

Entrepreneurial Agility: A Key to Notch Sustainable Business Performance in IT-Enterprises of Pakistan

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ABSTRACT

Entrepreneurial agility is an emerging phenomenon that circumambient over the last two decades. It refers to an individual or organizational capability to anticipate, visualize, and exploit unforeseen entrepreneurial challenges and opportunities existed in market. The study is intended to determine the role of entrepreneurial agility in creating sustainable business performance among IT-enterprises through the mediation of business model innovation. Additionally, the study also tested the moderation of environmental dynamism between a) entrepreneurial agility and sustainable business performance and b) entrepreneurial agility and business model innovation. Overall, the study established moderated mediation framework about creating sustainable business performance in IT-enterprises via key of 'entrepreneurial agility'. In this study, quantitative research approach is adopted to gather data from 215 respondents of IT-enterprises across Pakistan by using self-administered close-ended questionnaire. For sample selection, convenience sampling is used. Moreover, SPSS-24 (PROCESS macro) is used to test the moderated mediation framework about role of entrepreneurial agility in creating sustainable business performance through mediation of business model innovation and moderation of environmental dynamism. The empirical findings demonstrated that entrepreneurial agility has statistically significant effect on business model innovation and sustainable business performance. Likewise, business model innovation is also evidenced as antecedent of sustainable business performance. Moreover, mediation of business model innovation and positive moderation of environmental dynamism is also proved. This study is purely unique as it presented the moderated mediation framework of entrepreneurial agility, business model innovation, and sustainable business performance under the umbrella of environmental dynamism that were never tested and presented by anyone in context of IT-enterprises of developing countries like Pakistan. The study is enriched with certain theoretical and practical implications for body of knowledge, researchers, policy makers and practitioners. Current study highlighted the need and significance of entrepreneurial agility for IT-enterprises to get sustainable business performance. Moreover, this study is limited with cross-sectional empirical research in context of IT industry of Pakistan that created opportunities for upcoming researchers.

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INTRODUCTION

The concept of ‘agility’ got emergence in early 1990s as a ‘key solution’ to manage dynamic and ever-turbulent business environment. Agility is referred as ‘organizational capabilities to sense and scan unpredictable business challenges/opportunities and come up with the more effective strategy to tackle with it (Fawzy & Saad, 2023). Every business or businessman doesn’t possess agility; it needs special efforts and visionary transformation from ‘traditional business approach’ to ‘contemporary be-agile approach’ (Grand & Bartl, 2019). The concept of ‘agility’ is well grounded in management theory for which different terms are used, such as organizational agility, business agility, entrepreneurial agility, firm agility, operational agility, and many more (Haider et al., 2021). These all-mentioned terms are interchangeably used by various researchers but give similar meanings. The concept of agility is not specified for any particular industry, it is a dire need of an hour for every business to survive in highly competitive and dynamic business era. Entrepreneurial agility is the overall organizational ability to respond changes efficiently and effectively (Zulganef et al., 2023). Whereas, agile is the methodology to get agility in entire organizational system.

Among all other industries, IT-industry is one of the most competitive and fast-pace economic sector that is reflected by its ranking (4th in freelancing world) and IT exports (surged by 70%) in last three years (Li et al., 2023; Ali et al., 2021). According to State Bank of Pakistan (2021), Pakistan software exports worth \$783million that are further expected to reach \$20billion in 2025 (Li et al., 2023). Besides its success and growth, it is also one of the most agitating and challenging industry that requires incessant up-gradation and innovation. To endure in this ever-dynamic and fragmented business era, IT-enterprises struggle to transform their traditional working setup to updated and advanced frameworks (Palazzo et al., 2023). Among contemporary frameworks, ‘entrepreneurial agility’ is one of best tool and framework that enables the IT-enterprises to consistently innovate their practices according to global need, such as shift their working model from waterfall approach to agile approach.

Waterfall is traditional approach of project management in IT-industry that involves linear work flow (Pfaff, 2023). While, on the other hand, agile is an iterative approach characterized by high flexibility and simultaneous work on multiple projects (Qalam et al., 2023). In IT-industry, agile methodology is specifically used for software development or project management, but it doesn’t restrict to it, it prevailed in overall organizational vision. When organization is envisioned to ‘be agile’, agility is practiced in every part, department, level, and scale of an organization (صفری & Bagheri, 2022). Every individual of an organization strives to scan unforeseen challenges (either internal or external), manages required resources, develop required capabilities, and performs immediate actions to tackle them (Bidhandi & Valmohammadi, 2017). According to Pan et al. (2023) and Zulganef et al. (2023), entrepreneurial agility is one of key driver of organizational success and growth. In current era, organizational success and growth is contingent to innovation in its business model that can ultimately lead to sustainable performance. Sustainable business performance is classified as organizational performance in terms of its economic output, social

equity, and environmental performance. Sole monetary return or economic output can't guarantee the organizational survival in highly competitive business era (Afum et al., 2023; Chatterjee et al., 2021; Ruiz, et al., 2023; Yadegaridehkordi et al., 2023). Therefore, organizations transformed their vision from economic output to collective output in the form of environmental protection and societal contributions.

Being a star industry, IT enterprises used 'entrepreneurial agility' as a tool to innovate their business and get sustainable performance (Karimi & Walter, 2021). Though, various researchers and scholars presented their research findings about significance and role of agility for business performance (Manurung & Kurniawan, 2022; Melián-Alzola et al., 2020; صفری & Bagheri, 2022; Qalam et al., 2023; Ruiz, et al., 2023), but no one specified 'entrepreneurial agility' as a driver to innovate business model of IT-enterprises and its influence for their sustainable performance. Moreover, the concept of entrepreneurial agility and its potential significance is slightly matured in developed countries (Chatterjee et al., 2021; Denning, 2020; Melián-Alzola et al., 2020). However, the condition of developing countries like Pakistan is miserable where IT industry is striving to achieve 'agility' but no evidence is available academically. Due to which, entire globe is unaware about the capability of Pakistani IT-enterprises to compete and thrive in global digital age.

In this regard, this study came up with the unique moderated mediation framework of entrepreneurial agility for sustainable business performance of IT-enterprises. For which, entrepreneurial agility is treated as antecedent, business model innovation as mediator, sustainable business performance as outcome, and environmental dynamism as moderator. More specifically, researcher is intended to determine;

The direct effect of entrepreneurial agility on business model innovation and sustainable business performance.

The direct effect of business model innovation on sustainable business performance.

The mediating role of business model innovation between entrepreneurial agility and sustainable business performance.

The moderating role of environmental dynamism between a) entrepreneurial agility, and sustainable business performance b) entrepreneurial agility and business model innovation.

This model is purely unique as it highlighted the significance of entrepreneurial agility of IT-enterprises in context of developing countries like Pakistan. Moreover, it presented business model innovation as mediator that interlinked the entrepreneurial agility and sustainable business performance. Likewise, environmental dynamism is highlighted as moderator that can also positively affect the association of entrepreneurial agility, business model innovation and sustainable business performance.

LITERATURE REVIEW

Theoretical Premise

To explain the phenomenon of ‘sustainable business performance’ in IT-enterprises, this study used the theoretical lens of i) theory of change, and ii) theory of sustainable development. Firstly, theory of change was presented by Weiss (1995) to explain the causal linkage of an initiative. It describes the entire mechanism and methodology of planning, coordinating, monitoring, and assessment of an initiative (Wufka & Ralph, 2015). In this study, linkage of entrepreneurial agility and business model innovation is explained by process theory of change, in which organization took initiative to transform the traditional work structure to more flexible and dynamic approach of organizational working. It reflects the change in management thought and practice to foresee unanticipated entrepreneurial approaches for innovating business model. Theory of change helps the researcher to adopt entrepreneurial agility as a ‘key’ to create innovation in business model that reflects change in existing business practices (either manufacturing or services) and create sustainability in business performance. As business model innovation connects business agility and sustainable performance. Thrives (2021) used theory of change to explain business model innovation as a driving tool to lead sustainable performance. Moreover, environmental dynamism characterized as variation in business environment that hinders the innovating the business model and getting sustainable performance (Saad et al., 2021). Therefore, researcher used environmental dynamism as a moderator to strength the association of entrepreneurial agility, business model innovation and sustainable business performance.

Secondly, theory of sustainable development (presented by Thorstein Veblen in 1917) explains the development of present (initiative, projects and business) without compromising the ability and output of future generations (Shi et al., 2019). Theory of sustainable development built on three main pillars; economic viability, social development and environmental protection. In current study, this theory is best fitted as it completely explains the need, process and output of sustainable development of a business organization. It refers to individual and organizational set of actions intended to secure and enlighten present without conceding dreams of upcoming nations. The researcher used lens of ‘theory of sustainable development’ to explain the connection of agility, innovation and sustainability in ever dynamic business environment of IT-enterprises as Xing et al. (2020) claimed that IT-industry is one of the most dynamic industries that can only get sustainability through agility and business model innovation. Therefore, based on his claim, author developed moderated mediation framework (comprised of specific constructs) to test in context of IT-enterprises of Pakistan.

Hypotheses Development

Entrepreneurial Agility (EA) and Sustainable Business Performance (SBP)

Agility is the process of continuous iteration and perpetual collaboration to anticipate unforeseen challenges existed in the market and devise immediate strategy to cope with it (صفری & Bagheri, 2022). Agility is the key characteristics of an entrepreneurial venture that makes them distinctive from traditional organizations (Xing et al., 2020). Agility is characterized as organizational trait or individual trait, but can't be sustained without the continuous collaboration of strategy and agile leadership. Entrepreneurial agility enables the organization to manage stakeholder's uncertain demands especially clients (Karimi & Walter, 2021).

In dynamic business environment, agility is the critical aspect of determining organizational prosperity and failure (Hindrawati et al., 2022; Kohtamäki et al., 2020). Enterprises which don't possess agility will be unable to accept changes, having lack of information about environmental variations, inept to meet client's' ever-changing demands and remain far behind from competitors (Wairimu et al., 2021). Entrepreneurial ventures that possessed agility is capable enough to antedate, envisage and encash entrepreneurial opportunities in highly uncertain and dynamic business era. Entrepreneurial agility helps the organization to achieve sustainable organizational performance (Chakravarty et al., 2013). Sustainable organizational performance is reflected in its economic, social and environmental performance. Various researchers and intellectuals tested and confirmed the direct association of entrepreneurial agility and sustainable business performance (Chakravarty et al., 2013; Hindrawati et al., 2022; Lee et al., 2008; Serda et al., 2013) . Therefore, we may propose that;

H1: Entrepreneurial agility (EA) has positive association with sustainable business performance (SBP).

Entrepreneurial Agility (EA) and Business Model Innovation (BMI)

Unpredicted threats and challenges faced by entrepreneurial ventures urge them to innovate their existing business model irrespective of nature of industry either manufacturing or service (Xing et al., 2020). Today's business situation specifically IT-sector is considered as most dynamic and vigorous in which client's requirements are continuously changing that requires business transformation from traditional business working to agile practices (Palazzo et al., 2023). Moreover, pandemic 2019 impules the need of 'being dynamic' due to the difficulty faced by traditional organizations. As per entrepreneurial perspective, business model is the flow of working structure to endorse commercial opportunities and enhance the profitability margin (Pfaff, 2023).

Business model can't be developed for entire business life; it changes over the period of time according to industry's need, client's desires, competitive requirements, and global business demands (Geissdoerfer et al., 2018). To innovate the business models, managers are required to design market-required models, tested them to check what works and what fails, institutionalize learning mechanism, fix the market needs and finalize the business models (Chesbrough, 2007).

Entrepreneurial agility can be cognitive ability of managers and strategic ability of an organization to anticipate the upcoming challenges/entrepreneurial opportunities and redesign the business model accordingly (Mancuso et al., 2023). In this essence, the direct connotation of entrepreneurial agility and business model innovation is evidenced by multiple researchers across the globe (Akhlagh et al., 2022; Saraswati et al., 2022; Troise et al., 2023; Waty et al., 2022). However, the following hypothesis is framed;

H2: Entrepreneurial agility (EA) has positive association with business model innovation (BMI).

Business Model Innovation (BMI) and Sustainable Business Performance (SBP)

To survive in dynamic and highly chaotic digital business environment, organizations need to innovate their business structure by rethinking and redesigning the manufacturing process, service structure and distribution mechanism (Geissdoerfer et al., 2018). Business model innovation is a continuous and iterative process that requires special business competence whether it's linked with slight incremental phases, disruptive or radical innovation (Chesbrough, 2007; Mancuso et al., 2023). It is an essential factor for every business but its antecedents and processes can vary according to organizational context, resources, capabilities, and structure. It's a potential mechanism targeted to enhance sustainable business performance (Evans et al., 2017; Ahmad & Salman, 2020).

Sustainable business performance can be attained by innovating the technology, product, service, working strategy, organizational structure, governance mechanism, and most imperative relationship structure with stakeholders (Shakeel et al., 2020). In this essence, leading organizations specifically IT-enterprises transformed the transaction mindset to the most interactive, trust-based, and mutually beneficial relationship to achieve sustainable business performance (Bashir et al., 2022). Numerous researchers already proved the positive direct association of business model innovation (BMI) and sustainable business performance (SBP) (Cheah et al., 2018; Franceschelli et al., 2018; Morioka et al., 2016; Pedersen et al., 2018; Stubbs, 2019). Based on the aforementioned arguments, the following hypothesis may be proposed;

H3: Business model innovation (BMI) has positive association with sustainable business performance (SBP).

Mediation of Business Model Innovation (BMI)

The literature of business model innovation (BMI) highlighted that innovation requires organizational capability to sense the environmental upcoming challenges and potential entrepreneurial opportunities (Geissdoerfer et al., 2018; Ul Rehman et al., 2021). Chesbrough (2022) explained that entrepreneurial agility is the most essential capability for innovation-seeking organizations to get sustainable business performance (Mancuso et al., 2023). Entrepreneurial agility doesn't restrict to giant or leading business organizations, it is need of every organization to survive in highly competitive technological era. However, entrepreneurial agility is not inherited trait of managing business efficiently; it can be created, developed and sustained to survive in vibrant and chaotic business environment (Saraswati et al., 2022) . However, multiple researchers claimed that entrepreneurial agility is the key to bring business model innovation (Akhlagh et al., 2022; Troise et al., 2023).

Business model innovation is forecasting and scheming new strategies of undertaking business to create value for its stakeholders (Evans et al., 2017). Innovation can be technological or non-technological; likewise, it can be altogether creating a new business model, or modification/improvement into existing business model, acquirement of new business model or conversion from old to new business models (Bashir et al., 2022). As compared to traditional organizations, entrepreneurially agile ventures are capable enough to scan environmental factors (either internal or external), innovate the business model (either technological, non-technological), and get sustainable business performance (Cheah et al., 2018; Franceschelli et al., 2018; Morioka et al., 2016; Pedersen et al., 2018; Stubbs, 2019). Based on aforementioned argumentation, following hypothesis can be postulated;

H4: Business model innovation (BMI) mediates the association between entrepreneurial agility (EA) and sustainable business performance (SBP).

Moderation of Environmental Dynamism (ED)

Ahmed et al. (2022) claimed that environmental dynamism refers to vibrant technology, changes in market dynamics, and uncertain business environment. Environmental dynamism can be created by continuous technology advancement, incessant variation in client's demands, perilous competitive pressure, persistent stakeholder's expectations, and many more (Zulganef et al., 2023b). However, dynamic environment can simultaneously create positive and negative effects on business. On positive side, it broadens the organizational vision and arouse novel ideas to survive in technological competitive era (Akter et al., 2016). It opens a window of opportunity for entrepreneurial ventures in the form of innovative technologies, new markets, new learning opportunities, and adjustment to dynamic business environment (Sharma et al., 2022).

Environmental dynamism helps the business to increase organizational flexibility or agility to strength the organizational networking for innovating business model and get sustainable business competitiveness (Seo et al., 2020). While operating in vigorous business setting, the capability of managers can be enlightenment to formulate strategies accordingly and ultimate improvement in business performance (Sun et al., 2022). The strategic capability of an organization (named agility) and cognitive capability of managers are an essential factor to observe environment (either internal and external) and 'be flexible' to change existing working models, and come up with more novel/innovative business model (Kafetzopoulos, 2023).

Here, we discussed positive impacts of environmental dynamism as it eradicates the saturation of business model, stimulate the novel ideas, broaden organizational vision, improve networking, expand relationships with stakeholders, innovate the business models, enhance client's satisfaction, and ultimate sustain the business performance (Kafetzopoulos, 2023; Ogaga et al., 2023; Seo et al., 2020; Sun et al., 2022). The aforementioned discussion drives us to formulate the following hypotheses;

H5: Environmental dynamism (ED) moderates the relationship between entrepreneurial agility (EA) and sustainable business performance (SBP), such that the relationship is stronger at high rather than low level of environmental dynamism.

H6: Environmental dynamism (ED) moderates the association between entrepreneurial agility (EA) and business model innovation (BMI), such that the relationship is stronger at high rather than low level of environmental dynamism.

Conceptual Framework

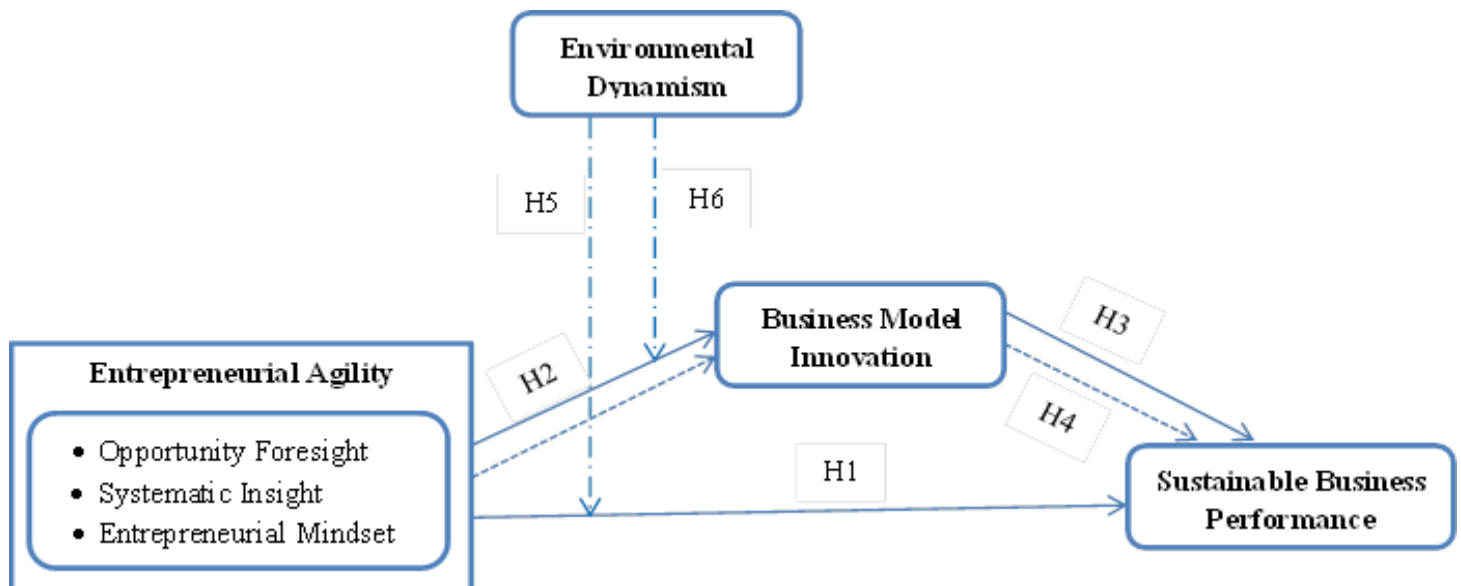


Figure 1: Conceptual Framework

Note: Description of relationships

- —————> For direct relationships
- - - - - -> For Mediation
- ·······> For Moderation

RESEARCH METHODOLOGY

Research Design

To explore the phenomenon of sustainability in IT-enterprises, the author used quantitative research approach under the umbrella of pragmatism paradigm. Quantitative research approach is the utmost suitable and pertinent method to examine the causal mechanism between certain variables specified for current study (Watson, 2015). In current study, the author is intended to reconnoiter the mechanism of sustainable business performance (SBP) via entrepreneurial agility (EA) in IT-enterprises. However, author specified business model innovation (BMI) as mediator and environmental dynamism (ED) as moderator to boost up the SBP via EA.

Unit of Analysis and Target Population

In current study, the author targeted top management and executive level employees of IT-enterprises across Pakistan to explore their response about adoption of entrepreneurial agility targeted to achieve sustainable business performance. Here, top tier management is targeted because they are better known about every action and reaction of organization in terms of change

in management thoughts, behavior, practices, targets, and achievements. So, top managers and executive level employees are taken as unit of analysis to identify the empirical associations of specific constructs used in the study.

Sampling Technique and Sample Size Calculation

In order to fulfill the research goals, author used convenience sampling technique to select the sample from targeted population. Convenience sampling technique is basically a qualitative research sampling technique but it can be used in quantitative research where author is unaware about total population of the study (Louangrath & Louanglath, 2014; Stratton, 2021). In the context of current study, author is unable to find out the total population due to unavailability of statistics about number of employees designated on top level and executive level of IT-enterprises. Besides, numbers of registered IT firms are available on official websites of SECP (Securities and Exchange Commission of Pakistan), StartupDotPK, and Board of Investment but list of employees (designation-wise) is not given. By using the aforementioned sampling technique, the author approached and requested 320 participants to provide the response against specific constructs of study. After multiple reminders via email and personal visits, 253 respondents were provided data out of 320. After initial screening and scrutiny, 38 survey forms consisted of missing values (that are discarded) and only 215 forms are used for analysis purpose (reflects 67.18% response rate). In current study, 215 duly filled responses are considered as sufficient based on evidence of Louangrath & Louanglath (2014). According to Louangrath & Louanglath (2014), sample size must be 10 times larger than the number of variables (adopted in theoretical framework) for unidentified population. Moreover, adequacy of sample size was also ensured through G*Power (3.1.9.2) software, which showed 173 sufficient sample size with 99% power at 5% significance level.

Data Collection

For data collection purpose, author used close ended questionnaire (self-administered and online survey both) comprised of two segments: demographic information of respondents (part-I) and statements (Part-II) against each variable specified for current study. Close ended questionnaire is used as it helps to collect data from large sample size in short span of time against verified measures available in literature (Krosnick, 2017). From duly filled responses, it is found that 152 (70.69%) males respondents provided data and only 63 (29.3%) are female respondents. According to working experience, 102 (47.44%) respondents have 5-10 years' experience, 75 (33.48%) held 11-15 years' experience and only 38 (17.67%) respondents are above 15 years' experienced. Likewise, 172 (80.46%) respondents are belonged to software and services companies and only 42(19.53) respondents are from companies related to technology hardware and equipment. As per age and size of firm, all respondents belonged to IT-enterprises which have more than 4 years age and having more than 10 employees.

Measures

As current study is intended to test the moderated mediation framework comprised of entrepreneurial agility (IV), business model innovation (mediator), sustainable business performance (DV), and environmental dynamism (moderator). To collect data against aforementioned variables, items are extracted from previous studies that tested and confirmed in different context and countries. In current study, those specific measures are used to retest in context of Pakistani IT-enterprises. The scale is developed on 5-points Likert Scale that varies from 1-5: 1 is specified for strongly disagree (SD) and 5 for strongly agree (SA). The detail of measures and its source includes;

- 13-items measure of Chakravarty et al. (2013) is used for entrepreneurial agility (EA).
- 8-items measure of Bhatti et al. (2021) is castoff for business model innovation (BMI).
- 12-items measure of Kordab et al. (2020) is opted for sustainable business performance (SBP).
- 6-items measure of Azadegan et al. (2013) is used for environmental dynamism (ED).

Furthermore, subject's experts (2 field experts from IT-enterprises and 2 academicians specialized in entrepreneurship and sustainability) are inducted to confirm the face and content validity of items against specific constructs. Likewise, Cronbach's Alpha is also adopted to check the reliability/inner consistency of items as it is the most commonly used technique especially in social sciences research when you have Likert scale questions (Hayes & Coutts, 2020).

Data Analysis

For analysis purpose, author used SPSS-24 version to analyze the quantitative data of 215 duly filled responses of respondents from IT-enterprises. SPSS-24 enabled the researcher to check reliability concerns of the scale and data collected against specific constructs. Moreover, factor analysis is used to confirm the factors and correlation pattern among observed variables. For model assessment, PROCESS macro (presented by preacher Hayes) based on bootstrapping sampling (recommended by Hayes et al. (2017a) aided the researchers to examine the moderated mediation framework of certain constructs specified in current study. Hayes et al. (2017) stated that PROCESS Macro Hayes is the utmost reliable and appropriate analysis technique of examining the mediation and moderation among multiple constructs simultaneously.

RESULT AND DISCUSSION

Descriptive Statistics

The output of descriptive statistics is portrayed in Table I, such as minimum (Min.), maximum (Max.), mean, and standard deviation (Std.D.). From the output, we can see that total 215 respondents provided duly filled response (reflected 67.18% response rate) against four constructs of the study (EA, BMI, SBP, & ED). In current study, respondent's feedback fluctuated between 1-5 for all variables. Moreover, the mean values and standard deviation ranged between 3.112 -3.453 & 0.532-0.681.

Table I: Descriptive Statistics Output

Variable's Name	N	Min.	Max.	Mean	Std. D.
Entrepreneurial Agility (EA)	215	1	5	3.112	.532
Business Model Innovation (BMI)	215	1	5	3.204	.681
Sustainable Business Performance (SBP)	215	1	5	3.264	.575
Environmental Dynamism (ED)	215	1	5	3.453	.643

Reliability of Measurement

The below-mentioned Table II depicts the output of reliability analysis (in the form of Cronbach's Alpha) to ensure the inner consistency of the specific measures. From the output, we can see that all Cronbach's alpha values varied between 0.735-0.810 (greater than threshold level: 0.7) that shows high reliability of data against all measures of four variable (EA, BMI, SBP, & ED).

Table II: Reliability Analysis Output

Constructs	N (Valid)	No. of Items	Cronbach's Alpha
Entrepreneurial Agility (EA)	215	13	0.735
Business Model Innovation (BMI)	215	8	0.782
Sustainable Business Performance (SBP)	215	12	0.810
Environmental Dynamism (ED)	215	6	0.769

Principal Component Analysis (PCA)

Being a multivariate technique, Principal Component Analysis (PCA) is commonly used to reduce the complexity of data and ensure construct validity of specific model of the study. It is dimension reduction approach that helps the researchers to reduce the uncorrelated items against specific measures of study. PCA assumes that total variance existed in the data is equal to the common variances of the items against specific variable. In current study, PCA is applied instead of total variance explained analysis as it's based on the assumption that total variance counted up all common variances of items that doesn't requires to be segregated into communal and unique variance (Schreiber, 2021). Here, PCA is applied on 13-items of entrepreneurial agility, 8-items of business model innovation, 12-items of sustainable business performance, and 6-items of environmental dynamism. Table III depicts that few uncorrelated items are removed and

remaining items are loaded because loaded items meet the threshold level (0.4). The detail of loaded items includes; 11-items in EA (loading range is .621-.824), 7-items in BMI (loading range is .538-.721), 8-items in SBP (loading range is .832-.936), and all 6-items in ED (loading range is .499-.675). Moreover, the output of KMO measure of sample adequacy (0.723 against EA, 0.694 against BMI, 0.827 against SBP, and 0.623 against ED) and Bartlett's test of Sphericity (all four constructs having 0.000) which fulfilled the standard requirements (KMO= \uparrow 0.6 and Bartlett's test of Sphericity= \downarrow 0.05).

Table III: Output of Principal Component Analysis (PCA)

Variable's Name	Items (removed)	Loading (range)	KMO measure of sample adequacy	Bartlett's Test of Sphericity
Entrepreneurial Agility (EA)	EA7 & EA11	0.621-0.824	0.723	0.000
Business Model Innovation (BMI)	BMI6	0.538-0.721	0.694	0.000
Sustainable Business Performance (SBP)	SBP5, SBP9 & SBP11	0.832-0.936	0.827	0.000
Environmental Dynamism (ED)	—	0.499-0.675	0.623	0.000

Correlation Analysis

Correlation analysis is opted to identify the communal relationship between multiple variables (EA, BMI, SBP, & ED). Correlation is a statistical technique that helps the researcher to make predictions and quantifies the strength of linear relationships between specific variables instead of only cause and effect relationships in the form of equations (Pandey, 2020). The output shown that all four variables have significant positive associations with each other at 0.05 (significance level). Moreover, the results depicted that environmental dynamism has strong association/correlation with sustainable business performance (0.694), while other all variables show moderate correlation (see table IV).

Table IV: Correlation Analysis Output

Variables	EA	BMI	SBP	ED
EA	----			
BMI	0.349*	----		
SBP	0.521**	0.438**	----	
ED	0.497**	0.537***	0.694***	----

Regression Analysis

Regression analysis enabled the researcher to examine the direct and indirect relationships between specific constructs; EA, BMI, SBP, & ED. The output of regression analysis is given in Tables V (for direct effects), VI (for mediation), & VII (for moderated mediation) in the form of significance values, β coefficients, upper and lower limits of confidence intervals. Simple regression was opted to test the direct hypotheses about specific constructs (EA, BMI & SBP) as it helps the researcher to test the cause-and-effect relationships between specific constructs used in the study. Furthermore, PROCESS Macro Hayes (2013) used to test the mediation and

moderation hypotheses (H4- H6) between specific variables used in the framework. In which, model 8 of Hayes (2013) helped the researcher to check mediation and moderation simultaneously of business model innovation and environmental dynamism based on bootstrapping technique of data.

Firstly, Table V presented the output of regression tables for direct effects (H1- H3), in which the regression coefficient values, t-values and R² values are given as follows; 0.626, 19.71 & .451 for EA & SBP (H1), 0.593, 17.56 & .325 for EA & BMI (H2), and 0.721, 22.73 & .476 for BMI & SBP (H3). All regression coefficient values are based on statistically significance at 0.05 levels (5% confidence interval). Overall, the statistical output for first three hypotheses (H1-H3) are supported and confirmed.

Table V: Output of Direct Effects

Hypotheses (tested)	Path	β coefficients	P-value	T-value	R ²	Remarks
H1	EA → SBP	0.626	0.010	19.71	.451	Confirmed
H2	EA → BMI	0.593	0.002	17.56	.325	Confirmed
H3	BMI → SBP	0.721	0.032	22.73	.476	Confirmed

Note: Significance at 0.05 levels (two-tailed)

Table VI presented the output of indirect relationships between EA, BMI & SBP (BMI is treated as mediator to establish the relationship between EA & SBP). For indirect relationships, bootstrapping technique is opted as the utmost appropriate and pertinent technique for boosting the data set for the indirect effect of certain variables. The indirect effects are given in the form of p-values, β coefficients, Boot LLCI, & ULCI. From the output of Table VI, it can be observed that business model innovation (BMI) partially mediated the association between entrepreneurial agility (EA) & sustainable business performance (SBP) with 0.431 (β coefficients), 0.000 (P-value), & 0.1721-0.3251 (Boot LLCI & ULCI: no zero existed between these values). Here, mediation is claimed as partial mediation because significant direct relationship is also existed between EA & SBP. Therefore, our fourth hypothesis (H4) for mediation is also confirmed and accepted.

Table VI: Output of Mediation Analysis

Hypothesis (tested)	Path	β -coefficients	Sig.-value	Boot LLCI	Boot ULCI	Remarks
H4	EA → BMI → SBP	0.431	0.000	0.1721	0.3251	Confirmed

Note: Significance at 0.05 levels (two-tailed)

Moreover, Table VII depicted the output for moderation of environmental dynamism (ED) between; a) EA & SBP (H5) and b) EA & BMI (H6). From the results, it can be viewed that ED is statistically significant positive moderator for both hypotheses (H5 & H6) with 0.326 (effect size for H5) & 0.483 (effect size for H6). Both hypotheses are statistically significant at 0.05 levels. Moreover, the under-mentioned table showed the Boot LLCI & ULCI values to further endorse the moderation of specific variables (aforementioned). For H5 (LLCI=1.0625 & ULCI=2.1648) and for H6 (LLCI=1.1742 & ULCI=1.2531). It means that both LLCI and ULCI values of H5 & H6 have similar signs (no zero existed between them) that proved statistically significant positive moderation of environmental dynamism between specific variables (mentioned as below). Likewise, the output of conditional indirect effect of environmental dynamism is given at three different levels -1 SD, M & $+1$ SD. The output highlighted the following values; a) indirect effect size=.321, Boot SE=.03, Boot LLCI=0.0325, Boot ULCI=1.2248 for -1 SD level of ED, B) indirect effect size=.431, Boot SE=.04, Boot LLCI=0.0437, Boot ULCI=1.2631 for M level of E & c) indirect effect size=.611, Boot SE=.07, Boot LLCI=0.0693, Boot ULCI=1.3248 for $+1$ SD level of ED, Moreover, Figure 2 (below-mentioned) is the output of simple slope analysis to confirm the moderation of environmental dynamism between a) EA & SBP and b) EA & BMI. The output of Figure 2 reflected the moderation of ED in both cases that strengthened the direct relationships proposed in H5 & H6. Therefore, the empirical results and pictorial output confirmed our H5 & H6 about the moderated mediation of ED.

Table VII: Output of Moderated Mediation Analysis

Hypotheses (tested)	Path	Effect	P-Value	Boot LLCI	Boot ULCI	Remarks
H5	EA $\xrightarrow{\text{ED}}$ SBP	0.326	0.000	1.0625	2.1648	Confirmed
H6	EA $\xrightarrow{\text{ED}}$ BMI	0.483	0.000	1.1742	1.2531	Confirmed
Conditional Indirect Effect at different levels of Environmental Dynamism (M \pm 1 SD)		Bootstrapped Indirect Effect	Boot SE	Boot LLCI	Boot ULCI	
	-1 SD	0.321	0.03	0.0325	1.2248	Confirmed
	M	0.431	0.04	0.0437	1.2631	
	$+1$ SD	0.611	0.07	0.0693	1.3248	

Note: Significance at 0.05 levels (two-tailed)

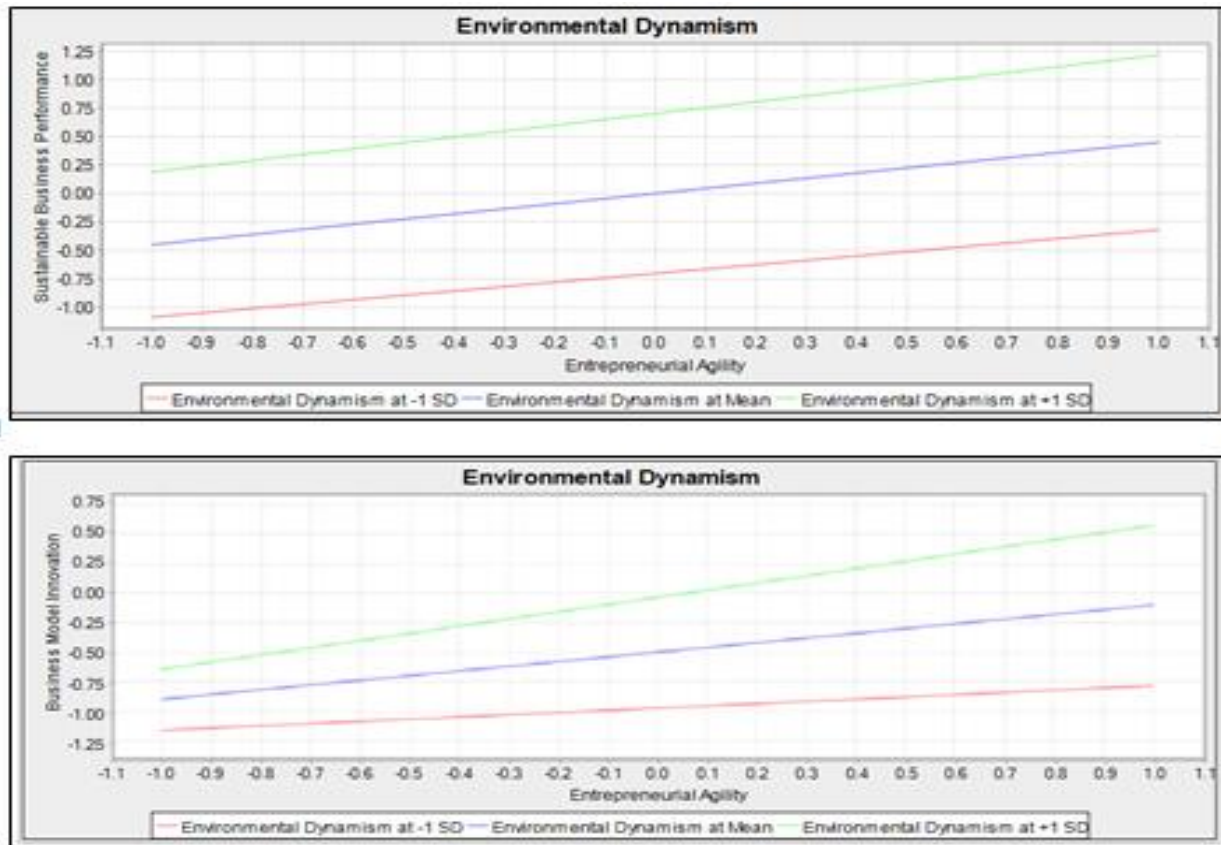


Figure 2: Moderating Evidence of Environmental Dynamism

Discussion

The survival in vibrant and highly competitive era, organizations requires continuous evaluation of its performance in terms of financial output, social contribution, and environmental protection (Fawzy & Saad, 2023). Instead of traditional performance structure, sustainable business performance is now extensively used as parameter of performance evaluation (Grand & Bartl, 2019). Among all other industries, IT-sector is one of the most competitive and fast pace economic sector that recognized Pakistan as 4th largest nation of freelancing in global IT market. The dynamics, environment, and market demands of IT-sector can never be saturated, it requires continuous up gradation and innovation (both technological and non-technological) (Li et al., 2023). The innovation is not characterized to only product or services innovation, it must be spread into organizational vision, working strategy, communication networks (for all stakeholders), team, practices, evaluation mechanism, and many more (Haider et al., 2021; Pan et al., 2023).

The above-mentioned requirements of innovations can be collectively entitled as business model innovation. The vigor and dynamism of environment don't always create problem, it can also generate opportunities for the business to broaden its vision, stimulate ideas to improve organizational philosophy, management, communication, output (product or service), and evaluation (Palazzo et al., 2023; Pfaff, 2023). Literature claimed that business model innovation

and sustainable business performance are conditional to managers' and organizational capability to scan environment, analyze market dynamics, identify emergent stakeholders' expectation and upgrade business model accordingly (Ancillai et al., 2023; Trischler & Li-Ying, 2022). The aforementioned required capabilities were discovered and entitled by John Varley and Peter Meanwell in 1991 as 'agility' that were later on named as organizational agility, firm agility, entrepreneurial agility, enterprise agility etc. (Haider et al., 2021).

In realization of need of sustainable business performance for IT-enterprises via agility, this study is anticipated to show the empirical evidence for moderated mediation framework of EA, BMI, SBP, & ED. To realize the said objectives, the researcher proposed six hypotheses; three for direct effects (H1-H3), one for mediation (H4), and two for moderation (H5-H6). The author adopted quantitative research approach and SPSS-24 to test the stated hypotheses. The regression analysis (simple regression and PROCESS macro-Hayes model) is used to estimate the proposed moderated mediation framework.

From the output, it has been found that entrepreneurial agility has significant (positive) relationships with sustainable business performance and business model innovation. The outcomes of current study are concurrent with the previous outcomes of various researchers in different contexts and settings (Akhlagh et al., 2022; Chakravarty et al., 2013; Hindrawati et al., 2022; Lee et al., 2008; Serda et al., 2013; Saraswati et al., 2022; Troise et al., 2023; Waty et al., 2022). Likewise, business model innovation has also significant (positive) association with sustainable business performance. Our finding about direct effect of BMI and SBP are parallel with the evidence of Cheah et al. (2018); Franceschelli et al. (2018); Pedersen et al. (2018); Stubbs (2019). Overall, our first three hypotheses (H1- H3) have confirmed at statistical significance level 0.05.

Moreover, our fourth hypothesis is about intervening (mediating) role of business model innovation between entrepreneurial agility and sustainable business performance. The output of PROCESS macro regression analysis confirmed that business model innovation is the significant mediator (at 0.05 significance level) between entrepreneurial agility and sustainable business performance. The P-value output has also reassured from the values of boot LLCI & ULICI (both values possessed positive signs and don't hold zero). The current study findings about mediation of BMI are analogous with the findings of following researchers: Cheah et al. (2018); Franceschelli et al. (2018); Morioka et al. (2016); Pedersen et al. (2018); Stubbs (2019). Overall, our hypothesis (H4) is also confirmed and supported.

Lastly, our H5 & H6 are postulated about the moderation of environmental dynamism between a) entrepreneurial agility & sustainable business performance, and b) entrepreneurial agility & business model innovation. The results of PROCESS macro regression analysis revealed that environmental dynamism is the statistically significant moderator (at 0.05 significance level) in both cases: a) EA & SBP, and b) EA & BMI. Furthermore, boot LLCI and ULICI values have also confirmed (having similar signs and no zero) the moderation of environmental dynamism. More specifically, the empirical output revealed that environmental dynamism created

moderation effect between entrepreneurial agility and sustainable business performance, such as high level of environmental dynamism enhances the strength of association between a) EA & SBP b) EA & BMI as compared to low level of environmental dynamism. Thus, out last two hypotheses (H5 & H6) are verified. Summing up the whole discussion, it can be stated that our moderated mediation framework is tested and confirmed that environmental dynamism is the positive factor that strengthen the relationships of entrepreneurial agility, business model innovation and sustainable business performance specifically in context of IT-enterprises.

CONCLUSION AND POLICY IMPLEMENTATION

Conclusion

This study in intended to present the moderated mediation framework about role of entrepreneurial agility in creating business model innovation and its lead towards sustainable business performance under the umbrella of environmental dynamism. In current study, the author used entrepreneurial agility as antecedent, business model innovation as mediating, sustainable business performance as outcome, and environmental dynamism as moderator. Based on empirical findings, it can be concluded that entrepreneurial agility is proved as the ‘key’ to notch sustainable business performance in context of IT-enterprises of Pakistan. Additionally, business model innovation is also evidenced as mediating variable between entrepreneurial agility and sustainable business performance. Moreover, environmental dynamism is also ascertained as significant moderator that positively boosted the direct association of a) entrepreneurial agility and sustainable business performance and b) entrepreneurial agility and business model innovation. Overall, our moderated mediation framework is tested and proved in context of IT-enterprises of Pakistan.

Implications of the Study

Likewise other studies, current study presented multiple theoretical (academic) and practical implications for the body of knowledge, policy makers, and practitioners. As per theoretical implications are concerned, this study used the theoretical lens of ‘theory of change’ (presented by Weiss, 1995) and ‘theory of sustainable development’ (presented by Thorstein Veblen in 1917) to explain the mechanism of sustainable business performance via entrepreneurial agility. The study enriched the body of knowledge with novel moderated mediation framework comprised of entrepreneurial agility as predictor, business model innovation as mediator, sustainable business performance as outcome, and environmental dynamism as moderator.

For practical implications, this study is equally beneficial as it guides the policy makers and practitioners to focus on entrepreneurial agility as a key to notch sustainable business performance specifically in context of IT-enterprises. Policy makers should take environmental dynamism as positive catalyst and make policies accordingly to foster innovation and ultimately improve sustainable business performance. Moreover, practitioners (specifically entrepreneurs and top management) should develop strategic agility, team agility, system agility and overall entrepreneurial agility to survive in highly competitive technological era.

Limitations & Future Research Agendas

This study has certain limitations that create opportunities for upcoming researchers to bring something innovative but impactful research ideas. In this study, the author used cross-sectional quantitative approach to present moderated mediation framework of achieving sustainable business performance via entrepreneurial agility. Future researchers can go for qualitative research to explore the antecedents of entrepreneurial agility, such as driving factors, required resources, setoff capabilities (individual and organizational), required culture, agility practices, and many more. Moreover, upcoming researchers can opt mixed method approach to explore the need, extent of existence, impact of entrepreneurial agility, and its potential benefits for managers and organizations. Moreover, author conducted this research in context of IT-industry but didn't compare findings from sub-categories exist in IT-industry. Future researchers can extend the model to other industries and compare its findings based on further clustering of industries (based on strata existed within industry).

REFERENCES

- Abdoli Bidhandi, R., & Valmohammadi, C. (2017). Effects of supply chain agility on profitability. *Business Process Management Journal*, 23(5), 1064–1082.
- Afum, E., Issau, K., Agyabeng-Mensah, Y., Baah, C., Dacosta, E., Essandoh, E., & Agyenim Boateng, E. (2023). The missing links of sustainable supply chain management and green radical product innovation between sustainable entrepreneurship orientation and sustainability performance. *Journal of Engineering, Design and Technology*, 21(1), 167–187.
- Ahmed, A., Bhatti, S. H., Gölgeci, I., & Arslan, A. (2022). Digital platform capability and organizational agility of emerging market manufacturing SMEs: The mediating role of intellectual capital and the moderating role of environmental dynamism. *Technological Forecasting and Social Change*, 177, 121513.
- Ahmad, S., & Salman, A. (2020). CEO Machiavellianism and Startup Performance: Upper Echelons Theory's Perspective. *International Journal of Management Research and Emerging Science*, 10(4).
- Akter, S., Wamba, S. F., Gunasekaran, A., Dubey, R., & Childe, S. J. (2016). How to improve firm performance using big data analytics capability and business strategy alignment? *International Journal of Production Economics*, 182, 113–131.
- Ali, K., Malik, M. S., Kausar, N., Chaudhry, M. A., & Liaqat, H. (2021). Responsible leadership and knowledge sharing in high tech firms: assessing the role of helping initiative and leader's empathy on job performance. *International Journal of Management Research and Emerging Sciences*, 11(3).
- Ancillai, C., Sabatini, A., Gatti, M., & Perna, A. (2023). Digital technology and business model innovation: A systematic literature review and future research agenda. *Technological Forecasting and Social Change*, 188, 122307.
- Arslan Haider, S., Moleiro Martins, J., Khan, S., Mohammad, P., Nuno Mata, M., Tehseen, S., &

- Abreu, A. (2021). A LITERATURE REVIEW ON AGILITY-IS THERE A NEED TO DEVELOP A NEW INSTRUMENT? *International Journal of Entrepreneurship*, 25(4), 1939–4675. www.tandfonline.com/page/lookingfor-
- Azadegan, A., Patel, P. C., Zangouezhad, A., & Linderman, K. (2013). The effect of environmental complexity and environmental dynamism on lean practices. *Journal of Operations Management*, 31(4), 193–212. <https://doi.org/10.1016/J.JOM.2013.03.002>
- Bashir, M., Alfalih, A., & Pradhan, S. (2022). Sustainable business model innovation: Scale development, validation and proof of performance. *Journal of Innovation & Knowledge*, 7(4), 100243.
- Bhatti, S. H., Santoro, G., Khan, J., & Rizzato, F. (2021). Antecedents and consequences of business model innovation in the IT industry. *Journal of Business Research*, 123, 389–400.
- Chakravarty, A., Grewal, R., & Sambamurthy, V. (2013). Information Technology Competencies, Organizational Agility, and Firm Performance: Enabling and Facilitating Roles.
- Chatterjee, S., Chaudhuri, R., Vrontis, D., Thrassou, A., & Ghosh, S. K. (2021). Adoption of artificial intelligence-integrated CRM systems in agile organizations in India. *Technological Forecasting and Social Change*, 168, 120783.
- Cheah, S., Ho, Y. P., & Li, S. (2018). Business Model Innovation for Sustainable Performance in Retail and Hospitality Industries. *Sustainability 2018*, Vol. 10, Page 3952, 10(11), 3952.
- Chesbrough, H. (2007). Business model innovation: It's not just about technology anymore. *Strategy and Leadership*, 35(6), 12–17.
- de Diego Ruiz, E., Almodóvar, P., & del Valle, I. D. (2023). What drives strategic agility? Evidence from a fuzzy-set qualitative comparative analysis (FsQCA). *International Entrepreneurship and Management Journal*, 19(2), 599–627.
- Denning, S. (2020). The quest for genuine business agility. *Strategy and Leadership*, 48(1), 21–28.
- Ervina Waty, I. G. S. R. E. I. S. B. A. (2022). Networking Capabilities and Digital Adoption of Business Agility: The Mediating Role of Business Model Innovation. *International Journal of EBusiness and EGovernment Studies*, 14(2), 224–241. <https://sobiad.org/menuscript/index.php/ijebe/article/view/1177>
- Evans, S., Vladimirova, D., Holgado, M., Van Fossen, K., Yang, M., Silva, E. A., & Barlow, C. Y. (2017). Business Model Innovation for Sustainability: Towards a Unified Perspective for Creation of Sustainable Business Models. *Business Strategy and the Environment*, 26(5), 597–608.
- Fawzy, R., & Saad, D. M. (2023). The Relationship between Agility Drivers, Agility Capabilities and Organizational Sustainability. *Journal of Business and Management Sciences*, Vol. 11, 2023, Pages 101-114, 11(2), 101–114.
- Franceschelli, M. V., Santoro, G., & Candelo, E. (2018). Business model innovation for sustainability: a food start-up case study. *British Food Journal*, 120(10), 2483–2494.
- Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable business model innovation:

- A review. *Journal of Cleaner Production*, 198, 401–416.
- Grand, S., & Bartl, D. (2019). Making new strategic moves possible: How executive management enacts strategizing routines to strengthen entrepreneurial agility. *Research in the Sociology of Organizations*, 61, 123–151.
- Hayes, A. F., & Coutts, J. J. (2020). Use Omega Rather than Cronbach's Alpha for Estimating Reliability. But.... *Communication Methods and Measures*.
- Hayes, A. F., Montoya, A. K., & Rockwood, N. J. (2017a). The analysis of mechanisms and their contingencies: PROCESS versus structural equation modeling. *Australasian Marketing Journal (AMJ)*, 25(1), 76–81.
- Hayes, A. F., Montoya, A. K., & Rockwood, N. J. (2017b). The analysis of mechanisms and their contingencies: PROOCCESS versus structural equation modeling. In *Australasian Marketing Journal*, 25(1), 76–81. Elsevier Australia.
- Hindrawati, G., Dhewanto, W., & Dellyana, D. (2022). Does Innovative Millennial Entrepreneurship have a role in fostering cyber learning on business performance? A perspective of entrepreneurial agility.
- Kafetzopoulos, D. (2023). Environmental dynamism and sustainability: the mediating role of innovation, strategic flexibility and HR development. *Management Decision*, 61(6), 1697–1716.
- Karimi, J., & Walter, Z. (2021). The Role of Entrepreneurial Agility in Digital Entrepreneurship and Creating Value in Response to Digital Disruption in the Newspaper Industry. *Sustainability*, 13(5), 2741.
- Kohtamäki, M., Heimonen, J., Sjödin, D., & Heikkilä, V. (2020). Strategic agility in innovation: Unpacking the interaction between entrepreneurial orientation and absorptive capacity by using practice theory. *Journal of Business Research*, 118, 12–25.
- Kordab, M., Raudeliūnienė, J., & Meidutė-Kavaliauskienė, I. (2020). Mediating Role of Knowledge Management in the Relationship between Organizational Learning and Sustainable Organizational Performance. *Sustainability*, 12(23), 10061.
- Krosnick, J. A. (2017). Questionnaire design. *The Palgrave Handbook of Survey Research*, 439–455. https://doi.org/10.1007/978-3-319-54395-6_53/COVER
- Lee, O. K. D., Sambamurthy, V., Lim, K. H., & Wei, K. K. (2008). IT-Enabled Organizational Agility and Sustainable Competitive Advantage. *ICIS 2007 Proceedings - Twenty Eighth International Conference on Information Systems*.
- Li, M., Malik, M. S., Ijaz, M., & Irfan, M. (2023). Employer Responses to Poaching on Employee Productivity: The Mediating Role of Organizational Agility in Technology Companies. *Sustainability 2023, Vol. 15, Page 5369, 15(6)*, 5369.
- Louangrath, P., & Louanglath, P. I. □. (n.d.). Minimum Sample Size Method Based on Survey Scales. *International Journal of Research & Methodology in Social Science*, 3(3), 45.
- Maciej Serda, Becker, F. G., Cleary, M., Team, R. M., Holtermann, H., The, D., Agenda, N., Science, P., Sk, S. K., Hinnebusch, R., Hinnebusch A, R., Rabinovich, I., Olmert, Y., Uld, D. Q. G. L. Q., Ri, W. K. H. U., Lq, V., Frxqwu, W. K. H., Zklfk, E., Edvhg, L. V, ... , فاطمی

-)2013. (ح. Synteza i aktywność biologiczna nowych analogów tiosemikarbazonowych chelatorów żelaza. *Uniwersytet Śląski*, 7(1), 343–354.
- Malek Akhlagh, E., Veshkaei Nejad, S. S., & Hatamei Nejad, M. (2022). Investigating the Effects of Entrepreneurship Orientation and Strategic Agility on Firms' Performance by Considering the Mediating Roles of Business Model Innovation and Learning Capability. *Journal of Business Administration Researches*, 14(28), 31–74.
- Mancuso, I., Messeni Petruzzelli, A., & Panniello, U. (2023). Digital business model innovation in metaverse: How to approach virtual economy opportunities. *Information Processing & Management*, 60(5), 103457.
- Manurung, A. H., & Kurniawan, R. (2022). Organizational agility: do agile project management and networking capability require market orientation? *International Journal of Managing Projects in Business*, 15(1), 1–35.
- Melián-Alzola, L., Fernández-Monroy, M., & Hidalgo-Peñate, M. (2020). Information technology capability and organisational agility: A study in the Canary Islands hotel industry. *Tourism Management Perspectives*, 33, 100606.
- Morioka, S. N., Evans, S., & Carvalho, M. M. De. (2016). Sustainable Business Model Innovation: Exploring Evidences in Sustainability Reporting. *Procedia CIRP*, 40, 659–667.
- Ogaga, I. A., Ezenwakwelu, C. A., Isichei, E. E., & Olabosinde, T. S. (2023). Ethical leadership and sustainability of agro-allied firms: moderating role of environmental dynamism. *International Journal of Ethics and Systems*, 39(1), 36–53.
- Palazzo, M., Micozzi, A., Lepore, D., Sreenivasan, A., Ma, S., Rehman, A. U., & Muthuswamy, S. (2023). Assessment of Factors Influencing Agility in Start-Ups Industry 4.0. *Sustainability*, 15(9), 7564.
- Pan, L., Xu, Z., & Skare, M. (2023). Sustainable business model innovation literature: a bibliometrics analysis. *Review of Managerial Science*, 17(3), 757–785.
- Pandey, S. (2020). Principles of correlation and regression analysis. *Journal of the practice of cardiovascular sciences*, 6(1), 7-11.
- Pedersen, E. R. G., Gwozdz, W., & Hvass, K. K. (2018). Exploring the Relationship Between Business Model Innovation, Corporate Sustainability, and Organisational Values within the Fashion Industry. *Journal of Business Ethics*, 149(2), 267–284.
- Pfaff, Y. M. (2023). Agility and digitalization: why strategic agility is a success factor for mastering digitalization – evidence from Industry 4.0 implementations across a supply chain. *International Journal of Physical Distribution and Logistics Management*, 53(5/6), 660–684.
- Qalam, A., Jurnal, :, Keagamaan, I., Kemasyarakatan, D., Saputra, R., & Nasution, Y. (2023). The Effect of Strategic Agility, Entrepreneurial Leadership and Innovation Capability on SME's Performance. *Al Qalam: Jurnal Ilmiah Keagamaan Dan Kemasyarakatan*, 17(4), 2825–2848.
- Saraswati, D. R., Pristiyono, P., & Harahap, A. (2022). The Effect of Business Model Innovation and Entrepreneurship Orientation on MSMEs Performance Through Business Agility

- Moderated Financial Literature. *Quantitative Economics and Management Studies*, 3(4), 498–507.
- Schreiber, J. B. (2021). Issues and recommendations for exploratory factor analysis and principal component analysis. *Research in Social and Administrative Pharmacy*, 17(5), 1004-1011.
- Seo, E. H., Kim, C. Y., & Kim, K. (2020). A Study on the Mechanisms Linking Environmental Dynamism to Innovation Performance. *Sustainability*, 12(23), 9999.
- Shakeel, J., Mardani, A., Chofreh, A. G., Goni, F. A., & Klemeš, J. J. (2020). Anatomy of sustainable business model innovation. *Journal of Cleaner Production*, 261, 121201.
- Sharma, M., Kumar, A., Luthra, S., Joshi, S., & Upadhyay, A. (2022). The impact of environmental dynamism on low-carbon practices and digital supply chain networks to enhance sustainable performance: An empirical analysis. *Business Strategy and the Environment*, 31(4), 1776–1788.
- Shi, L., Han, L., Yang, F., & Gao, L. (2019). The Evolution of Sustainable Development Theory: Types, Goals, and Research Prospects. *Sustainability*, 11(24), 7158.
- Stratton, S. J. (2021). Population Research: Convenience Sampling Strategies. *Prehospital and Disaster Medicine*, 36(4), 373–374.
- Stubbs, W. (2019). Strategies, practices, and tensions in managing business model innovation for sustainability: The case of an Australian BCorp. *Corporate Social Responsibility and Environmental Management*, 26(5), 1063–1072.
- Sun, P., Zhou, X., Shao, C., Wang, W., & Sun, J. (2022). The Impacts of Environmental Dynamism on Chinese Tour Guides' Sustainable Performance: Factors Related to Vitality, Positive Stress Mindset and Supportive Policy. *International Journal of Environmental Research and Public Health*, 19(15), 9289.
- Trischler, M. F. G., & Li-Ying, J. (2022). Digital business model innovation: toward construct clarity and future research directions. *Review of Managerial Science*, 17(1), 3–32.
- Troise, C., Jones, P., Candelo, E., & Sorrentino, M. (2023). The role of entrepreneurial alertness, digital platform capability, organisational agility and business model innovation on young innovative companies' performance.
- ul Rehman, W., Jalil, F., & Rafique, S. (2020). International Journal of Management Research and Emerging Sciences. *International Journal*, 10(1), 67-80.
- Wairimu, J., Liao, Q., & Zhang, L. (2021). Digital Investments in Organizational Learning and Entrepreneurial Agility. 62(6), 1169–1181.
- Watson, R. (2015). Quantitative research. *Nursing Standard (Royal College of Nursing (Great Britain) : 1987)*, 29(31), 44–48.
- Waty, E., So, I. G., Indrajit, R. E., & Abdinagoro, S. B. (2022). Networking capabilities and digital adoption of business agility with Business model innovation as a mediating variable. *Journal of Intelligence Studies in Business*, 12(1), 83–90.
- Wufka, M., & Ralph, P. (2015). Explaining Agility with a Process Theory of Change. *Proceedings - 2015 Agile Conference, Agile 2015*, 60–64.
- Xing, Y., Liu, Y., Boojihawon, D. K., & Tarba, S. (2020). Entrepreneurial team and strategic

- agility: A conceptual framework and research agenda. *Human Resource Management Review*, 30(1), 100696.
- Yadegaridehkordi, E., Foroughi, B., Iranmanesh, M., Nilashi, M., & Ghobakhloo, M. (2023). Determinants of environmental, financial, and social sustainable performance of manufacturing SMEs in Malaysia. *Sustainable Production and Consumption*, 35, 129–140.
- Zulganef, Z., Pratminingsih, S. A., & Rianawati, A. (2023a). Leveraging strategic intuition to reach firm performance: the role of entrepreneurial agility and environmental dynamism. *Jurnal Siasat Bisnis*, 49–60.
- Zulganef, Z., Pratminingsih, S. A., & Rianawati, A. (2023b). Leveraging strategic intuition to reach firm performance: the role of entrepreneurial agility and environmental dynamism. *Jurnal Siasat Bisnis*, 49–60.
- صفری, S., & Bagheri, A. (2022). Examining the relationship between Organizational Agility and Entrepreneurial Spirit with regard to the moderating role of Information Technology in Physical Education Instructors. *Technology and Scholarship in Education*, 2(3), 25–33.