Pan Africa Business Simulation Games: The ITIS Case Study

Gildo Cossa[1], Bráulio Alturas[1], Ana Calado Pinto[2] and Licínio Roque[3]

[1]Instituto Universitário de Lisboa (ISCTE-IUL), ISTAR-Iscte, Lisboa, Portugal,
[2]Lisbon University, the School of Social and Political Sciences (ISCSP), Lisboa, Portugal
[3]University of Coimbra, Dep of Informatics Engineering, Coimbra, Portugal

Abstract. Economists have demonstrated a positive correlation between management quality and the country's economic performance. In turn, business simulation games have shown their educational effectiveness in developing management skills crucial for African countries. However, its use is still nascent. Although they present different characteristics favorable to its implementation, for example, The African Continental Free Trade Area, the Digital Transformation Strategy Project for Africa (2020-2030), and The Pan-Africa Games Group, they also present singular characteristics such as the predominance of the informal sector, political instability, and high corruption rates. These factors influence the designing and adoption of the Pan-African Business Simulation Games Framework suitable for this specific context. This proposal aims to contribute a gaming framework to support collaborative development and appropriation by the end-users and Multi-User with content representative of their contextual diversity. The successful EVER project and Bootcamp created by the Mozambican firm ITIS, which adopted a lean startup methodology to add local content in Business Games, can inspire the Pan African Business Simulations Games - PABSG.

Keywords: Game-Based Learning, Business Simulation Game, Pan Africa, Game Design

1. Introduction

The use of Business Games or Business Simulation programmes is widely accepted in literature as having started 3,000 years before the Common Era, and became widespread around the 1950s with the development of computing. The process since that decade has been accompanied by the emergence of international associations such as ABSEL, ISAGA, and others dedicated to research publication and program proposals.

Despite the lack of companies and organisations in Africa providing internships and other practical activities for young people, who make up the majority of the population (Generation Z), [1]-[3] the use of business games, which have proven effectiveness at the didactic level, is not recorded on the continent. The specialised organisation Pan Africa Group Games was only formed in 2021. Projects based on simulations and virtual reality have been used not only because of their proven effectiveness, but also because they reduce risks, costs, and time if the activities had to be carried out in a real context [4]. It is from this perspective that the present article aims to propose the framework design of Pan-African business games. To do this, research was conducted based on literature review, qualitative and exploratory case study because the main question is "what can be learned from the study of startup businesses" [5]. This results from the experience of the author, who was the tutor/teacher/co-founder of the projects SPEE, EVER and Bootcamp promoted by the company ITIS in Mozambique. ITIS identified a problem that could be analysed on the basis of a lack of opportunities for Generation Z internships or a lack of organizations involved in practical learning based on management at international standards (see Fig 1).

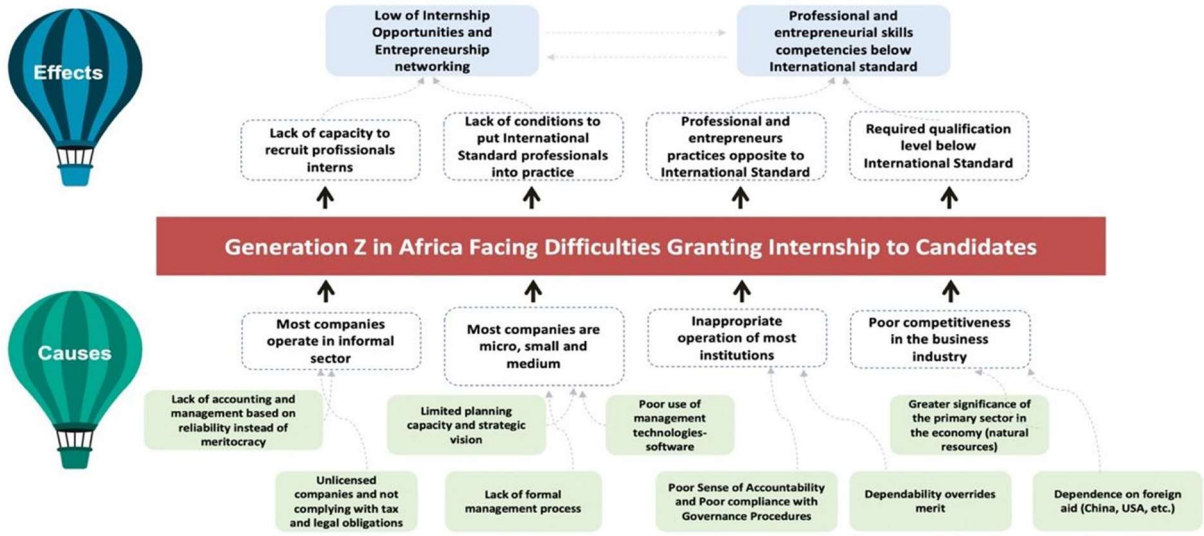

Fig. 1 - Tree Problem

This article is part of a vast research project to develop the "Framework of Pan Africa Business Simulation Games". This article discusses what can be learned from startups to develop the framework of Pan Africa Business Simulation.

2. Literature Review

Economists and social science researchers have demonstrated a positive correlation between management quality and the performance of people, companies, and the economy of a country [6], [7]. Business simulation games have also shown their effectiveness in developing management skills like communication, teamwork, and strategy definition since the 1950s [8]– [10]. These skills are crucial for developing countries [4]. Various approaches to the effectiveness of entrepreneur simulation games have been made in the context of game-based learning, serious games [11], gamification [12], [13], though the effectiveness of the latter is questionable [14], [15]. There are several empirical studies that support the effectiveness of business simulation games, in their different types (conceptual, top, functional) [16], and interventions at the publication level made by organisations specialised in learning games, most of which were created more than 60 years ago [17].

Despite the African continent having a higher prevalence of developing countries, the use of games is still nascent. However, awareness and opportunities for game adoption are increasing, with a majority of young people (15 years old) having access to technology [18], significant improvements in the business environment index [19], the African Continental Free Trade Area (AfCFTA) [20], and the Digital Transformation Strategy Project for Africa (2020-2030). The Pan-Africa Games Group (PAGG) is the first games organisation representing more than 10 African countries, with over 200 professionals and 8 different languages. PAGG aims to harness the power of gamification to create fun ways to solve some of Africa's challenges, including health, education, women's empowerment, and climate change. However, other characteristics common to most countries still persist, such as the predominance of the informal economy [3], [21], problems in statistics, such as overstated GDPs [1], corruption (Neo-Patrimonialism) [22]– [25], and political instability [22]– [24], [26], [27]. According to Lopes, the challenges in Africa include poor planning, design, and execution skills, macroeconomic volatility, weak institutional and human capabilities, limited investments in social and economic infrastructure, limited investments in technology and R&D, and political instability [1].

Business simulation games are defined as simulators that combine organizational context models with mathematical models to simulate administrative processes in an economic context that should be realistic [28]–[30]. With the increase in computing power and ease of use, students may be asked to create their own "better" versions of the business games, in addition to making decisions in the traditional ones [31]. It is possible to include functionalities that allow end users to appropriate and create content, for instance, wiki [32] or co-creation [33].

Business games may present some similarities; however, they can differ according to several elements such as purpose, target group, rules, among others (see Table 1).

Games Architecture			
Design Specifications	1. Client 2. Purpose 3. Subject 4. Target Group (Intended Audience) 5. Context of Use		
Social System	Syntactic (Form)	Semantics (Content)	Pragmatics (Use)
Players	Number of players. Number of positions of the participants in the game	Roles Composition of roles in the social organisation.	Context of learning: types of targeting; purpose of learning, Types of knowledge;
Rules	Rules of interaction with the game; Rules of preparation; Rules for starting and stopping; Rigid rules; Rules governed by the principles of the game; Free form; Starting positions; Permitted moves; End positions in the game;	Relationships between roles, communication, rules, procedures Evaluation of destinations/places for resource allocation and relative position between players	Teams of facilitators Format and instructions for strict rules versus free form. Evaluation functions
Resources	Space of the game; Set of positions in the game; Set of pieces;	Positioning of the pieces; significance of the cultural and socio-economic situation Set of occupied and available positions	Materials; Equipment; Accessory or paraphernalia Installations

Table 1 - Klabbers Simulation Game Analysis Framework [17]

The proposed design process should follow similar stages to scientific research, beginning with a clear definition of the objective intended to be achieved with the game, followed by researching existing solutions on the market, their characteristics, and surveying existing research on the topic (see Table 2). The game proposal's conception must undergo successive validation tests. After the validation tests, it will be possible to train the participants responsible for using the system to train others.

Step	Summary Description
Definition of specific objective	Define a set of specific objectives that must be achieved.
Review of previous work	Review previous research to detect and correct deficiencies
Elaboration	Develop the product that achieves the intended objectives
Tests and evaluations	Test on a group that can be used and eventually assess its suitability for the objectives.
Revision	Revise the product
Re-testing	Repeat the testing and review to optimise the product.
Training	Produce a teacher training programme.

Table 2- Steps to Produce Business Simulation Games [41]

2.1. Methodology

For the present article, research was developed based on a literature review, qualitative and exploratory case study, because the main question is "what can be learned from the study of startup businesses" [5]. The qualitative research does not present a diary or chronicle about the case study, but explains through existing concepts around startups and serious games [34]. The paper discusses how the startup achieved scalability during 11 years. Some authors, such as Yin and Creswell, recommend six types of information to collect or multiple sources of data: documents, archival records, interviews, direct observations, participant-observations, and physical artefacts [5], [34].

The group which was selected for research can be called theoretical sampling, the participants interviewed are theoretically chosen to support the best way to form the theory [34]. In this case study, the selection of the group was based on the participants of the bootcamp program who managed to establish a formal company (see Table 3). The information for the study was collected from a wide range of sources, namely: documents such as magazines, strategic plan; videos from YouTube of the EVER program and Bootcamp; physical artefacts such as tax files, accountability reports, and commercial law documents; interviews with the CEO of ITIS and also the 8 participants who successfully completed the EVER program; direct observations (participation in the programs as a trainer), participant-observations (interaction with the participants of the program).

Source	Link	Date
Bootcamp Newsletter 1st Edition	Newsletter - BSBC_PT 2.pdf	August 2022
Videos about EVER	https://www.youtube.com/@canalitis4096	August 2022
Video about Bootcamp	https://www.facebook.com/itis.ac.mz/videos/751386389403128	August 2022
Xonguile Magazine	https://xonguila.co.mz/rubrics/Oe3L__0B4iHZYOUZCa3gag%3D%3D%2BOutros/cBGjlUntB7rej3DUvxhn0Q%3D%3D%2BTechsolutions	January 2022
Blessking Photography Company	https://www.instagram.com/blessking_photography/	August 2022
Lionesses of Africa Magazine	https://www.lionessesofafrica.com/blog/2022/2/13/startup-story-of-sofia-maquile	February 2022
Softcode Company	https://www.softcode.co.mz/contact/	September 2022
MLDC Company	https://www.instagram.com/lamaisondechoix/?igshid=YmMyMTA2M2Y	September 2022
ITIS Company	https://itis.ac.mz/en/home/	September 2022
ITIS strategy Plan 2018-24	restricted access	September 2022
Accountability Reports	(hard coy)	December 2022

Table 3 - Source of Data

In Africa, although this is a new phenomenon, there are quite a significant number of countries that have already started using gamified solutions and are members of the Pan Africa Games Group[1] (PAGG), which represent 10 African Countries. These countries even have centres/studios for development of Business Simulations games, such as South Africa, Senegal, Cameroon, Ghana, Tunisia, Ethiopia, Kenya and Rwanda. Additionally, countries like Angola, Namibia, and Mozambique have conducted studies in the field of BGS.

1 https://pagg.group/

1. CASE STUDY

Instituto de Tecnologia, Inovação e Serviços (ITIS) was created in 2010 in Mozambique, with the slogan "*Innovation as Continuous Requirement*" initially having Business Simulation Games - SPEE *(Sistema de Práticas Empresariais e Empreendedorismo)* as their main product. The Business Simulation Games started in Mozambique in 2005 with the Instituto Superior de Ciências e Tecnologias de Mozambique (ISCTEM) with a platform acquired from the Expandindustria[2] company based in Portugal, followed by UEM being acquired by Aveiro University[3], Portugal in 2009. In 2010, ITIS launched the first Business Simulation Game called System of Business Practices and Entrepreneurship - SPEE, becoming the first and only startup in Mozambique in the serious games sector. "A startup is a temporary organization in search of a scalable, repeatable, profitable business model" [35]. The ITIS achieved scalability with a new business model. First of all, it is based on subscriptions that could be acquired semi-annually, annually, or by getting an unlimited license. Second, SPEE was designed based on local reality and feedback ("appropriate, guiding, and significant") [30] from potential customers (players), business stakeholder's environment such as the stock exchange, banks, revenue authorities, universities, business associations, etc. from an iteration perspective, i.e., a lean start-up approach [36] and "because great ideas come from networks, not individuals" [37]. According to [1], local realities:

> *"Any approach aimed at understanding Africa's development and related challenges that ignores the roles of local actors but privileges large actors such as the World Bank misses the reality of development as a homogeneous activity. To block out any sterile theoretical excess, we must take into consideration the roles of different actors in society and consider how each defines its own reality of development."*

The majority of business games in Africa (Mozambique Case) is similar to the World Bank and International Monetary Fund program in Africa (Structural Adjustment Programs - SAPs), i.e., policy prescriptions that are applied without proper context. *"Too often, these conventional policy recommendations focus on one-size-all and business-as-usual models that do not accommodate Africa's diverse and fast-changing realities nor do they allow for local agency"* [1]. Additionally, the player (student) will not be able to develop a mental model that is congruent with the real phenomenon if the game model does not accurately represent the genuine reality [30].

Third, SPEE adopted a model similar to the one developed by Henry Mintzberg (experiencing management by action) [38], in which students are not forced to simulate in one sector or company but to create a company according to their dreams, expectations, or previous professional experience.

The scalable recurring model can be noted by the growth (see Figure 2), where between 2010 and 2017, 10 higher education institutions started using SPEE. By 2019, bootcamp Business Simulation was tested for adolescents between 11 and 17 years of age, and in 2020, an internationalisation process began with the EVER project (virtual internships) involving Portuguese-speaking countries, namely Brazil, Angola, Mozambique, Cape Verde, São Tomé and Príncipe. Over the 12 years of SPEE, trainees have created successful companies, such as Edilson Alberto (18 years old), Prince Chone (17 years old), and others in table 3. It can be said that the product

[2] http://www.expandindustria.pt/

[3] https://www.ua.pt/pt/uc/10115

fits the concept "Job To be Done - (JTBD)" [39] by promoting the spirit of entrepreneurial attitude and good management practices for which it was designed.

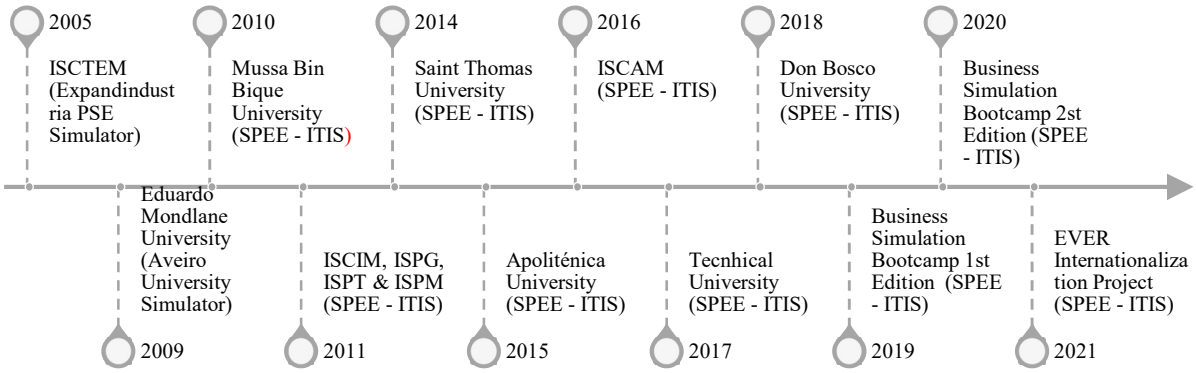

Fig. 2 - Chronology of the Implementation of Business Simulation Games in Mozambique

The EVER experience involved students from five Portuguese-speaking countries, where four virtual companies were created in Mozambique. The participants showed enthusiasm for the e-learning project, and despite not knowing Mozambican legislation and having their first contact with SPEE in EVER, it was possible to see that young Africans are "native speakers" in digital tools [11]. Participants noted that business games are key to developing skills such as professionalism, leadership, teamwork, critical thinking, assertiveness, time management, diversity, and responsibility [40]. In the experiment, it was possible to see that African countries with few resources to acquire laboratories can benefit from gaming technologies to simulate various scenarios [4]. The purpose of SPEE is to develop management and entrepreneurial skills, and currently, it is not known whether the participants of the EVER project created companies in their respective countries, as happened in the Bootcamp and in the Universities in Mozambique. Nevertheless, research has shown that business simulation players were successful in their professional careers [41].

2. Conclusion

The design of the Pan Africa Business Simulation Game Framework can be inspired by various theoretical approaches and the ITIS experience with EVER and Bootcamp. However, the success of EVER and Bootcamp was due to the target group being young, familiar with information technologies, and the design taking into consideration local content (Glocal) based on "the lean startup" development and "experiencing management by action" by Mintzberg.

However, ITIS Software's SPEE has several limitations that prevent it from becoming a PABSG. Firstly, it only caters to one business environment (Mozambique), and it does not allow to configure for simultaneous simulation of the several of context business (different countries). Secondly, it is only available in Portuguese. Lastly, end-users do not allow to contribute creating new content.

Given the predominant characteristics of the African context, including informality, corruption (neopatrimonialism/patronage), and political instability, it is possible to ensure inclusive (lean) development by including functionalities that allow end-users to appropriate and create content, and Multi-User functionalities that enable virtual interaction and collaboration without travel expenses. This is a global trend in participatory cultures that supports the design of interactive technologies for appropriation and reconfiguration by end-users and multi-users. Additionally, artificial intelligence can be used to capture the local experiences of diverse African contexts.

ACKNOWLEDGMENTS

This work was undertaken at ISTAR-Information Sciences and Technologies and Architecture Research Center from Iscte-Instituto Universitário de Lisboa (Univer-sity Institute of Lisbon), Portugal, and it was partially funded by the Portuguese Foundation for Science and Technology (Project "FCT UIDB/04466/2020").

REFERENCES

[1] C. Lopes and G. Kararach, *Structural change in Africa: misperceptions, new narratives and development in the 21st century*. in The international political economy of new regionalisms series. New York, NY: Routledge, 2020.

[2] W. K. Anim-Odame, 'Global trends and African real estate markets', in *Understanding African Real Estate Markets*, 1st ed.London: Routledge, 2022, pp. 4–17. doi: 10.1201/9780429279256-2.

[3] V. Mahajan, *O despertar da Africa: 900 milhões de consumidores africanos têm mais para dar do que se julga*. Coimbra: Almedina, 2013.

[4] E. P. dos S. Nunes, L. G. Roque, and F. de L. dos S. Nunes, 'Measuring Knowledge Acquisition in 3D Virtual Learning Environments', *IEEE Comput. Graph. Appl.*, vol. 36, no. 2, pp. 58–67, Mar. 2016, doi: 10.1109/MCG.2016.20.

[5] R. K. Yin, *Case study research and applications: design and methods*, Sixth edition. Los Angeles London New Dehli Singapore Washington DC Melbourne: SAGE, 2018.

[6] N. Bloom and J. Van Reenen, 'Why Do Management Practices Differ across Firms and Countries?', *J. Econ. Perspect.*, vol. 24, no. 1, pp. 203–224, Feb. 2010, doi: 10.1257/jep.24.1.203.

[7] N. Bloom, C. Genakos, R. Sadun, and J. Van Reenen, 'Management Practices Across Firms and Countries', *Acad. Manag. Perspect.*, vol. 26, no. 1, pp. 12–33, Feb. 2012, doi: 10.5465/amp.2011.0077.

[8] H. M. Cannon, A. Yaprak, and S. Sasser, 'Incorporating Cosmopolitan-Related Focus-Group Research into Global Advertising Simulations', *Dev. Bus. Simul. Exp. Learn. Proc. Annu. ABSEL Conf.*, vol. 29, 2002, Accessed: May 16, 2022. [Online]. Available: https://journals.tdl.org/absel/index.php/absel/article/view/742

[9] A. L. Halpin, 'A Review of the Simulation Research in the Academy of Management Journal: Suggestions for Strengthening the Research Conducted by ABSEL Members', *Dev. Bus. Simul. Exp. Learn. Proc. Annu. ABSEL Conf.*, vol. 40, 2013, Accessed: May 16, 2022. [Online]. Available: https://journals.tdl.org/absel/index.php/absel/article/view/34

[10] N. S. Shami, N. Box, T. Fort, and M. Gordon, 'Designing a Globalization Simulation to Teach Corporate Social Responsibility', *Dev. Bus. Simul. Exp. Learn. Proc. Annu. ABSEL Conf.*, vol. 31, 2004, Accessed: May 16, 2022. [Online]. Available: https://journals.tdl.org/absel/index.php/absel/article/view/634

[11] T. Susi, M. Johannesson, and P. Backlund, *Serious Games: An Overview*. Institutionen för kommunikation och information, 2007. Accessed: Jun. 06, 2022. [Online]. Available: http://urn.kb.se/resolve?urn=urn:nbn:se:his:diva-1279

[12] J. McGonigal, *Reality is broken: why games make us better and how they can change the world*. New York: Penguin Press, 2011.

[13] J. McGonigal, *A Realidade Em Jogo*. Rio de Janeiro: Best Seller, 2017. Accessed: May 20, 2022. [Online]. Available: http://public.eblib.com/choice/PublicFullRecord.aspx?p=6697494

[14] E. D. Mekler, F. Brühlmann, K. Opwis, and A. N. Tuch, 'Disassembling gamification: the effects of points and meaning on user motivation and performance', in *CHI '13 Extended Abstracts on Human Factors in Computing Systems*, in CHI EA '13. New York, NY, USA: Association for Computing Machinery, Apr. 2013, pp. 1137–1142. doi: 10.1145/2468356.2468559.

[15] E. D. Mekler, F. Brühlmann, A. N. Tuch, and K. Opwis, 'Towards understanding the effects of individual gamification elements on intrinsic motivation and performance', *Comput. Hum. Behav.*, vol. 71, pp. 525–534, Jun. 2017, doi: 10.1016/j.chb.2015.08.048.

[16] A. J. Faria, 'The Changing Nature of Business Simulation/ Gaming Research: A Brief History', *Simul. Gaming*, vol. 32, no. 1, pp. 97–110, Mar. 2001, doi: 10.1177/104687810103200108.

[17] J. H. G. Klabbers, *The magic circle: principles of gaming & simulation*. Rotterdam: Sense Publishers, 2006. Accessed: May 16, 2022. [Online]. Available: http://www.myilibrary.com?id=81228

[18] GSMA, 'The Mobile Economy Sub-Saharan Africa 2021', GSM Association, London EC4N 8AF, 2021. Accessed: May 25, 2022. [Online]. Available: https://www.gsma.com/mobileeconomy/sub-saharan-africa/

[19] World Bank, *Doing Business 2020: Comparing Business Regulation in 190 Economies*. Washington, DC: World Bank, 2020. doi: 10.1596/978-1-4648-1440-2.

[20] World Bank, *The African Continental Free Trade Area: Economic and Distributional Effects*. Washington, DC: World Bank, 2020. doi: 10.1596/978-1-4648-1559-1.

[21] O. L. da Silva, 'O impacto da economia informal no processo de desenvolvimento na África Subsariana', masterThesis, Instituto Superior de Economia e Gestão, 2010. Accessed: May 05, 2022. [Online]. Available: https://www.repository.utl.pt/handle/10400.5/2778

[22] D. Acemoglu and J. A. Robinson, *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*, 1. ed. New York: Crown Business, 2012.

[23] A. Dias, J. M. R. Lúcio, and T. Coelho, 'Corrupção e Pobreza em África: Os legados coloniais em perspectiva comparada', *Rev. Serviço Público*, vol. 66, no. 3, pp. 395–424, 2015.

[24] F. Fukuyama, *Political Order and Political Decay: From the Industrial Revolution to the Globalization of Democracy*, First paperback edition. in New York Times bestseller. New York: Farrar, Straus and Giroux, 2015.

[25] A. C. Gomes, *A lógica do Afecto: Cultura e Gestão em Africa*. Lisboa: Clássica Editora, 2012.

[26] M. Castells, *Fim do Milénio*. Lisboa: Fundação Calouste Gulbenkian, 2003.

[27] E. M. Gagas, *Impossible Practices for Possible Economic Development in Africa Development in Africa: Insights into Africa's Economic Development Problems And Prospects In The 21st Century*. Insight Into Africa's Economic, 2022.
[28] T. M. de Classe, R. M. De Araujo, G. B. Xexéo, and S. Siqueira, 'The Play Your Process Method for Business Process-Based Digital Game Design', *Int. J. Serious Games*, vol. 6, no. 1, pp. 27–48, Mar. 2019, doi: 10.17083/ijsg.v6i1.269.
[29] J. J. S. B. Hall, 'Existing and Emerging Business Simulation-Game Design Movements', *Dev. Bus. Simul. Exp. Learn. Proc. Annu. ABSEL Conf.*, vol. 36, 2009, Accessed: Jun. 15, 2022. [Online]. Available: https://journals.tdl.org/absel/index.php/absel/article/view/350
[30] L. L. Pereira and L. G. Roque, 'Design Guidelines for Learning Games: the Living Forest Game Design Case', 2009, [Online]. Available: http://www.digra.org/wp-content/uploads/digital-library/09287.16436.pdf
[31] A. J. Faria, D. Hutchinson, W. J. Wellington, and S. Gold, 'Developments in Business Gaming: A Review of the Past 40 Years', *Simul. Gaming*, vol. 40, no. 4, pp. 464–487, Aug. 2009, doi: 10.1177/1046878108327585.
[32] D. Tapscott and A. D. Williams, *Wikinomics: how mass collaboration changes everything*, Expanded ed. New York: Portfolio, 2008.
[33] C. K. Prahalad and M. S. Krishnan, *The new age of innovation: driving cocreated value through global networks*. New York: McGraw-Hill, 2008.
[34] J. W. Creswell and C. N. Poth, *Qualitative inquiry & research design: choosing among five approaches*, Fourth edition. Los Angeles: SAGE, 2018.
[35] S. Blank and B. Dorf, *The Startup Owner's Manual: the Step-By-Step Guide for Building a Great Company*. Hoboken, New Jersey: John Wiley & Sons, Incorporated, 2020.
[36] E. Ries, *The lean startup: how constant innovation creates radically successful businesses*. London: Penguin Business, 2019.
[37] R. Hoffman, J. Cohen, and D. Triff, *Masters of scale: surprising truths from the world's most successful entrepreneurs*, First edition. New York: Currency, an imprint of Random House, a division of Penguin Random House LLC, 2021.
[38] H. Mintzberg, *Bedtime stories for managers: farewell to lofty leadership... welcome engaging management*, First edition. Oakland, CA: Berrett-Koehler Publishers, Inc, 2019.
[39] C. M. Christensen, T. Hall, K. Dillon, and D. S. Duncan, *Competing against luck: the story of innovation and customer choice*, First edition. New York, NY: HarperBusiness, an imprint of HarperCollins Publishers, 2016.
[40] S. M. Iipinge, P. N. Batholmeus, and C. Pop, 'Using Simulations to Improve Skills Needed for Work-Integrated Learning before and during COVID-19 in Namibia', *Int. J. Work-Integr. Learn.*, vol. 21, no. 5, pp. 531–543, 2020.
[41] J. Wolfe and C. R. Roberts, 'A Further Study of the External Validity of Business Games: Five-Year Peer Group Indicators', *Simul. Gaming*, vol. 24, no. 1, pp. 21–33, Mar. 1993, doi: 10.1177/1046878193241004.