to the mining sector. During recent years the mining sector been highly scrutinised by governments, the media and the general public, pressuring them to engage in more sustainable practices, including improved disposal and re-utilisation of by-products (Kinnunen & Haksonen, 2019).

The "total waste to landfill" refers to the disposal destination of waste. The year with the highest amount of waste going to landfill reported was 2016, being Coca-Cola (American non-alcoholic beverage producer) as the leading actor. It should also be noted that regarding "total waste recycled" by companies, the available data on

Coca Cola indicated that this firm led this metric, with 8.2 billion tons of recycled waste in 2016. Of course, these figures must be interpreted within the context of Coca Cola's immense operating size compared to other companies. Within this metric, Hyundai Mobis (South Korea auto-parts company) is the firm that reports the most.

Total waste-recycled can also be analysed in percentage terms, this allows for more useful comparisons between companies regarding how much of total waste is being recycled. For this metric, called "percentage of waste recycled", there is data on companies reporting 100% of waste-recycled: Gold Fields (South Africa gold mining company), Vattenfall AB (Swedish State-owned power company), PTT Global Chemical (petrochemical and refining company from Thailand), Aberdeen Asset Management (investment management company from Scotland) and Yapi Kredi (Commercial bank from Turkey).

Companies recycling and reuse strategies are also measured through the "reclaimed products" metric, which shows the capacity of the company to produce goods whose materials can be reused in new production processes. The available data indicate that the leading companies in this metric are Shiseido Group (Japanese personal care company), with 91% of products and packaging materials reclaimed in 2015, and Coca-Cola Hellenic Bottling Company with 60% in 2016. On the other hand, the metric "recycled input materials" is linked with the contribution of companies to the conservation of global resources, by representing the percentage of input materials that are recycled.

Responsible use of energy constitutes another key element towards achieving progress towards SDG-12, and WikiRate provides several useful metrics for comparing this element among companies. The "total energy consumption within the organization" measures the energy consumption within corporations; this consumption can come either from renewable or non-renewable sources. This indicator is important as the environmental footprint of an organization is partly shaped by its energy sources, which can also be a potential cost-saver for the company.

The "total water discharge" metric is directly linked with the company's impact on the surrounding environment and local communities. By reducing volumes of water effluents discharged to subsurface and surface waters, or sewers that lead to rivers, oceans, lakes, wetlands, treatment facilities, and groundwater (CEO Water Mandate, 2019), firms can eventually reduce their ecological impact and operational costs. The organization with the highest historical water discharge is Ford Motor Company (American automaker company), with a total of 11.4 billion m^3 of water discharge in 2014, and the company with the most reports on this metric is Inscape Corporation (design enabler from Canada).

Emissions, waste creation, recycling, and the responsible use of water and energy are fundamental factors towards the achievement of SDG 12. Analyses of these factors help reveal how companies might be dealing with their production and waste processes, as well as their eventual contribution to the preservation of natural resources. Greater participation and reporting on the GRI metrics could

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help commensurate the sustainable business practices of companies, as producers and consumers of different products and services. They also serve as proxies to analyse the private sector commitment to the international frameworks, multilateral agreements and national regulations, fine-tuned with environmental protection and related to mitigation and adaptation efforts to climate change.

DISCUSSION

According to Pallaro et al., (2015), sustainable consumption and production are one of the most challenging objectives for private corporations. Considering the social dimension of sustainability, producers are responsible for the safety of the goods and services they sell and for the welfare of employees. On the other hand, clients and customers can opt for sustainable consumption by boycotting unethical or toxic brands.

Additionally, Tseng et al., (2018) state that the issues of sustainable consumption and production require exploration in different business contexts. Thus, the authors identify different business-decision making models to understand and to improve sustainable consumption and production.

Taking a comprehensive view, Jonkutė and Staniškis (2016), explain different measures and techniques that companies can implement to reduce negative environmental impact and improve sustainability performance. These are included in the Resource Efficiency and Cleaner Production (RE & CP), which reduces the environmental impact of companies through prevention. Industrial Ecology (IE), which reduces the environmental impact of consumption and promotes cleaner technologies, while it stimulates the use of companies' waste as raw material for other industrial processes. Eco-Labelling, which provides consumers with clear and concrete information about their environmental commitments. Environmental Product Declaration (EPD), which is a way to quantify the ecological impact of a product, by providing information regarding energy use, emissions and waste. Sustainability Reporting includes standards as ISO 14000; Eco-Management and Audit Scheme (EMAS); Social Accountability 8000; and the GRI, which includes aspects of social, economic, and environmental attempts of businesses to reach sustainable consumption and production.

The 2030 Agenda is redefining and focusing CSR initiatives towards the SDGs, motivating new business models based on circular economy and other social, financial and environmentally responsible initiatives. Companies have increased their understanding of the economic, social and environmental dimensions of sustainability and its long-term impact on growth and prosperity. This whole set of ideas and practices has increased the knowledge, commitment and implementation of the SDGs, subsequently generating significant shared value.

Sustainability reporting facilitates the alignment of corporate strategy towards genuine sustainability. Signalling practical actions businesses can implement to make a significant difference, helping them prioritise and make decisions, which reinforce the relevance of SDGs within the companies—allowing them to enact

more substantial contributions. The universality of SDGs also facilitates access to new markets. This agenda consists of a common language with common goals, which additionally provides elements for comparability when adopting common indicators for measurement.

Countries must continue pursuing the challenge of sustainability, advancing towards the achievement of the SDGs and promoting their effective adoption by increasing number of participating companies, organizations, and levels of government, such as local governments. Corporations exercise an undeniable influence, they are the indispensable engine of the economy, right at the centre of markets and societies' efforts to alleviate poverty, protect the environment, and revitalize economic progress. Besides, they play an essential role in financing SDGs, for example, through public-private-partnerships (PPP), responsible taxes and other instruments.

Ensuring sustainable consumption and production patterns, i.e., achieving SDG 12, constitutes both a plausible purpose and a meaningful challenge, replicable to other SDGs, such as those related to energy, sanitation, water protection, protection of ecosystems, etc. Thus, SDG 12, could indeed be interpreted as a transversal goal, with significant leverage, and convening power.

Nevertheless, as this study demonstrates, the progress towards achieving sustainable consumption and production patterns is uneven. Not all companies advance at the same rhythm, and many of those that officially declare compliance, do not report data on the 8 targets and 13 related indicators. These odd realities demonstrate that there is much to learn, and the corporations for which data is available, serve as noble standards upon which legitimate policies for production and consumption patterns can be established.

Although global-scale policies are ideal, it would be more realistic to aspire for the emergence of consensual policies within single industries, or among sets of economic partnering countries. In other words, the odd chances of implementing worldwide policies of responsible production and consumption, should not prevent economic actors from advancing responsible practices with fewer players and in less than global jurisdictions. The utmost aspirations can eventually foster exemplary leadership and actions that would subsequently contagion other players, levelling the playing field.

For this to happen, it is necessary to strive for the mobilization of multiple private and public agents, organizations and individuals; permeated by long-term perspectives. If all actors demand and promote the highest levels of legitimacy, it would be easier to require and reward the implementation of all the targets embodied in SDG 12.

In this sense, it is crucial to promote more inclusiveness in management education in terms of decisions and shared responsibilities. As Castrillón-Orrego (2009:3) argued, "If business agents develop a genuine concern about satisfying the legitimate needs of society as a whole and all its diverse components, it will be easier for them to assure long term sustainability and profitability". Ultimately, individuals

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and all sorts of organizations need to reflexively acknowledge their participation and potential influence within the whole system.

Therefore, reflecting upon the WikiRate's analyses that herein is presented, facilitates the formulation and eventual implementation of responsible management. Among other outcomes, market and societal players could reward or sanction the behaviour of businesses.

Governmental officials could also benefit by appreciating responsible management and promoting the best practices, which would eventually support the implementation of several targets of SDG 12, for example, the first one (Target 12.1); which compels the implementation of 10-year programs. By observing what companies do, it would be also more accessible for countries to enact legitimate "public procurement practices that are sustainable, in accordance with national policies and priorities" (Target 12.7). Besides, learning from the best practices, not only inspires action, but sets workable examples of how to "achieve the sustainable management and efficient use of natural resources" (Target 12.2).

The genuine and overall achievement of SDG 12 will depend on the simultaneous contribution of business corporations, governments and individuals, having their actions converge into the explicated 12 targets; which implies the challenge to balance their dualistic role as producers and consumers. As has Sarkis (2012) argues, sustainable consumption and production mean multiple levels of analysis, and following Staniškis (2012), to assure SCP, it is necessary to articulate different stakeholders.

For instance, Target 12.3., aiming at the reduction of food losses along production and supply chains, can be more easily achieved, if perceived in a comprehensive view, for example, when each producer envisions herself at the retail and consumer end of the cycle. Extrapolated to other fields of society and sectors of the economy, it helps achieve Target 12.5., by promoting the reduction of "waste generation through prevention, reduction, recycling and reuse".

Without pretending to offer a panacea, the intent to critically study the data reported (and absent) in WikiRate, might constitute an exciting and replicable example, highlighting the importance of credible data and information, to make better decisions. As Target 12.8 signals, the pertinent information is essential to improve our production and consumption behaviour. If individuals and governments count with "relevant information and awareness", they could check, punish and reward businesses' conduct, providing responsible feedback conducive to stimulate sustainable production and consumption.

SDG target 12.6 requires the UN Member States to "Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle" (United Nations, 2018). The official indicator for this target is the number of companies publishing sustainability reports. The available data in WikiRate is evidence that there are responsible managers committed to the 2030 Agenda. We suggest to policymakers to join efforts with business schools in fostering the inclusion of service learning

and experiential learning pedagogies in sustainability and CSR related courses, to inspire both students and lecturers to become familiar with companies' sustainability reports via inputting data in WikiRate. From our perspective, working with WikiRate could help policy makers and business schools to promote the debates and the general awareness towards sustainability reporting. Besides, these will increase the number of available data. Furthermore, it will help to improve the validity of the input data, and to encourage the companies to verify the data (on WikiRate) on their own firms. If this could be possible, WikiRate could be used as accountability support for accessing accurate data on the contribution of the private sector to the SDGs.

CONCLUSIONS

Although sustainable development issues have gained lots of attention in the last few decades, there is a need for more globally coordinated actions, which are required to achieve real sustainability. Global efforts are yet to be implemented in more genuine, determined, articulated and solid bases (Oldekop et al., 2015). The consensual adoption of the SDGs by the UN system constitutes a notorious statement and a long-term commitment, which demands even further attention and substantial efforts by all interested parties. Achieving the 17 SDGs and 179 targets is an ambitious and imperative endeavour. The whole set of SDGs is not only plausible and aspirational but also truly necessary to assure the survival of humankind. The SDGs included in the 2030 agenda are fundamental for a long-term vision of well-being and inclusive prosperity for business, society and governments.

This paper highlights some efforts and gains in terms of more responsible patterns of production and consumption. We provide positive evidence of what can be achieved, and urgently warn that much more needs to be done. So far, the pace and scale of achievements are insufficient.

Measures such as ecological footprint, monitoring of aggregate material consumption, and material footprint, serve to monitor the estate of commitment towards sustainable consumption and production (Akenji & Bengtsson, 2014). Just as Roy and Singh (2017) state, the operational implementation of sustainable consumption and production can be achieved through strategies of pollution prevention, education for sustainability, as well as with socially responsible investment and advertisement reforms. Moreover, effective consumers' participation in the sustainable consumption and production implementation can be amplified by providing information on material usage, energy usage, and human aspects of the company.

As positive achievements, the evidenced initiatives and analysed metrics provide reasons for hope. More pertinent and relevant metrics lead to increased transparency and lay the groundwork for better decision making. The fact that more companies are following the guidelines established by the GRI, reinforces proper accountability patterns which dynamize responsible consumption and production, while making it easier to correct and punish irresponsible ones.

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By working with, and assessing the existing metrics of diverse emissions, wastes, recycling, and water usage, this paper also signals the importance of widening the variety of strategies companies could enact in coherence with SDG 12. Thus, the efficient progress of sustainable consumption and production can be fostered by the creation of an integrative model that incorporates economic, social, and environmental dimensions of sustainability. Such a model would ideally include managerial measures and tools, well-known engineering, control over products, services and industrial processes, and engagement of different interest groups as active actors of sustainable consumption and production (Jonkutė & Staniškis, 2016).

LIMITATIONS AND FUTURE RESEARCH

Although the methodology herein implemented can be replicated, and the procedures strive for validity, the findings nevertheless are subjected to many limitations. First, it is important to acknowledge that the data extracted from the WikiRate platform, comes from different corporate reports, with information of companies from different industries, countries, and from different time periods; where companies select their own indicators, limiting the auditability by third parties, and hence the trustworthiness of the reports and the resulting comparisons and analyses.

It is also unavoidable to highlight that individuals (students) enter data into WikiRate, whose knowledge and expertise in sustainability issues is not fully consolidated, which might generate interpretations errors and biases. The sample of companies present in WikiRate is not necessarily statistically representative; instead, it constitutes a convenience sample. Furthermore, this study does not present an analysis by sector nor size of the diverse participating companies. For future studies, these limitations need to be addressed.

Regardless of the limitations, given the amount of information it provides, and the visibility it gives to key components and variables, the WikiRate platform offers lots of value and contains enormous potential as a source of valuable data for research, corporate comparison, and useful information for policymaking. The information available opens multiple avenues for research and uncovers multiple business practices. As such, in order to increase the power and credibility of the platform, it is important for companies and all interested parties to participate in the reporting and verification process of the registered data.

The paper signals the need for more solid theoretical and methodological approaches to evaluate the contribution of the private sector to specific SDGs. The chances to get more actors actively engaged will increase with the implementation of more rigorous mechanisms of reporting and verification, such as fine-tuning reports, and triangulating data sources.

Further sophistication of measurements is also needed. These should be based on comprehensive notions and more solid concepts, which should support theoretical categories capable of describing and explaining the diverse complexity of production and consumption patterns. If all stakeholders were equipped with

better conceptual tools, more useful information would be generated to understand, assess and eventually nurture policies in terms of responsible production and consumption; connecting corporations to the whole chain of suppliers, producers, clients, and final consumers.

More informed decision makers, along the complete economic cycle, shall lead to more sustainable practices, which assure long-time coherence and sustainable value generation for all parties.

Other future research questions should focus on the political challenges and meaningful influences that the implementation of the whole set of SDGs could generate. These concerns transcend academic jargon and emerge as a genuine effort to legitimize the search for SDGs all through society. Thus, facilitating the consequent enactment of efforts that businesses and governments conduct towards their achievement.

Research around the role of businesses in the 2030 Agenda must continue. The major role they have played in shaping the global economy implies that businesses constitute a key lever to facilitate (or hinder) the transition to sustainable development. Identifying factors that enable accelerating and scaling-up (at the firm level) innovative solutions, more sustainable production technologies, as well business models that lead to the dematerialization of the economy, is also a relevant topic for further research.

Thus, the paper invites more case studies and cross-country and longitudinal comparisons to answer some related questions, such as: how can business maximize their contribution to global sustainable development? How could managers and policymakers collaborate to generate sustainable value for all stakeholders, and that will encourage business contributions to the SDGs? Overall, companies must be accountable in terms of their contributions to the achievement of the 2030 development agenda.

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AUDIT FEES AND AUDIT QUALITY: EVIDENCE FROM GULF COOPERATION COUNCIL REGION

HONORARIOS DE AUDITORÍA Y CALIDAD DE LA AUDITORÍA: EVIDENCIA DE LA REGIÓN DEL CONSEJO DE COOPERACIÓN DEL GOLFO

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ABSTRACT

This study examines the association of audit fees with audit quality among a total of 104 and 108 non-financial companies listed on The Gulf Cooperation Council stock markets for the periods preceding and subsequent to the event, respectively, over the period 2005–2010. Using OLS regression, the results show that there is a significantly positive association between audit fees and audit quality for the periods preceding and subsequent to the new auditor selection. Furthermore, the results of this study contribute to the existing theory and empirical evidence indicating how audit fees are associated with audit quality in the periods preceding and subsequent to the new auditor selection. This study offers policy-makers additional evidence to utilize for setting up and/or enacting regulations in The Gulf Cooperation Council region, regarding issues related to audit fees.

KEYWORDS

Audit fees, audit quality, Gulf Co-operation Council region.

RESUMEN

Este estudio examina la asociación de los honorarios de auditoría con la calidad de la auditoría entre un total de 104 y 108 empresas no financieras que cotizan en los mercados de valores del Consejo de Cooperación del Golfo para los períodos anteriores y posteriores al evento, respectivamente, durante el período 2005-2010. Utilizando la regresión OLS, los resultados muestran que existe una asociación significativamente positiva entre los honorarios de auditoría y la calidad de la auditoría para los períodos anteriores y posteriores a la selección del nuevo auditor. Además, los resultados de este estudio contribuyen a la teoría existente y la evidencia empírica de cómo los honorarios de auditoría están asociados con la calidad de la auditoría en los períodos anteriores y posteriores a la selección del nuevo auditor. Este estudio ofrece a los responsables de la formulación de políticas evidencia adicional que se utilizará para establecer y / o promulgar regulaciones en la región del Consejo de Cooperación del Golfo con respecto a cuestiones relacionadas con las tarifas de auditoría.

PALABRAS CLAVE

Honorarios de auditoría, calidad de la auditoría, región del Consejo de Cooperación del Golfo.

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BACKGROUND OF THE STUDY

Although recent institutional changes in The Gulf Cooperation Council (GCC) region, namely, in Saudi Arabia, Oman, Qatar, Bahrain, and The United Arab Emirates, would place an increasing demand for audit services, some concerns associated with the audit function still exist. Few audit failures have occurred, and qualified audit reports have been received during the entire history of the GCC. In particular, the Big 4 audit firms have been involved in two cases (Al-Shammri et al., 2008; Asiri, 2009). Al-Shammari et al. (2008) argue that the low number of reported audit failures in the GCC does not reflect a good audit function. Rather, Al-Gahtani (2005) argues that the accounting and auditing professions are still under development in terms of presence and enforcement. The audit function, at this point, is concerned only with issues related to recording financial transactions, keeping source documents, preparing financial statements, and auditing financial statements by licensed auditors.

As world economic powers, the six oil-based members of the GCC—Saudi Arabia, Bahrain, Kuwait, Qatar, Oman, and The United Arab Emirates, share a large number of economic, cultural, and political similarities, which far outweigh any differences (Al-Hussaini, Al-Shammari, & Al-Sultan, 2008; Aljifri & Moustafa, 2007; Al-Muharrami, Matthews, & Khabari, 2006; Chahine & Tohme, 2009). The audit markets of the GCC have suffered from a paucity of research in past decades. This situation exists particularly because of the restrictions imposed on foreign stock ownership, the lack of common accounting and auditing regulations, and the uncertainty of economic and political conditions. Recently, however, GCC countries have adopted and developed large-scale economic and market policies and strategies that lend themselves to market-oriented economies. These include high oil prices, low interest rates, 100% foreign ownership, strong international oil demand, a stable geo-political environment, acceleration of reform measures, an increase in privatization programs, lifting of investment restrictions, a strong GCC corporate sector, low aggressive tax regimes, improvement of accounting and auditing regulations, and the establishment and enacting of corporate governance codes (Al-Shammari et al., 2008; Bley & Chen, 2006; Hussain, Islam, Gunasekaran & Maskooki, 2002; Omran, Bolbol & Fatheldin, 2008).

In the GCC, the disclosure of issues related to auditor change or rotation of audit firms is explicitly addressed in a weak manner within the codes of corporate governances. In this regard, only Omani and Qatari codes of corporate governance state that a mandatory rotation policy should be applied every four and three years, respectively. The Bahraini code of corporate governance indicates that the company shall disclose items related to reasons for any changing and reappointing of auditors (Al-Shammari *et al.*, 2008; Chahine & Tohme, 2009; Harabi, 2007; Hawkamah and IFC, 2008; Omran et al., 2008). For example, according to Hawkamah and the IFC survey of 2008, approximately 47% of listed companies in MENA countries (i.e., GCC) indicated that they made an auditor change. Furthermore, a large majority

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of banks and listed companies in the MENA region (i.e., GCC), namely 68.8% of listed companies, employ international audit firms (Binder, 2009). Under these circumstances, these concerns have negatively influenced the structure of the audit service market in the GCC, and agency problems are more likely to arise between majority and minority shareholders. Therefore, the GCC region is a unique position in terms of the context of auditor change. There is an ambiguity regarding the possible effects of auditor change on auditor independence in the GCC context.

However, to date, no single theory explains why companies switch from one auditor to another (DeAngelo, 1982; Grayson, 1999; Knapp & Elikai, 1988; Schwartz & Menon, 1985). Additionally, no broad theory exists to explain how firms choose a new auditor, or weigh the cost tradeoffs in switching auditors (Blouin, Grein, & Rountree, 2005). Moreover, Clarkson and Simunic (1994) report that up until now, a comprehensive set of endogenous and exogenous variables that are related to audit quality are not determined by the existing theories. In addition, it is difficult to categorize the potential determinants influencing auditor choice based on the underlying theories, because of the incompleteness of the underlying theories related to auditor choice; the overlapping of the theories with each other; (Wallace, 1984) and the ignorance of behavioral issues related to auditor choice (Beattie & Fearnley, 1998). Consistent with this, Meyer (2006) indicates that theories based on Western countries may be unsuitable for, and irrelevant to, other countries.

Previous studies on auditor choice have been conducted primarily in countries with Anglo-Saxon legislation, such as the U.S and U.K, and they are heavily based on agency theory. Furthermore, they have resulted in contradictory and inconclusive results. Thus, the findings of the previous studies might not be applicable in the context of the GCC, which is a dissimilar setting in terms of the audit market, institutional framework, level of regulatory enforcement, and culture. In this regard, DeFond and Francis (2005) call for research on auditor choice outside the U.S. It is emphasized that there should a comprehensive corporate governance perspective that takes into consideration the various national institutions where corporate governance practices are set in (Cortes, Echeverry, Ramirez and Yaque, 2017; Riano, 2009; Aguilera, 2005; Pugliese et al., 2009). In light of these deficiencies, audit quality issues seem to require further empirical investigation. Haniffa and Hudaib (2007) report that a paucity of research exists concerning audit function in the GCC. This appears to still be a vague situation in the GCC, and to the best of the researchers' awareness there is a lack of empirical research showing the association of audit fees and auditor choice. Thus, this study examines factors leading to auditor change in the GCC countries.

Among earlier and recent research on auditing, no consensus has been reached regarding the existence of a single proxy for audit quality; namely, that available proxies have more than one measurement is more important. DeFond (1992) indicates that studies on auditor choice, and methodologically, lack a comprehensive proxy for audit quality. DeAngelo (1981) has stated that audit quality is an unobservable

task and, therefore, is difficult to be evaluated objectively. In this regard, economists indicate that market participants may come out with proxies measuring quality services when they are involved in quality-differentiated marketplaces (Barzel, 1982). Empirically, several audit-quality surrogates have been used in early and recent extant research on auditor choice. Unfortunately, mixed and inconclusive results have been reported by these studies (Al-Ajimi, 2009). Haskins and Williams (1990) have suggested that the conflicting findings among previous studies on auditor choice could be attributed to the extensive of restricted operationalization of audit quality as a binary indicator. Therefore, in the social science research field, there has been strong support for the use of multiple indicators of theoretical constructs. Nunnaly and Bernstein (1994, p.86) argue that "because constructs concern domains of observables, a better measure of any construct is obtained by combining the results from a number of measures than by taking any one of them individually. Similarly, combining several observables provides greater construct validity and scientific generalizability, in the domain as a whole, relative to a single measure."

In support of this, Agrawal and Knoeber (1996) have argued that misleading results occur when showing the effect of one single indicator and not considering multiple indicators of theoretical constructs. In the same vein, O'Sullivan, Percy and Stewart (2008) have stated that investigating the overall mechanisms gives a stronger effect of measurement than just examining them individually. One of the more rigorous studies using a complex measurement of audit quality is that conducted by DeFond (1992) in the U.S. This study uses a combination of four audit quality surrogates that have a recurring presence in the literature: brand-name auditor, auditor size, industry specialist, and auditor independence. DeFond (1992) reports that a combination of measurements can be used to capture the same underlying construct—the auditor's ability to alleviate agency conflicts. Consequently, the combination of these four measurements may provide more information than if they are used individually. He also indicates that testing hypotheses using each of the auditor characteristics would be considered a "noisy" measure of audit quality. Therefore, combining the four measurements may increase the power of the tests and would, in turn, reduce noise in the independent variable.

This study extends previous studies on auditor choice and adopts the combined measure of audit quality in DeFond's (1992) sole study, a U.S.-based study, which comprises four surrogates: brand name auditor, auditor independence, auditor size, and auditor expertise. This study compares different time periods than that of DeFond's (1992); as the U.S. and the GCC have different institutional and business environments, audit markets, and culture. This study is expected to report different results than those of DeFond (1992). In addition, this current study addresses audit fees, which have not been examined empirically within the framework of auditor selection based on DeFond's (1992) study (Model 2). Based on the suggestions of agency theory, different levels of audit fees may lead to a variation in the demand for audit quality (Fama & Jensen, 1983; Jensen & Meckling, 1976; Wallace, 1980, 1987).

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Woo and Koh (2001) document that audit fee has been suggested as a relevant determinant in explaining variation in the demand for audit quality. AL-Qadasi et al. (2019) argue that different conflicts of interest in the Malaysian context affect auditor choice and audit fees will enrich the extant auditing literature.

A substantial amount of previous studies on auditor choice excluded the variable of audit fee from their models due to the fact that audit fee data are difficult to obtain because of its proprietary nature. Palmrose, (1986) and Simunic, (1980) report that there is an association between firm size and audit fees. In specific, some empirical studies collected audit fee information directly from companies (Palmrose, 1982; Simunic, 1980; Wallace, 1984). However, they documented a low response rate. In the GCC, companies are not required by law to mandatory disclose their audit fees. DeFond (1992) reports that, because of the difficulty in obtaining audit fee data, it is appropriate to estimate the size of the company relative to the audit firm's total client base, using data on company revenues. Following the work of DeFond (1992), this study adopts a similar measurement in estimating audit fees. The aim of this study is to examine the association between audit fees and audit quality for a total of 104 and 108 non-financial companies listed on the GCC stock markets for the periods preceding and subsequent the event, respectively, over the period 2005–2010.

The remainder of this paper is structured accordingly. Section two reviews the literature and develops the hypothesis. Section three highlights the research method. Section four reports the results and discussions. The final section illustrates the conclusion.

LITERATURE REVIEW AND DEVELOPMENT OF HYPOTHESIS

According to the agency theory, audit fees with various levels can lead to change in the demand for audit quality (Fama & Jensen, 1983; Jensen & Meckling, 1976; Wallace, 1980, 1987). Audit quality has a direct relationship to the independence of the auditor given that without independence, the opinion of the audit is meaningless. The various levels of audit fees cause the effects of economic dependence of the auditor on the audit client (Bryan-Low, 2003; Gunny et al., 2007; Weil & Tannenbaum, 2001).

Empirical studies have shown that the Big-8 audit firms may likely have larger fees due to the quality of their work that is high, the influence of their reputation, the related costs involved, and the position of their oligopolistic market, especially in the case of the larger audited firm. It is expected that the Big-8 fees are lower, due to economies of scale of the auditor (Pong & Wittengton, 1994). Studies such as Beattie and Fearnley (1995); Bedard et al. (2000); DeAngelo (1981a); Ettredge and Greenberg (1990); Hogan (1997); Turpen (1990); and Simon & Francis (1988) have indicated that a firm's cost saving for the client, which was brought about by a decrease in audit fee, is a significant justification for the changing of auditors by the firms for a less costly one.

According to the report of a study in US by Simon and Francis (1988), client firms made a lower payment for fees relative to the higher ones that they would have paid if the clients had had the features of necessary fees in the earlier three years of their

engagement in the audit. On average, the fee discount of 24% was found at the earlier year of engagement in the audit. The discount disappears after having remined for an extra two years at this low level. In particular, they show that a reduction in fee which brings about switches of auditors, could show variation in the quality of the auditor or efficiency in the level of technology, as compared to the form of fee reduction that constitute a threat to the independence of auditor. The test was done again, in order to make corrections for the impacts of unexpected results, by making use of observations from the same level of auditor changes only.

With respect to a given client, the assumption was made that there is an absence of any significant differences in efficiency between auditors belonging to the same class and to those with comparable reputations among the auditors of a given class. The same outcome was arrived at as that determined from a subsample with the use of statistical tests, and those with the same levels of auditor variation. The conclusion determined was that reduction of fee could worsen the problem associated with independence caused by the presence of quasi-rents as analyzed by DeAngelo (1981a). In their study, Beattie and Fearnley (1995) find that in the UK listed companies, 66% of them that deemed it necessary to change their auditor, gave the current levels of audit fee ranking as a motive for deeming it necessary to have such a change. Pong and Whittington (1994) have also provided analysis of the effect encountered in the first year of changing the auditor, and pointed out that the new auditors appointed have the tendency of charging a lower fee as compared to incumbent auditors. Furthermore, Woo and Koh (2001) show that if companies have the feeling that there is no significance difference that exits in the quality of the audit provided with the lower audit fee charged, then the companies will appoint another auditor. Hudiab and Cooke (2005) observe that with a higher level of fee, there are fewer tendencies for a qualified audit to give an opinion because a client will not want to allow an audit qualification if the audit fees paid are higher than average.

In spite of the fact that firms obtain the services of auditors whose charges are the cheapest justify the fact that many reasons abound for the discouragement of firms from the continuous variation of auditors, just to conserve audit fees (Kallunki, Sahlstrom & Zerni, 2007; Lindahl, 1996). The costs of switching as described by Klemperer (1995) refers to the special costs that the customers incur as suppliers are changed. The costs of switching occur due to the fact that customers who had earlier bought services from one supplier encounter extra costs in a case where they choose to switch to another supplier for the same services. Due to the fact that the costs of switching offer firms a kind of monopolistic power, the firms encounter an opportunity cost to either invest in market share by reducing the price charge to have new customers, or the firms realize profits by increasing the prices charge relative to the existence of the customer relationships. With the presence of switching costs, several studies have confirmed the preference of business relations with a long period in industries that produce complex and tailored goods or services (Campbell, 1985; Ford et al., 1986; Stewart, 1998).

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The report by Francis (1984) and Simunic (1980) confirms inconsistent results with respect to audit services pricing while Simunic (1980) reports that in the US market, audit prices bear no significant difference between the Big-8 and the non-Big-8 audit firms, in a small sample of companies characterized as having sales of lesser than $ 125 million, and a large sample of companies characterized as having sales greater or equal to $ 125 million. This finding is consistent with the structure of a competitive market without product differentiation to the Big-8 audit firms. As a contradiction, it was reported by Francis (1984) that in the Australian market, audit prices associated with the Big-8 was considerably greater than those associated with the non-Big-8 in the small and large sample of companies. The results provide consistency with a structure of a competitive market with product differentiation to the Big-8 audit firms. The distinction in the size of auditee in the foregoing two studies might provide for an explanation for the resultant contradiction. In Simunic (1980), the average size of asset for small and large auditees amounted to $177 and $892 million (US dollars), respectively, as distinct from that in Francis (1984) with $8 and $90 million (Australian dollars). The distinctions in the size of auditee indicate that Simunic and Francis appear to identify two samples stemming from the larger and smaller end of the size continuum, respectively. On this basis, Francis would have no ability to generalize with respect to "larger" auditees regarding the Big-8 product differentiation.

Simunic's model has been tested by other studies by using various time periods and industries in analyzing data. Others have examined the particular factors determining the audit fee by the firms in various countries as well as in different institutional environments (Craswell et al., 1995; Francis et al., 2003; Taylor & Simon, 1999). In recent studies, Che Ahmad et al. (2006) have empirically reported that there is a positive association between auditor choice among brand name and audit fees. Woo and Koh (2001) find that higher audit fees are associated with auditor changes. Cassell et al. (2012) document a significantly negative association between abnormal audit fees and the auditor change from the Big 4 to the non-Big 4 audit firms. Fargher et al. (2001) report an insignificant association between audit fees and in the selection of the Big-6 audit firms. Salehi et al. (2019) show no significant relationship between audit quality and audit fees stickiness. Salehi et al. (2017) find no significant relationship between audit fees pressure and audit quality. In addition, an insignificant association has been reported by Jung et al. (2016) between audit quality and abnormally high audit fees. In this same regard, Hudaib and Cooke (2005) find an insignificant relationship between audit fees and the propensity to switch for distressed qualified auditees and management director change. In their pre-SAS600 model, they find that audit fees are associated with auditor change and, in post-SAS600, they could not find no such association. Nazri et al. (2012b) find that audit fees are positively related to audit quality. With this in mind, studies linking audit fees with auditor choice produce contradictory results.

Regarding background associated with the above discussion, the present study proposes direct associations between audit fees and the audit quality. The testable hypotheses are identified in direct forms, respectively:

H1: Ceteris paribus, there is a positive association between audit fees and audit quality.

RESEARCH METHOD

Sample and Data Collection

The population of interest is comprised of all non-financial companies listed on the Stock Exchanges of the five members of the Gulf Cooperation Council (GCC) with auditor switches occurring during the period from 2006 to 2009. This selection is the most recent test period for which data were available. Further, the boom of the GCC clearly emerged in early 2005 (Chahine & Tohme, 2009). A span of a four-year period was employed because it was assumed to be superior to a shorter period, which might be more susceptible to unusual events. A period longer than four years, however, would extend the company comparisons to a time period too long after the auditor change event to be of interest. Another reason for using a four-year period is that this study is restricted by the data availability. The information has been gathered as the result of two points in time: (1) the first fiscal year-end "$t\text{-}_1$" (before an auditor change): to correspond approximately to the year before the auditor change, and (2) the third year-end "t_1" (after the auditor change): to correspond approximately to the year after the auditor change. Further, this study targets companies that have not changed their auditors in the auditor change as they did not change their auditors between 2006 and 2009.

All data that are denominated in several currencies of the five members of the GCC are translated into US dollar equivalents for the purpose of the study. For the purpose of minimizing the noise and voiding the including of proxies surrogating for non-agency cost variables, several non-agency cost motivated variables that lead to the cases of auditor changes are excluded as follows. *First,* companies that have experienced a bankruptcy (DeFond, 1992; Lee, Mande & Ortman, 2004; Menon & Williams, 2008; Carcello & Neal, 2003). *Second,* companies that have selected a new auditor twice or more during the period considered in this study are eliminated from the sample (DeFond, 1992; Khalil *et al.*, 2010; Chan *et al.*, 2007). *Third,* companies that own subsidiaries of other companies of 20% or greater are also excluded from the sample in the current study (DeFond, 1992; Johnson & Lys, 1990). *Fourth,* companies that change their auditors because of merging at any time during the period considered in this study are excluded (Johnson & Lys, 1990; Lennox, 2000; Khalil *et al.*, 2010). *Fifth,* companies that have received adverse or disclaimer opinions at any time during the period considered in this study are eliminated (DeFond, 1992). *Sixth,* companies that have changed their auditors because of a mandatory rotation policy (DeBerg *et al.*, 1991). *Seventh,* companies that are engaged in banking, insurance or diversified financial services are excluded (e.g., Hudiab & Cooke, 2005; Chan *et al.*,

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2007; Jackson, Moldrich & Roebuck, 2008; Desender *et al*., 2009; Carcello & Neal, 2003). And, *finally*, companies whose auditors resign are also eliminated (Carcello & Neal, 2003; Robinson & Jackson, 2009).

Applying the above criteria, excluding non-auditor change companies, and also eliminating companies with incomplete data, the sample size was reduced to 109 auditor-change companies that have experienced a change in their audit quality. After the screening process for the two-year periods; before (t_{-1}) and after (t_1) the auditor selection, five cases of multivariate outliers have been detected for the pre-auditor-selection model, and one case has been reported for the post-auditor-selection model. Thus, a final sample of 104 and 108 companies were identified to be eligible for inclusion in the analysis of the pre-auditor-selection model (t_{-1}) and post-auditor-selection model (t_1), respectively. A breakdown of the sample by year using the brand-name classification is shown in Table 3.1.

Table 3.1. Summary of Auditor Change Types (Big 4/Second Tier/Local – Classifications*)

	Upgrade Change		Par Change	Downgrade Change		
	+2	+1	0	-1	-2	Total
2006	0 (0%)	0 (0%)	3 (4%)	1 (6%)	0 (0%)	4 (4%)
2007	1 (100%)	5 (24%)	10 (15%)	8 (44%)	0 (0%)	24 (22%)
2008	0 (0%)	10 (48%)	30 (44%)	6 (33%)	1 (100%)	47 (43%)
2009	0 (0%)	6 (28%)	25 (37%)	3 (17%)	0 (0%)	34 (31%)
Totals	1 (1%)	21 (19%)	68 (62%)	18 (17%)	1 (1%)	109 (100%)

*Where

+2 = from local firm to Big 4

+1 = from local audit firm to second tier audit firm, or from second tier audit firm to Big 4

0 = no change in classification

-1 = from Big 4 to second tier audit firm, or from second tier audit firm to local audit firm

+2 = from Big 4 to local audit firm

Table 3.1 provides a classification for auditor change types (Big 4/second tier/local) for the considered period from 2006 to 2009. Column 1 shows that one company (1%) had changed from a local audit firm to a Big 4 audit firm during the considered period. Another 21 (19%) companies, as represented by column 2, had changed either from a local audit firm to a second tier audit firm or from a second tier audit firm to a Big 4. It is worth noting that about 22 (20%) of the sample companies had experienced an upgrade change in their audit quality during the considered time period of the study. A total of 68 (62%) companies had changed their auditors within the same classification of auditor type as shown in column 3. They had experienced par change in their audit quality in terms of brand name. Column 4 indicates that 18 (17%) of companies had either changed from Big 4 to second tier audit firm or from second tier audit firm to a local audit firm. Column 5 indicates that one company (1%) had changed from a Big 4 audit firm to a local audit firm. It is worth noting that 19 (18%) of companies had experienced a downgrade change in their audit quality. Thus, the majority of the auditor-change cases have taken place among the Big 4 audit firms during the considered time period of study, giving an indication that the GCC audit market is dominated by the Big 4 audit firms.

It is worth mentioning that the frequency of auditor change had occurred in 2007 (22%), 2008 (43%) and 2009 (31%). This is due to the learning taking place by the time significance of corporate governance, and the enforcement of implementing the codes of corporate governance that had been taking place surrounding this time period. The start-up of this process begins in the 2007 period and reaches the peak in 2008. These circumstances were a result of the GCC establishing a common market on January 1st, 2008. All GCC companies and citizens have no barriers to invest and thus traded in any other GCC country. Consequently, these events have rearranged the alignment of the auditor-client relationships that, in turn, has led to many auditor changes cases in 2008 (Arab Times, 2012).

Regression Model

This study adopts and modifies DeFond's (1992) model of audit quality. DeFond (1992) reports that there is a possibility of resolving agency problems by combining the auditor characteristics (auditor size, brand name, expertise, and independence) as a construct. These variables are expected to be better measures of audit quality when considering as a group and not individually. For the reasons of performing hypotheses' tests, if each of these variables is a noisy measure of audit quality, then the combination of these variables can minimize the dependent variable's noise by the power of the tests that would have been increased.

The combination of the four audit quality proxies is done by using the Principal Component Analysis's technique. For this purpose, an eigenvalue analysis is utilized and the linear combination is done using the correlation matrix of the variables of interest. Futhermore, this procedure can account for the maximum amount of variance. In order to measure the auditor's ability to resolve agency problems, the

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common factor is utilized. To estimate this model, Multivariate Analysis is applied using Ordinary-Least Square (OLS regression) which is estimated using cross-sectional data, for a period of three years spanning one year before the auditor change through one year after the auditor change. The following OLS regression is used by this study:

$$AQ\_SCORE = \beta_0 + \beta_1 FEE + CONTROL\ VARIABLES\ (\beta_1 BDE\_SCORE + \beta_2 ACE\_SCORE + \beta_3 GOV\_OWN + \beta_4 FAMILY\_OWN + \beta_5 DOMESTIC\_OWN + \beta_6 LASSET + \beta_7 LEV + \beta_8 ROA + \beta 9 MGT\_CHAN + e \quad \ldots\ldots (2)$$

Where the dependent variable is:

AQ_SCORE	= the principal components linear combination of the four audit firm's quality measures based on DeFond (1992),

Where the independent variables are:

Test Variable	
FEE	= proportion of firm's revenues to audit firm's total revenues,
Control variables	
BDE_SCORE	= proportion of board of directors' effectiveness,
ACE_SCORE	= proportion of audit committee effectiveness,
GOV_OWN	= percentage of 5 or more of the ordinary shares held by the government and its agencies,
FAMILY_OWN	= percentage of 5 or more of the ordinary shares held by a family,
DOMESTIC_OWN	= percentage of 5 or more of the ordinary shares held by domestic corporations,
LASSET	= $\log_{10}$ of the total assets,
LEV	= total debt to total assets,
ROA	= return on assets,
MANG_CHAN	= dummy variable, coded "1" if there is a change in chairperson, CEO and other board members and "0" otherwise,
e	= Error term.

Since OLS regression is used to test the hypotheses, outliers are detected and handled, assumptions of multicollinearity, normality, heteroscedasticity, linearity, autocorrelation and model specification tests such as *Linktest* and *Ramsey* test are also evaluated.

The dependent variable in this study is audit quality AQ_SCORE. It is well established by the prior and recent research on auditing that there is no consensus of a single proxy for audit quality, and the available proxies have more than one measurement. It is also worth highlighting that one of the reasons that previous studies have produced conflicting results, is that they use different simple audit quality proxies and/or the binary indicator variables of audit quality. Importantly, one of the more rigorous studies using a complex and comprehensive measurement of audit quality is that conducted by DeFond (1992) in the U.S. data. This study uses a combination of four audit quality surrogates that have a recurring presence in the literature, namely; brand name auditor, auditor size, auditor specialist and auditor independence.

DeFond (1992) reports that a combination of measurement can be used to capture the same underlying construct, namely he auditor's ability to alleviate agency conflicts. Consequently, it is suggested that the combination of these four measurements may provide more information than if they had been individually used. DeFond (1992) also indicates that performing hypotheses testing using each of the auditor characteristics would be considered a noisy measure of the audit quality. Therefore, combining the four measurements may increase the power of the tests that would, subsequently, reduce noise in the independent variable. To the best of the researcher's knowledge, DeFond's (1992) study is the only one that uses the comprehensive combination of four surrogates of audit quality because he concludes that the results obtained by this combined measure are similar to those obtained by using the simple model of brand name. Unlike DeFond's (1992) study that was conducted in U.S., this study is carried out in the GCC setting, which is considered to be a different institutional and audit environment. Accordingly, different results are expected to be reported. Therefore, the similar measurement of the comprehensive combined measure of audit quality is adopted by this study. The four surrogates of audit quality used to construct the combined measure of audit quality have been measured as follows:

Auditor Size

Auditor size is measured based on the following equation (total client assets audited by the new auditor - the total client assets audited by the old auditor = difference)/ the larger of the old or new audit firm total client assets. The result of this equation will range between -1 and 1. The positive results indicate an auditor change to a larger auditor. This measurement is considered a good surrogate for audit quality (Chan et al., 2007; DeAngelo, 1981; DeFond et al., 2000; Johnson & Lys, 1990; Reynolds & Francis, 2001).

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Brand Name Auditor

To calculate the switch in the brand name auditor, the following values are given to the classification of quality: "2" = Big 4 firms, "1" = second tier firms and "0" = local firms. In the determining of the rank-ordered variable (-2, -1, 0, 1, & 2), the following calculation is applied: (the value of the firm subsequent to change – the value of the audit firm prior to the change). Positive numbers indicate "upgrade;' an increase in brand name reputation while negative numbers indicate "downgrade;" a decrease. This category enables the model to consider the direction of auditor change. This measure is specifically used by DeFond (1992) and Lee et al. (2004). Importantly, classifying auditors as three categories of quality differentiation is previously used by Bedingfield and Loeb (1974), Burton and Loeb (1967) and Carpenter and Strawser (1971).

Industry-Specialist Auditor

Industry-specialist auditor variable classifies audit firms as an "industry-specialist auditor" if its market share in the client's industry is 10% or greater and "non-industry-specialist auditor." Companies are then coded "1" if they have changed from "non-industry-specialist auditor" to an "industry-specialist auditor," "0" if they have experienced no change in industry-specialist and "-1" if they have changed from "industry-specialist auditor" to non-industry-specialist auditor." This measurement is used by DeFond (1992). Further, the measurement of industry-specialist and non-industry-specialist based on the market share in the client's industry is used by several recent and earlier studies (Beasly & Petroni, 2001; Craswell et al., 1995; DeFond, 1992; Eichenseher & Danos, 1981; Iskandar et al., 2000; Krishnan et al., 1996; Rhode, Whitesell & Kelsey, 1974; Sahdan, & Rasit, 2008; Schiff & Fried, 1976; Shockely & Holt, 1983; Williams, 1988; Zeff & Fossum, 1967).

Auditor Independence

It is documented by several studies that auditors, in certain circumstances, might fear dismissal by companies that pay a large amount of fees in case they report a breach (DeAngelo, 1981b; DeFond, 1992; Firth, 1985; McKeown et al., 1991). DeFond (1992) documents that fee data are difficult to obtain and/or not available because of its proprietary nature. In order to avoid the weak disclosure of audit fees by companies, some researchers have collected audit fee information directly from the clients, but they received a low response rate, approximately 33%. (Palmrose, 1982; Simunic, 1980; Wallace, 1984). In the GCC setting, the same circumstances exist because companies operating in the GCC are not required by law to mandatory disclosure of their audit fees. Therefore, DeFond (1992) and Chan et al. (2007) measure the independence of the audit firms as the difference between the ratio of the switching of client firm's revenues to the total revenues of the clients of the old auditor, minus the same ratio for the new auditor. This ratio is bounded by "1" and "-1,' with positive numbers indicating a switch to a more independent audit firm.

This study adopts the same measurement of DeFond (1992) and Chan et al. (2007) since it has been thought to be a better proxy for audit quality in the environment where audit fees are not disclosed. Auditor independence is calculated using the following formula: (difference between the ratio of the switching of client firm's revenues to the total revenues of the clients of the old auditor - the same ratio for the new auditor). This ratio is bounded by "1" and "-1,' with positive numbers indicating a switch to a more independent audit firm. More importantly, audit firm size based on companies' sales has been used as a good quality surrogate because it is suggested that companies' sales are associated with quasi-rents (Chan et al., 2007; DeFond, 1992; Francis & Wilson, 1988; Johnson & Lys, 1990).

We also control for the effect of nine agency-related variables on audit quality. As for board of directors' effectiveness score *BDE_SCORE*, Cassell et al. (2012) have investigated the influence of corporate governance index (independence, meetings, and financial expertise of board and audit committee members) on auditor switch from a Big 4 to a non-Big 4. They concluded that board of directors' effectiveness is related to the auditor-client realignments. In addition, studies on auditor choice have empirically linked auditor choice with board of directors' characteristics (Beasley & Petroni, 2001; Chen & Zhou, 2010; Lee et al., 2004; Alzahrani & Che-Ahmad, 2015). The expected sign for the association of board of directors' effectiveness with audit quality is positive. In terms of audit committee effectiveness *ACE_SCORE*, the extant research on auditor choice has linked audit committee characteristics and auditor choice (Cassell et al., 2012; Abbott & Parker, 2000; Archambeault & DeZoort, 2001; Carcello & Neal, 2003; Chen & Zhou, 2010; Lee et al., 2004; Robinson & Owens-Jackson, 2009). The expected sign for the association of audit committee effectiveness with audit quality is positive.

As for government ownership *GOV_OWN*, agency theory suggests a negative association with auditor change. Guedhami et al. (2009) document a significantly negative relationship between the government's equity stake and the choice of Big 4 audit firms. Wang et al. (2008) report that small local audit firms are selected by local SOEs. And, there is no difference between central SOEs non-state firms in terms of selecting small local audit firms. Chan et al. (2007) find a negative association between government ownership and auditor size. The expected sign for the association of government ownership with audit quality is negative. In terms of family ownership

FAMILY_OWN, this study uses the agency framework and follows Carey et al. (2000) arguing that agency problems such as self-interest, conflict of interests and goals and information asymmetry can still arise in family businesses. Therefore, agency theory predicts the existence of potential conflict in family business (Fama & Jensen, 1983). Carey et al. (2000) find that the demand for audit quality is positively associated with the degree of family ownership. This is because of the existence of non-family members and representation on the board of directors. The expected sign for the association of family ownership with audit quality is negative. Regarding domestic corporate ownership *DOMESTIC_OWN*, the agency costs

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would be reduced in a case when there is an increase in the holdings of the owner-largest shareholder. Therefore, the controlling owners will be motivated to improve earnings informativeness due to their need in managing earnings for the purpose of alleviating contractual constraints. This circumstance is associated with demanding a higher audit quality (Jensen & Meckling, 1976). Hiring a high audit quality by the controlling owners is expected to signal a good practice of corporate governance and is indictive of a credible financial reporting from the perspective of the minority shareholders and other investors. Allen and Phillips (2000) empirically report that corporate ownership can reduce the costs of monitoring the alliances or ventures between firms and their substantial shareholders in companies involved in certain business agreements. It is further indicated that higher degrees of technical and organizational and financial resources are provided by domestic investors than those provided by foreign investors (Chibber & Majumdar, 1999; Djankov & Hoekman, 2000; Khanna & Palepu, 2000). The expected sign for the association of domestic corporate ownership with audit quality is positive.

As for the firm size *LASSET*, Lin and Liu (2009) document that firm size is positively related to the selection of Top-10 audit firms. With regard to the association between firm size and the selection of brand name auditor (Big 4/6/8), Palmrose (1988), Hope et al. (2008), Knechel et al. (2008), Gudhami et al. (2009) find a significantly positive relationship. Further, Wang et al. (2006) find that firm size is negatively associated with the selection of small local audit firms. Cassel et al. (2012) document that firm size is negatively associated with auditor change from Big 4 to non-Big 4 audit firms. However, Lee et al. (2004) report that firm size is positively associated with the change among Big-5, national and local audit firms. Abbott and Parker (2000) find that firm size is positively related to the selection of specialist auditor. Robinson and Owens-Jackson (2009) report a significantly positive association between firm size and the incidence of auditor change. The expected sign for the association of firm size with audit quality is positive. Regarding leverage *LEV*, DeFond (1992) and Hope et al. (2008) report a significant and positive association. With respect to the association between auditor leverage and auditor size, DeFond (1992) find a significantly positive association. As for audit quality change, Lee et al. (2004) report that leverage is positively associated with the probability of change among Big 4, national and local audit firms. Eichenseher and Shields (1989) the documentation that leverage is positively related to the incidence of a change from non-Big 4 to Big 4 audit firms. With respect to the incidence of auditor change, Woo and Koh (2001) report a significantly positive association between leverage and auditor change.

In terms of the auditor independence, DeFond (1992) find that leverage is positively related to the selection of independent auditor. The expected indication for the relationship between leverage and audit quality is positive. In terms of firm performance *ROA*, Schwartz and Menon (1985) indicate that change in a company's financial condition may produce a change in the desired package of audit services (Schwartz & Menon, 1985). Woo and Koh (2001) indicate that auditors who are working

with higher perceived audit and business risks will assign more audit procedures and conservative accounting treatments or if there is still a distressed situation, the incumbent auditor might resign. Moreover, companies with unsound financial positions may select another auditor in the hopes of receiving more favorable audit reports (Citron & Taffler, 1992; Haskins & Williams, 1990). Lindahl (1996) reports that one indication of financial distress is a loss which may lead to an auditor change. The expect sign for the link between firm performance and audit quality is positive. With respect to management change MANG_CHAN, it is indicated that a new management team charged with the responsibility of bringing about a corporate recovery may view the selection of reporting methods as a means for influencing the decisions of suppliers of capital, by portraying corporate performance in a more favorable light, and thus, may be facilitated by finding an auditor willing to sanction those methods advocated by management (Burton & Roberts, 1967; Carpenter & Strawser, 1971; Hudaib & Cooke, 2005; Lurie, 1977; Schwartz & Menon, 1985; Woo & Koh, 2001). Beatttie and Fearnley (1998) provide further evidence vis-a-vis management change. They have reported that 35% of auditor change companies cite top management changes as a reason for switching. Empirically, Robinson and Owens-Jackson (2009) report a significantly positive association between management change and the propensity of auditor change. Carcello & Neal (2003) report a significantly positive relationship between management change and the auditor change, after receiving and ongoing report concern. The expected indication for the relationship between management change and audit quality is positive.

RESULTS AND DISCUSSIONS

Descriptive Statistics

Table 4.1 and Table 4.2 display a statistical description of the continuous and dichotomous variables used in the regressions for the two-year periods; before (t-$_1$) and after (t_1) the auditor selection.

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Table 4.1. Descriptive Statistics of Continuous Variables

Variables	(t_{-1}: n= 104; t_1: n = 108)				
	Mean	Median	Min	Max.	Std.Dev
Panel A: Independent Variables					
FEE _ t_{-1} (decimal)	0.12	0.005	0.00	1.00	0.27
FEE _ t_1 (decimal)	0.09	0.004	0.00	1.00	0.25
BDE _ SCORE _ t_{-1} (decimal)	0.58	0.57	0.29	0.86	0.16
BDE _ SCORE _ t_1 (decimal)	0.56	0.57	0.14	0.86	0.15
ACE _ SCORE _ t_{-1} (decimal)	0.81	0.83	0.33	1.00	0.18
ACE _ SCORE _ t_1 (decimal)	0.82	0.83	0.33	1.00	0.16
GOV _ OWN _ t_{-1} (%)	7.47	00.00	00.00	74.30	15.00
GOV _ OWN _ t_1 (%)	8.03	00.00	00.00	74.30	16.12
FAMILY-OWN _ t_{-1} (%)	11.21	00.00	00.00	82.77	17.24
FAMILY-OWN _ t_1 (%)	10.71	00.00	00.00	82.77	16.72
DOMESTIC _ OWN _ t_{-1} (%)	23.47	0.140	00.00	100.00	25.54
DOMESTIC _ OWN _ t_1 (%)	26.17	14.90	00.00	100.00	28.68
LASSET _ t_{-1} ($ *mil*)	1.17	0.14	0.002	34.38	4.78
LASSET _ t_1 ($ *mil*)	1.15	0.14	0.002	34.38	4.72
ROA _ t_{-1}	9.91	9.20	-12.51	42.46	10.38
ROA _ t_1	8.18	8.27	-17.44	35.08	10.22
LEV _ t_{-1}	21.00	13.21	0.00	96.13	21.89
LEV _ t_1	19.76	12.34	0.00	95.41	21.38
Panel B: Dependent Variables					
AUD _ SIZE _ t_{-1}	0.08	0.10	-0.86	1.00	0.29
AUD _ SIZE _ t_1	0.09	0.11	-0.86	1.00	0.30
AUD _ INDE _ t_{-1}	0.03	-0.00	-0.99	0.99	0.32
AUD _ INDE _ t_1	0.03	-0.00	-0.99	0.99	0.32
AQ _ SCORE _ t_{-1}	2.35	0.94	0.00	26.63	3.82
AQ _ SCORE _ t_1	2.31	0.99	0.00	26.57	3.78

As reported in Table 4.1, the *FEE* mean (median) values for the year prior to the auditor selection (t_1) and the year after the auditor selection (t_1) are 0.12 (0.005) and 0.09 (0.004), respectively. On average, this suggests that there is a decreased tendency in the audit fees for the period surrounding the auditor selection. Inclusion of several client firms with large percentages of audit fees causes a large difference between the mean and median of the audit fees. The mean (median) values of the

effectiveness of board of directors (*BDE_SCORE*) for the periods before ($t\text{-}_1$) and after the auditor selection (t_1) are 0.58 (0.57) and 0.56 (0.57), respectively. This suggests that, on average, there is a decrease in the degree of board effectiveness in the year subsequent to the auditor selection (t_1) compared with the year prior to the auditor selection ($t\text{-}_1$), although the median board of directors' effectiveness is identical for both the pre--auditor selection year ($t\text{-}_1$) and the subsequent year after the selection is made (t_1). With respect to audit committee effectiveness (*ACE_SCORE*), the mean (median) values for the period prior to the auditor ($t\text{-}_1$) and the period subsequent to the auditor selection (t_1) are 0.81 (0.83) and 0.82 (0.83), respectively. This implies that there is an increase in the level of audit committee effectiveness in the year subsequent to the auditor selection (t_1) compared with the pre-auditor selection year ($t\text{-}_1$), in spite of the fact that the median audit committee effectiveness remains the same in the considered periods ($t\text{-}_1$ & t_1).

With regard to the government ownership (*GOV_OWN*), the mean values for the year prior to the auditor selection ($t\text{-}_1$) and for the year subsequent the auditor selection (t_1) are 7.47% and 8.03%, respectively, with identical median values of 0.00. The minimum (maximum) values of the government ownership for the both periods before ($t\text{-}_1$) and after the auditor selection (t_1) are 0.00 (74.30%) and 0.00 (74.30%), respectively. These statistics suggest that there is an increase in the percentage of government owned companies in the two-year periods surrounding the auditor selection ($t\text{-}_1$ & t_1). The maximum values of the government ownership in the GCC indicate that there is a dominance presence of the government owning high percentages of companies' shares up to 74.30%. The very large difference between the mean and median of the government ownership is due to the inclusion of several client firms with very large government ownership.

In terms of the *FAMILY_OWN*, the mean values for the both periods; before ($t\text{-}_1$) and after (t_1) the successor auditor selection are 11.21 and 10.71, respectively with equal median values of 0.00. The minimum (maximum) values for the both periods before ($t\text{-}_1$) and after the successor auditor selection (t_1) are 0.00 (82.77%) and 0.00 (82.77%), respectively. The statistics of mean values show that there is a decrease in the proportion of family ownership in the surrounding period of auditor selection. The minimum (maximum) values exhibit that there is a high presence of family ownership among GCC companies reaching up to 82.77%. The very large difference between the mean and median of the family ownership is because of the inclusion of several client firms with very high percentages of family ownership.

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With respect to the *DOMESTIC_OWN*, the mean (median) values for the year of the predecessor auditor (t-$_1$) and the year subsequent the successor auditor (t_1) are 23.47% (0.14%) and 26.17% (14.90), respectively. The minimum (maximum) values of the domestic corporate ownership for the both periods; before (t-$_1$) and after (t_1) the successor auditor are 0.00 (1.00) and 0.00 (1.00), respectively. The statistics of the domestic corporate ownership mean (median) values portray that there is an increased tendency for domestic corporate ownership in the years surrounding the auditor selection. There is also an indication shown by the minimum (maximum) statistics that there is a high existence of the domestic corporations owing high percentages of GCC companies. Among the three dominant groups; namely government, family and the domestic corporations, the latter group has the highest dominant presence in the GCC market followed by family and, then, the government. It is also worth noting that the very large variation between the mean and median values of the domestic corporate ownership is due to the fact that there are several companies with very large domestic corporate ownership that have been included in the sample. This inclusion does not result in large outliers as can be seen in the following section.

As for *LASSET*, the mean (median) values for the both periods; the year of the predecessor (t-$_1$) and the subsequent year of the successor (t_1) are *$ mil* 1.17 (0.14) and *$ mil* 1.15 (0.14), respectively. This indicates that the firm size in GCC countries increases in the period surrounding the auditor selection. And, the difference between the mean and median values is because of including several client firms with large sizes. As for the *ROA*, the mean (median) values for the both periods; before (t-$_1$) and after (t_1) the auditor selection are 9.91 (9.20) and 8.18 (8.21), respectively. There is a decrease, on average, in GCC companies' firm performance for the period surrounding the auditor selection. With respect to the *Lev*, the mean (median) values for the year of the predecessor (t-$_1$) and the year subsequent to the successor (t_1) are 21.00 (13.21) and 19.76 (12.34), respectively. The leverage mean indicates that there is a decreased trend in the debt level of GCC companies in the time surrounding the auditor selection.

As depicted by Table 4.2, the number of companies with *MGT_CHANGE* is relatively small compared with non-management change companies in year t-$_1$ [29 (28%)] and is closer to the half in year t_1[49 (45%)]. Comparing the management change between the year of the predecessor auditor (t-$_1$) and the year subsequent the successor auditor (t_1), the management change in year t_1 is higher than the management changes in year t-$_1$ by 41%, suggesting that the event of management change in the period subsequent to the auditor selection can explain more about the auditor selection, and quality-differentiated audits.

Table 4.2. Descriptive Statistics (Percentage) for Dummy Variables

	t_{-1}: n= 104; t_1: n = 108		Totals
Dichotomous Variables	1	0	
MGT _ CHANGE _ t_{-1}	29 (28%)	75 (72%)	104 100%
MGT _ CHANGE _ t_1	49 (45%)	59 (55%)	108 100%

Table 4.3 presents the descriptive statistics for the number of the dominant group ownership, namely; government and its agencies, family, and domestic corporate owners.

Table 4.3. GCC Ownership Structure of the Sample Companies

Ownership Type	Government Ownership		Family Ownership		Domestic Corporate Ownership		Foreign-Corporate Ownership	
	t_{-1}	t_1	t_{-1}	t_1	t_{-1}	t_1	t_{-1}	t_1
Number of dominant groups who own 5% or more	37 (36%)	38 (35%)	51 (49%)	49 (45%)	67 (64%)	72 (67%)	7 (0.07%)	5 (0.05%)
Number of companies with 0% ownership of the dominant groups	67 (64%)	70 (65%)	53 (51%)	59 (55%)	37 (36%)	36 (33%)	97 (93%)	103 (95%)
Total	104 (100%)	108 (100%)	104 (100%)	108 (100%)	104 (100%)	108 (100%)	104 (100%)	108 (100%)

Table 4.3 shows that there is no variation in the foreign-controlled ownership which justifies the reason for excluding such type of the ownership from Model 2. There is a lack of corporate governance framework in the GCC countries which leads to the absence of foreign investors who would be likely to apply good corporate governance practices (INSEAD, 2010; AL Majlis, The GCC Board Directors Institute, 2009).

The highest number of ownership type is the domestic corporate shareholder who dominates the majority of the companies in GCC (t_{-1}: 67 (64%); t_1 = 72 (67%). This follows in line with what has been found by Claessens *et al.* (2000), namely that domestic

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corporate is among the largest group of blockholders in many emerging markets. The second highest dominant ownership in number is the family shareholders ($t_{-1:}$ 51 (49%); $t_{1:}$ 49 (45%). Government ownership is ranked as the third dominant group in GCC market ($t_{-1:}$ 37 (36%); $t_{1:}$ 38 (35%).

The preponderance of positive mean (median) changes in the dependent variables (name-brand, auditor size, independence, expertise and the combined measure) indicates that the general change was to larger, higher quality auditors. The difference in the mean (median) values for the dependent variables between the prior year to the auditor selection (t-$_1$) and the subsequent year to the auditor selection (t_1) is due to the dropping of five and one outliers, respectively. The very large difference in terms of value and sign between the mean and median of the auditor independence is because of the inclusion of several client firms with very large auditor independence. Both models are generally constant over the two measurements dates, and they show almost equivalent values for the descriptive analysis.

The Principal Component Analysis (PCA) using the varimax rotation is applied to combine the four variables, namely; brand-name auditor, auditor size, auditor independence and auditor expertise. Extracting common factors out of a set of variables can be done using the factor analysis tool, PCA. An eigenvalue analysis is utilized and the linear combination is done using the correlation matrix of the variables of interest. Further, this procedure can account for the maximum amount of variance. The common factor is used in the hypotheses tests as a measure of the audit quality. For all the three variables (brand-name, independence and expertise), the overall values of Kaiser-Meyer-Olkin were (t-$_1$: .574) in the predecessor year and (t_1: .578) in the subsequent year to the successor, exceeding the recommended value of .50 (Hair *et al.*, 2010). The Bartlett test was highly significant in both periods (t-$_1$: p = .00; t_1: p = .00). This indicates the degree of the appropriateness of the factor analysis in a manner that provides for the statistical probability that the correlation matrix has significant correlations among at least some of the variables (Hai *et al.*, 2010). These suggest that the assumptions of factor analysis were met.

The PCA revealed the presence of two factors or components loading with two eigenvalues exceeding one for the both periods (t-$_1$ & t_1). A total of three variables (brand-name, independence and expertise) were loaded on the first factor with factor loadings between .869 and .676 in the t-$_1$ and between .865 and .660 in year t_1. And, the fourth variable, auditor size, was loaded as only one variable on the second factor with factor loadings of .892 in year t-$_1$ and .882 in year t_1. It is worth noting that the first three audit quality surrogates (brand name, independence and expertise) have been combined under one component to reflect the common factor measuring the auditors' ability to alleviate agency conflicts. In the same regard, auditor size has been extracted as a second factor to act as a surrogate variable of audit quality that is representative of that factor. Economists indicate that market participants may come out with proxies measuring quality services when they are involved in quality-differentiated marketplaces (Barzel, 1982).

Although it is still a problematic giving a specified definition of audit quality, this result suggests that, in GCC countries, the audit quality has two primary definitions, but interlinked sources of demand for audit quality: (1) a combined measure of auditor characteristics, namely; brand-name, independence and expertise, and (2) auditor size. In terms of the first definition, the combined measure, for this type of audit service, represents the information demand (Dopuch and Simunic, 1982) and insurance demand (Beattie & Fearnley, 1995). The information demand signals the quality of the management's representations concerning financial performance. The insurance demand stems from investors' desire to indemnify themselves from financial losses via the auditor's professional liability exposure. Importantly, DeFond (1992) has reported that the combination measure captures the same underlying construct, namely the auditor's ability to alleviate agency conflicts. The combined variables are expected to be a good measure of audit quality when considered as a group and not individually, in a manner that they would increase the power of the tests by reducing noise in the dependent variable. Further, for the purposes of obtaining a greater construct validity and a power of generalization, it is advised to use a combination of several proxies rather than a single proxy (Nunnaly and Bernstein, 1994). This is due to the fact that these variables act in a complementary mode which might explain the conflicting results reported by the previous studies, as they consider each variable in isolation from the others, ignoring the point that the effectiveness of a single variable depends on the others.

As for the auditor size, this type of service reflects the agency demand which is closely related to the information demand through which auditing services is required in order to increase the credibility of the financial statements and their reliability as a monitoring device (DeFond, 1992; Francis & Wilson, 1988). This single surrogate variable, auditor size, has a factor loading that is substantially higher than all other factor loadings in the both periods ($t\text{-}_1$ & t_1), but, as shown by the anti-image matrices, the MSA value is lesser than 0.5, supporting its deletion from the analysis in year $t\text{-}_1$. Using this single variable as a representative of the audit quality may cause some problems, (Hair *et al.*, 2010): (1) as it does not address the issue of measurement error encountered when using single measures, and (2) it runs the risk of potentially misleading results by selecting only a single variable to represent, perhaps, a more complex set of results. Therefore, this variable has been excluded, and the loadings of the combined measure of audit quality have been recalculated.

As shown in Table 4.4, the latent root criterion for number of factors to derive would indicate that there was one component loading to be extracted with eigenvalue with more than one for the both periods ($t\text{-}_1$: 1.83; t_1: 1.81) and with a simple structure. This factor captures 61.01% and 60.39% of the total variance in the variables for the both periods before ($t\text{-}_1$) and after (t_1) the auditor selection, respectively. The factor solution has explained more than half of the original variables' variance, so the communality values for the both periods ($t\text{-}_1$ & t_1) are higher than 0.50. The Kaiser-

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Meyer-Olkin values were identical for the both periods; before (t_{-1}: .58; n = 104) and after (t_1: .58; n = 108) the auditor selection, exceeding the recommended value of .50.

Also, the sample size for both periods exceeds the preferably number, which is 100 or larger (Hair *et al.*, 2010). The Barlett's tests of sphericity were highly significant for both periods (t_{-1}: p = .00; t_1: p = .00), supporting the factorability of the correlation matrix. In addition, an examination of the measure of sampling adequacy for each item fall within the acceptable range (t_{-1}: .55 - .62; t_1: .55 - .62) (Hair *et al.*, 2010). At this stage of statistical analysis of the PCA, the assumptions of factor analysis were met. The factor loadings are between .71 and .87 in year t_{-1} and between .70 and .87 in year t_1. These loadings were greater than .30 which is considered to meet the minimum level required (Hair *et al.*, 2010). Reliability (Cronbach's Alpha) values for this factor are .65 in year t_{-1} and .64 in year t_1. These values fall within the accepted range (Hair *et al.*, 2010). Since this factor measures the ability of auditors alleviating the agency conflicts, and its original name is retained.

Table 4.4. Principal Component and Reliability Analyses on Audit Quality

Variables	Factor Loadings (t_{-1})	Factor Loadings (t_1)
Name-Brand Auditor	.87	.87
Auditor Independence	.75	.75
Auditor Expertise	.71	.70
Eigenvalue	1.83	1.81
% of variance	61.01	60.39
Kaiser-Meyer-Olkin (KMO)	.58	.58
Bartlett's Test of Sphericity: Approx Chi-Square	57.41	56.75
df	3	3
Sig	.00	.00
Cronbach's Alpha (α)	.65	.64

It is worth highlighting that the combined measure of audit quality in DeFond (1992)'s sole study, a U.S based-research, is comprised of four surrogates, namely; brand-name auditor, auditor independence, auditor size and auditor expertise. This suggests that, in the U.S setting, the audit quality as one bundle or as an aggregation measurement encompasses these four auditor characteristics. Following DeFond (1992)'s combined measure of audit quality in the GCC context, a different result has been reported. It consists of only brand-name auditor, auditor independence and auditor expertise. The difference in the structure of the combined measure of audit quality between U.S and GCC countries could be attributed to differences which exist in the institutional frameworks, audit and business environments, and culture.

This study uses the correlation matrix, variance inflation factor (VIF) and tolerance (1/VIF) as examinations identifying the possible existence of multicollinearity.

Table 4.5. *Correlation Matrix of Independent Variables for the Two-year Period ($t\text{-}_1$ & t_1)*

	BOD_SCORE	ACE_SCORE	GOV_OWN	FAMILY_OWN	DOMESTIC_OWN	FEE	LASSET	ROA	LEV	MGT_CHANGE
Panel A: Year $t\text{-}_1$										
BDE _ SCORE	1									
ACE _ SCORE	.203*	1								
GOV _ OWN	.180	.069	1							
FAMILY _ OWN	-.061	.023	-.247*	1						
DOMESTIC _ OWN	.276**	.085	-.226**	-0.158*	1					
FEE	-.023	-.056	.096	.076	-.259**	1				
LASSET	-.360*	-.156	.197*	-.229*	-.221*	.424**	1			
ROA	.021	-.104	.205*	.012	-.009*	.280**	.198*	1		
LEV	.089	.105	-.230*	.254**	.102	-.157	-.074	-.172	1	
MGT _ CHANGE	.282**	-.076	.132	.066	.075	-.074	.030	.080	.064	1
Panel B: Year t_1										
BDE _ SCORE	1									
ACE _ SCORE	.016	1								
GOV _ OWN	.137	.163*	1							
FAMILY _ OWN	-.001	-.055	-.253**	1						
DOMESTIC _ OWN	.193*	.026	-.253**	-.196**	1					
FEE	-.057	-.107	-.006	-.072	-.213*	1				
LASSET	-.170	-.250**	.245*	-.215**	-.288**	.315**	1			
ROA	-.029	-.016	.195*	.028	-.050	.100	.105	1		
LEV	.127	.007	-.155*	.148	.162	-.174	.037	-.375**	1	
MGT _ CHANGE	-.067	-.016	.091	.157	-.056	.097	-.047	-.003	.003	1

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

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As shown by Table 4.5, the correlation matrixes verify that no multicollinearity exists among the variables in both models, pre-auditor selection ($t\text{-}_1$) and post-auditor selection (t_1), as none of the variables correlates above 0.90. All the variables have a correlation of equal to or less than .424 in *t*-1 and .375 in t_1. With respect to the VIF and tolerance, multicollinearity is not a problem in this study for both periods ($t\text{-}_1$ & t_1) since tolerance values are higher than .10 and VIF values are lesser than 10 (Hair *et al.*, 2010) as shown in Table 4.6.

Table 4.6. Multicollinearity Statistics of Assessing VIF and Tolerance Values

Independent Variables	VIF		Tolerance (1/VIF)	
	$t\text{-}_1$	t_1	$t\text{-}_1$	t_1
FEE	1.46	1.22	.686	.821
Control Variables				
BDE _ SCORE	1.61	1.17	.622	.856
ACE _ SCORE	1.10	1.17	.906	.853
GOV _ OWN	1.43	1.54	.699	.649
FAMILY _ OWN	1.31	1.37	.764	.728
DOMESTIC _ OWN	1.38	1.42	.723	.704
LASSET	1.70	1.52	.587	.660
ROA	1.19	1.23	.837	.812
LEV	1.20	1.34	.831	.749
MGT _ CHANGE	1.16	1.00	.859	.928

Multivariate Results

Ordinary-Least Square (OLS) was used to evaluate the level of effect of the hypothesized variables on the decision of hiring a differentiated-audit quality using STATA.

Table 4.7. OLS Analysis Results–Auditor Selection (Model 2)

Variables	Expected Sign	Pre-Auditor-Selection Model 2_a (t-$_1$)			Post-Auditor-Selection Model 2_b(t_1)		
		Coef.	t	$P>\|t\|$	Coef.	t	$P>\|t\|$
Test variable							
FEE	+	0.41	3.70	**0.000**	0.36	3.65	**0.000**
Control variables							
BDE _ SCORE	+	-0.31	-0.43	0.666	0.73	1.16	0.247
ACE _ SCORE	+	0.13	0.25	0.803	-0.04	-0.07	0.945
GOV _ OWN	-	0.07	0.50	0.621	0.11	0.77	0.444
FAMILY _ OWN	+	1.07	1.83	**0.070**	1.46	2.40	**0.018**
DOMESTIC _ OWN	+	0.99	2.44	**0.017**	0.73	2.02	**0.046**
LASSET	+	0.03	0.20	0.843	0.12	0.12	0.320
ROA	+	-0.03	-3.03	**0.003**	-0.02	-2.65	**0.009**
LEV	+	-0.002	-0.44	0.664	-0.01	-1.22	0.225
MGT _ CHANGE	+	0.43	2.02	**0.046**	-0.02	-0.11	0.910
Adjusted R^2			14.38			14.04	
Model F-stat.			2.73			2.75	
P-value			0.006			0.005	
No. of Observations			104			108	

Bold = significance at 1%, 5% and 10%

Table 4.7 indicates the estimated model coefficients, the associated significant test results, the adjusted R^2 and the F-values for the both models; before (t-$_1$) and after (t_1) the auditor selection. In particular, Table 7.8 portrays the comparative results of the OLS regressions for each of the two-time periods examined (t-$_1$ & t_1) using the principal components combined dependent variable and that of audit quality. These two periods encompass both sides of the year of the auditor selection. The F-value for each year (t-$_1$&t_1) surrounding the auditor selection is statistically significant at the 1% level, indicating that the overall model can be interpreted. The adjusted R^2 for the two-year periods; the year of the predecessor auditor (t-$_1$) and the subsequent year

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to the auditor selection (t_1) are 14.38% and 14.04%, respectively. The statistics show that the pre-auditor selection model $t\text{-}_1$ has explained 14.38% of the total variance in the audit quality and the post-auditor selection model t_1 has explained 14.04% of this variance. This indicates a moderately good fit and comparable to the R^2 in the study of DeFond (1992) and higher than the R^2 in the other studies used indicating an individual audit quality surrogate (Abbott & Parker, 2000; Chan *et al*., 2007). The adjusted R^2s indicate that the period of time surrounding the auditor selection ($t\text{-}_1$ & t_1) provides a good explanatory power for the auditor selection behavior, which suggests that managers may react and anticipate agency conflict changes when they choose new auditors.

Surrounding the two-year periods of the study; before ($t\text{-}_1$) and after the auditor selection (t_1), the largest *t*-statistics in the period prior to the auditor selection ($t\text{-}_1$) were 3.70 (*p*-value < 0.00), -3.03 (*p*-value < 0.01), 2.44 (*p*-value < 0.05), 2.02 (*p*-value < 0.05), and 1.83 (*p*-value < 0.10) which are for audit fees. This is consistent with the conjecture of the agency theory, and this study reports a significant positive association between *FEE* and *AQ_SCORE* in either period ($t\text{-}_1$: *p*-value = 0.000; t_1: *p*-value = 0.000). This significant association is comparable in the year prior ($t\text{-}_1$) and subsequent (t_1) to the auditor selection, indicating that GCC client firms select higher audit quality in reaction to and in anticipation of changes in the audit fees. Thus, this result gives support to hypothesis H_1. This result is consistent, empirically, with Che Ahmad *et al.* (2006), Francis (1984), Nazri *et al.* (2012b), and Pong and Wittengton (1994). One possible interpretation for this result is that, as shown by Table 7.1, 62% of the auditor changes have been taken place among Big 4 audit firms, indicating that this group of auditors dominates the audit market of GCC countries, and they charge fee premium.

CONCLUSIONS AND IMPLICATIONS

Conclusion

The objective of this study is to identify the association of audit fees with audit quality among listed companies in the GCC region. A total of 104 and 108 non-financial companies listed on the GCC stock markets for the periods preceding and subsequent to the event, respectively, over the period 2005–2010 were studied. A quantitative approach was applied to answer a specific hypothesis developed for the auditor selection model. The results show that the relationship between audit fees and audit quality is significant and positive. This association is consistent with the prediction of agency theory. This result is also consistent, empirically, with Che Ahmad et al. (2006). This study contributes to the corporate governance and auditing literature by providing an initial empirical link between audit fees and the control variables of corporate governance mechanisms (board of directors' effectiveness, audit committee effectiveness, and ownership structure), the audit-specific characteristic, and firm-specific characteristics with auditor selection decision in several ways: First, this study adds to the recent literature by researching and associating audit fees and audit

quality. To the best of the researcher's awareness, no empirical evidence is available that has linked audit fees and audit quality. Second, as a methodological contribution, the present study addresses audit fees, which have not been examined empirically with the framework of auditor selection based on DeFond's (1992) study. Based on the suggestions of agency theory, different levels of audit fees may lead to a variation in the demand for audit quality (Fama & Jensen, 1983; Jensen & Meckling, 1976; Wallace, 1980, 1987). Woo and Koh (2001) document that audit fee has been suggested as a relevant determinant in explaining variation in the demand for audit quality.

Limitations of the study lie, first, on the auditor choice model where the model is developed focusing on establishing a relationship between the audit fees and audit quality. Although a statistically significant association is found, implication of this research design is that the auditor selection model is only able to demonstrate an association and not a causal relationship. Second, the audit fees and audit quality data in this study covers only three years—the period spanning 2005–2010—which may not be generalized for other before-and-after periods. Generalizing the results of this study to other years should be seen with some attentiveness. Third, the quality of the results can be judged based on the quality of the sample data. Our sample is designed based on certain criteria which indicates the possibility of excluding some major auditor-change companies from the sample. Therefore, the results are valid only to the extent that the sample is representative of the population. Finally, Kuwaiti firms have been excluded from the sample because of poor disclosure information.

Following the limitations highlighted above, there is a possibility of extending future examinations to other country settings that have comparable features and business environments to those of the present study, in order to determine its validity in different environments and time periods. Additionally, it is recommended that a longitudinal study be carried out, which examines the relationship of audit fees with audit quality. Furthermore, comparative studies among GCC countries may enrich the theory of audit demand. In addition, taking a sample from non-listed companies, family and non-family companies, small and medium-sized companies would offer new insights to the audit demand literature, theory, and the level of competition in the market.

Auditor independence in the GCC is deemed to be the most important implication that could be understood from of the results of this study. Significantly, the management of listed companies in the GCC would gain a deeper understanding of the issues related to audit fees that they will pay to their external auditors, and how this payment can determine the audit quality they demand. The management of the companies in the GCC should be aware that the audit quality has a direct relationship to the independence of the auditor, in that without independence the opinion of audit is meaningless.

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Implications for Management and Stakeholders

The findings of this study may serve to enhance the practices of corporate governance by management and shareholders, and may, as well, improve the demand for audit quality within the organization. The significance of having better practices of corporate governance ought to be recognized in making financial reporting to be more credible and quality oriented. It has not been considered a suitable practice for listed firms which have weak internal systems of corporate governance to appoint auditors with low-quality. In this environment, the shareholders who control the listed firms have the tendency of depriving the private benefits of exploiting small shareholders.

The results of this study would benefit banks in the way they assess the creditworthiness of incorporating companies in the GCC. The numbers appearing in audited financial statements mandate bond covenants. Moreover, credit decisions made by lenders are based on audited financial statements. Therefore, audit opinions are of the utmost importance for any lending institution. Investors and financial analysts depend on audited financial statements in making decisions related to bonds, bond rating, and all other decisions related to investments in GCC markets. Accordingly, increased understanding and prediction of companies' events are important to this user group.

All types of audit firms would benefit from an increased understanding of the audit environment within the GCC setting. This opportunity would help them assess the propriety of continuing their current strategies and policies to attract new clients and, therefore, enhance positive strategies and policies and correct negative ones. For instance, the audit firm may make decisions to adjust its audit proposal, change the audit team or staff, and/or make any other reasonable adjustment that would increase its chances of staying with the existing client, as well as attracting new ones.

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