Article

Modeling the Influence of Information Systems on Sustainable Business Performance and Competitiveness

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Abstract: The necessity for sustainable development, the coronavirus pandemic, and conducting business within the frameworks of the fourth industrial revolution—Industry 4.0 create a challenging environment where enterprises have difficulties to achieve and maintain competitiveness. Information is becoming a core construct when it comes to conducting business in the modern, globalized business environment. In this paper, the influence of information systems (IS) on sustainable business performance and competitiveness is analyzed. Additionally, the influence of human resource management (HRM) and decision making (DM) on sustainable business performance and competitiveness, as two crucial constructs in the new paradigm of conducting business, are addressed. The relations are discussed from the aspect of sustainable development and future post-pandemic business trends. The main goal is to determine the relations between the noted constructs in a transitional setting. In sum, 184 manufacturing enterprises from Republika Srpska were surveyed via a structured survey, where the focus was on quantifying and modeling the influence of IS, HRM, and DM on sustainable business performance. The results indicate that IS, HRM, DM can affect business performance in a transitional economic setting. This approach is novel, as the existing body of literature does not address all the noted influencing factors on sustainable business performance and competitiveness in a transition economy. Hence, this paper significantly contributes to the existing body of literature and provides a solid basis for future research in this domain.

Keywords: information system; enterprise sustainability; human resource management; decision making; sustainable business performance and competitiveness

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1. Introduction

Conducting business amidst the globalization of markets presents a challenge for enterprises. The sheer number of barriers and risks, which globalization has brought to the markets, has made achieving and maintaining a competitive position a struggle for enterprises [1]. In addition to these dynamic conditions, the COVID-19 outbreak has put an additional strain on enterprises [2]. Agility and efficient adaptation to change of enterprises is imperative for maintaining a stable position on the market. Due to the demands of the international market, enterprises have to consider the implementation of various integrated management systems, which can bring additional risk to business performance [3]. When it comes to enterprises that operate in transition economies, the challenges of globalization are even more pronounced, and due to inadequate productivity, low product quality, obsolete manufacturing equipment, as well as an inadequate or non-existent application of modern management tools and techniques, achieving competitiveness on an international market seems practically impossible [4]. Along with the globalization of markets, the modern business environment is characterized with constant changes in the domain of information–communication technology (ICT) [5].

There is a rapid development of ICTs, which pressures enterprises to conduct business within the framework of the fourth industrial revolution—Industry 4.0. This further

indicates that the application of modern information–communication technologies (ICTs) by enterprises is an important factor in sustainable development [6,7]. ICTs play an increasing role in various business processes. Enterprise planning software (ERP), big data analytics or market and business data analysis, cloud-based solutions, and various web applications have the potential to positively affect strategic decision making and long-term sustainable business performance [8]. In order for an enterprise to be successful it has to address the dynamic and constant changes which are present in the modern business environment. Industrial manufacturing enterprises can improve through these ICTs (material flow, logistics, simulation modeling) [9]. The improvements of various business processes that ICTs bring to an enterprises can open doors towards further sustainable development. However, challenges are still present, as solutions towards sustainable development often requires high initial costs and resources [10].

Increasing business performance in a sustainable manner requires managers as well employees to be aware of their internal and external business environment. This implies the necessity for effective decision making [11], an adequate supporting information system [12], and adequate human resource management [13]. It can be argued that the era of rigid, status-quo-oriented enterprises is over, and that flexibility, rapid adaptation, and risk taking is the new norm of conducting business. Managers have to take into consideration the changes in trends on markets and focus on satisfying customers in order to develop loyalty and increase customer retention, which collectively positively affects sustainable business practices [14].

The current body of literature addresses the noted business metrics and factors in various contexts. However, it seems that there is gap when it comes to analyzing the impact of information systems on sustainable business performance and competitiveness in a transitional setting. This paper fills this gap as it analyses data from manufacturing enterprises, which conduct business in the Republika Srpska (an entity of Bosnia and Herzegovina). The main goal of the paper is to analyze the relation and impact of information system (IS) applications on sustainable business performance and competitiveness (SBPC). In addition, decision making (DM) and human resource management (HRM) are included as influencing factors. The significance of the paper lies in its structured approach to analyzing and identifying how enterprises in transitional economies face the challenges of achieving sustainable development brought by the new paradigms of conducting business.

The paper includes four main sections (excluding the Introduction and Conclusion sections). The first section provides a theoretical framework for the research and the hypotheses are proposed. In the second section, the methodology is presented. The methodology includes details on the sample, survey, and statistical tools, which were used for data analysis. Next, the results from the data analysis are presented. In the fourth section, the obtained results and the research as a whole are discussed. Afterwards, conclusions are drawn and guidelines for future research are noted.

2. Theoretical Framework and Hypothesis Development

2.1. *The Impact of Globalization and the Necessity for Sustainable Development in Conducting Business*

The globalized market has intensified the competitive relations between SMEs and large corporations [1]; modern ICTs have become a crucial tool to achieve competitiveness and sustainable development [15] that provide an adequate platform for innovation, which positively affects sustainability and competitive ability [16]. The application of information systems in the modern business environment is becoming imperative as dynamic changes and intensified competitive relations are becoming “default” market characteristics. The rapid development of information–communication technologies and the rapid distribution of information, the application of information systems is developing a key role when it comes to conducting business. The application of information systems is beneficial in urban and rural areas, and in developed and in developing countries as well [17]. Gathering market data and processing those data into information can improve decision making when it comes to operational and strategic goals.

It is evident that the globalization of markets has intensified the competitive relations between enterprises. The constant fragmentation and segmentation of markets has made it difficult for enterprises to adapt and easily maintain a competitive position on the market [18]. Further, the rapid development of ICTs, which are the main “engine” of development when it comes to globalization, also contributed to the transition from the third to the fourth industrial revolution—Industry 4.0. Conducting business on globalized markets and within the frameworks of Industry 4.0, which is characterized by the application of advanced ICTs such as cloud computing, big data analytics, cyber security, Internet of Things (IoT), Internet of Value (IoV), wireless sensors, etc., presents a challenge for enterprises around the world [19,20]. Such advanced technologies often require investments into the enterprise’s infrastructure, employees and an overall business model “revamp” is often suggested. These technologies and their implementation in various capacities can reduce operation costs and improve productivity and product quality [21].

Furthermore, globalized markets “levelled” competitive relations, and SMEs became competitors to big corporations and vice-versa. In such a competitively intensified environment, achieving competitive ability is a challenge and requires effective management, such as improvement in other business sectors (distribution, logistics, manufacturing, quality, innovation, etc.). This indicates that globalization not only changed the modern business environment, but also changes the “default settings” on which conducting business should be based on. Even though it seems that globalization has mainly negative effects on enterprises and the overall economy, the matter is a little more complex. Surely, globalization offers developed countries a more favorable position on the international market (monopolies), while developing countries are continuously pressured into regress.

Enterprises have to create value for customers in order to attain a somewhat competitive position on the international market. As there is a large number of competitors, enterprises have to be customer-oriented [22], which indicates that enterprise efforts should be aimed at increasing customer satisfaction and customer retention. Further, improving business performance when conducting business on globalized markets requires productivity, quality, modern management tools and techniques, and developing innovations [23,24].

Globalization has some positive effects as well, including the integration of people into a world community, increased intensity and speed of financial, commercial, and technological procedures, and globalization can reduce the sense of isolation of developing countries [25]. Therefore, as the process of globalization is continuous and evolves in an increased rate, enterprises should not put up resistance towards change, but rather change their business models into a more flexible and change-proof adaptable organization. Adaptability should be within the concept of sustainable development, as the increase in environment-protection awareness molds a new framework of conducting business. To achieve adequate business performance in this new environment-friendly, green, and sustainable framework of conducting business, enterprises have to take into consideration digitalization, organizational culture, and corporate social responsibility with a sustainable leadership philosophy [26–28].

In sum, the globalization of markets and the rapid development of ICTs have created a business environment where changes are constant, and continuous improvement of business processes is imperative for achieving and maintaining a competitive position on the market. The post-pandemic environment has intensified the already present narrative of the importance of sustainable development. Thus, enterprises have to face these challenges with the goal to optimize between profits and sustainability. A potential step further for achieving sustainable business practices is the implementation of information systems

2.2. Information Systems and Sustainable Business Performance and Competitiveness

In the modern business environment where information is hyper-distributed, enterprises have to adapt and apply information systems in order to effectively conduct business processes, and to achieve and maintain a stable competitive position on the market. Not only those information systems have to be successfully implemented, but also they have

to be adequately applied in accordance with demands of the market and the enterprise's goals [29]. Information systems are the core of the modern and sustainable circular economy model where the application of digital platforms, data analysis, blockchain technologies, artificial systems, and other ICT solutions are becoming an imperative for success in business [30]. The number of enterprises, which apply some form of information systems, increases along with the increase in the fragmentation and segmentation of markets where business is driven by information. This further indicates that implementing an information system solution involves the evaluation of market dynamics and business goals in order to obtain the best cost-to-benefits ratio from the implemented solution. If the changes brought by the COVID-19 outbreak are taken into consideration, it is evident that organizations are more dependent on effective and efficient information system [31] compared to pre-pandemic periods. From here, it is evident that the application of information systems in various enterprises will spread rather than subside.

Sustainable business performance and competitiveness represents a vital and key approach for surviving in a competitive environment [32]. Sustainable business performance and competitiveness includes social and ecological value that is synchronized with economic value [33]. Sustainable business performance and competitiveness models aim at achieving social, economic, and environmental goals [34]. Therefore, the concept of sustainable business performance and competitiveness can be viewed as a complex and integrated system of various business objectives, that takes into consideration not only the economic aspects of conducting business, but also its impact on social and ecological dimensions as well.

Sustainable business performance and competitiveness that derives from the key aspects of a sustainable business model that includes value creation (focus on the market and customers), value chain (good relations with suppliers), organizational values (employee efficiency and communication, good HRM practices), and sustainable performance management (sustainable revenue growth, ROI, etc.) [35]. These key aspects were also taken into consideration in this research, which is evident within the survey (Table A1 in the Appendix A). Sustainable business performance has to adapt to the changes on the market and to take into consideration the values of customers and the technological innovation that occurs in the modern business environment. It was noted earlier that Industry 4.0 affects the market and how enterprises conduct their business. Industry 4.0 also promotes and plays an important role in the process of sustainable business development and competitiveness [36]. From here, it can be argued that information systems as a part of the wide array of technologies that characterize Industry 4.0 could have a positive effect on sustainable business performance and competitiveness.

Overall, the implementation and application of information systems is imperative as there is a large percentage of enterprises, which apply some type of information systems. Therefore, the application of information systems is somewhat a necessity just for "keeping up" with competitors on the market [37]. An effectively applied information system positively affects the performance of various business processes such as, but not limited to, supply chains, decision making, real-time data tracking, etc. [38]. Time management, cost over-runs, safety, quality management, customer value management, safety issues, and other business metrics and processes can be improved in a sustainable way through the application of ISs [39,40]. From here, the first hypothesis is proposed:

Hypothesis 1 (H1). *Sustainable business performance and competitiveness (SBPC) is in a positive relation with information systems (IS).*

2.3. Human Resource Management, Decision Making, and Sustainable Business Performance and Competitiveness

Effective human resource management (HRM) it is necessary to note that adequate HRM practices do not always guarantee business performance [41]. However, when it comes to conducting business on globalized markets, HRM has its role in the process of achieving competitiveness in a sustainable way [42]. In the study conducted by Farouk

et al. [43], it was discussed that HRM practices had a positive influence on strategy innovation, organization innovation, and overall business performance. Similarly, it was noted that HRM practices had a positive effect on employee performance and on the development of employee skills and knowledge [44]. In the same research it was argued that adequate HRM practices positively affected overall business performance outcomes. Evidently, HRM has a key role in improving business processes. This is the result of the increasing need for knowledge and effective intellectual capital allocation. As employees are the main carriers of knowledge and skills, the necessity for effective HRM increases with the necessity for knowledge and innovation development.

Furthermore, with the rapid development of modern ICTs, and with the proliferation of artificial intelligence, big data analytics and other productivity enhancing tools, the concept and application of e-HRM emerges. The concept of e-HRM involves digital data analytics with the goal to acquire fast-paced adaptability, flexibility, and sustainability of the enterprise on the market [45,46]. For the majority of enterprises, the concept of e-HRM is not defined clearly, and “upgrades” with ICTs in HR departments being viewed as such, and not as a whole new concept. Now, even though e-HRM and HRM are not differentiated by the majority of enterprises, the role of HRM in achieving competitive ability is undeniable. HRM has a dual role, where the first one includes practices which improve employee satisfaction, productivity, and overall business performance. The second role includes the innovation of organizational performance measurement and management systems (PMMS) [47]. Overall, it is evident that HRM practices are important for conducting business in the modern business environment. Based on this, the following hypothesis is proposed:

Hypothesis 2 (H2). *Human resource management (HRM) has a positive relationship with sustainable business performance and competitiveness (SBPC).*

Furthermore, decision making, which results in operational and strategic processes, presents an integral part of improving business performance, while fast-paced decision making, which are based on the data collected and analyzed from the market, are an important driving force of increasing business performance. In the previous section, the role of information systems in conducting business was discussed. The information obtained from analyzing market data, customer data, and competition data can improve decision making, which further can lead to improved business performance [48]. Productive decision making plays an important role when it comes to improving and maintaining long-term business performance and competitiveness as well as sustainability in the domain of supply chains, manufacturing, and distribution [49]. Information systems have the potential to systematically improve decision making and provide significant support for individuals or groups who have to make short-, mid- and long-term business decisions. From here, the following hypothesis is proposed:

Hypothesis 3 (H3). *Decision making (DM) has a positive relationship with sustainable business performance and competitiveness (SBPC).*

2.4. Information Systems, Human Resource Management, and Decision Making

When changes on the market are dynamic, business decisions have to be made in a timely manner. Information and data are crucial as such, information about markets, customers, consumers, and competitors provide the basis for strategic and operational business planning [50]. Managers can apply the obtained data through information systems to make fast-paced and effective decision. Enterprises have to evaluate their business processes and based on this evaluation, choose an adequate information system. For example, accounting information systems (AIS) can positively affect financial performance and manager education [51]. Further, enterprise resource planning software (ERP) can provide support for decision making when it comes to managing and predicting material requirements, as well as support in other business processes [52]. Now, investing in ERP systems can be a financial burden for enterprises. Therefore, it is necessary to thoroughly

analyze which sectors in the enterprise would benefit from the ERP software. These can be, but not limited to, finance, inventory, HRM, sales, engineering, warehouse, marketing, production, etc. [15]. Information systems can have a crucial role in the process of scaling up, increasing innovation, and expanding business initiatives [18,53]. In order to effectively implement an information system solution and apply it for obtaining the necessary mechanisms for sustainable development, it is necessary to have above-average HRM practices, and the managers have to be productive when it comes to decision making. From here, the following hypotheses are proposed:

Hypothesis 4 (H4). *Information systems (IS) are in a positive relationship with human resource management (HRM).*

Hypothesis 5 (H5). *Information systems (IS) are in a positive relationship with decision making (DM).*

To further address the logical presence of inter-relations between the noted factors, a fourth hypothesis is proposed:

Hypothesis 6 (H6). *Decision making (DM) positively affects human resource management (HRM).*

Why are these and the previously noted constructs important? Information systems have been noted in the existing body of literature as potentially influencing factors on business performance [54–56]. Its effect is also noted in the sectors as well, including human resource management [57,58]. In addition, HRM practices have the potential to affect business performance and competitiveness [44,59]. When it comes to decision making, the application and effect of information systems is evident in the existing body of literature [60,61]. Now, decision making, as a generalized business process, can involve every aspect of conducting business, including HRM [60,62]. Therefore, the effect of decision making on HRM is also investigated. Finally, the decision making as process is analyzed in the context of business performance [62,63]. It is evident that the existing body of literature is broad when it comes to information system application, HRM practices, and decision making. However, the influence of information systems on sustainable business performance and competitiveness with additional influencing factors, in a transitional business environment with a focus on sustainability is not properly investigated. More precisely, there are no current papers in this domain that address these relations in transitional economy from the aspect of sustainability. This paper effectively fills this gap in literature by investigating manufacturing enterprises in the Republika Srpska.

In sum, the research includes four variables: information systems (IS), human resource management (HRM), and decision making (DM) as independent variables, and sustainable business performance and competitiveness (SBPC) as a dependent variable. The research framework, which includes the proposed hypotheses, is presented in Figure 1.

As seen on Figure 1, hypotheses H_1 , H_2 , and H_3 directly correspond to the main objective of the paper (solid lines), while hypotheses H_4 , H_5 , and H_6 correspond to the inter-relations between the independent variables (dashed lines).

Figure 1. Research framework.

3. Methodology

The research methodology for this study includes the standard accepted procedures. The research objective of the research is to model the potential influence of information systems, human resource management, and decision making on sustainable business performance and competitiveness.

The study includes a structured survey and collected data from 184 respondents—enterprise managers (sample size $n = 184$). The sample included 35 micro enterprises, 38 small enterprises, 84 medium-sized enterprises, and 27 large enterprises. The survey collected data on demographic information (gender, age, education); information systems; human resource management; decision making; sustainable business performance and competitiveness. The survey items within each dimension are presented in Table A1 in the Appendix A section. The sample included micro, small, medium-sized, and large enterprises. This raises the question if the sample should be viewed separately according to enterprise size or to analyze it as one big sample. Previous studies where enterprises were researched, the sample was segmented only in the instances where the aim of the study was to determine differences between the enterprises. In other cases, the samples were noted as whole, regardless of enterprise size. In this current paper, in order to address the potential differences between enterprise sizes, the logistic regression analysis, as the main statistical tool, was conducted in four variations. The first is with all enterprises together. The second variation was only with micro enterprises. The third variation included small- and medium-sized enterprises, while the fourth and final variation of the logistic regression analysis included only the large enterprises. Furthermore, the research was conducted in three main phases.

The first phase included the development of a structured survey and the distribution of these surveys to manufacturing enterprises. The survey included 59 items in the form of seven-point Likert items. Additionally, information on age, gender, and education of the participant as well as information on the enterprise's size was collected. The survey was developed in accordance with similar studies conducted in the domain of information systems, human resource management, decision making, and business performance [64–67]. The participants were informed that the survey was anonymous. Time allocated to complete the survey was one week for online/email surveys, and 1 h for participants who filled out the survey on a hardcopy. The hardcopy surveying was conducted on-site (within the enterprise).

The second phase was data storage and analysis. The data are ordinal in nature, and after analyzing the most appropriate way of analyzing this type of data, the following statistical tools were used:

- Descriptive statistics—basic values, means, standard deviation, Cronbach’s alpha values;
- Correlation analysis—the correlation coefficients does not necessarily indicate causality; however, if the literature background is taken into consideration, then it does have statistical significance;
- Linear regression—not the most appropriate way of analyzing ordinal data, but still acceptable and provides sufficient insight into the relations between the independent variables (IS, HRM, DM) and dependent variable (SBPC);
- Logistic regression—a more appropriate analysis compared to linear regression, and it can explain the relations between the independent variables and dependent variable. The logistic regression has been found appropriate for this type of data. In sum, four variations of the logistic regression analysis were conducted (all enterprises; micro enterprises; small- and medium-sized enterprises; large enterprises)
- Test for multicollinearity—this is an important part of modeling the relations between the observed factors, as the presence of multicollinearity would indicate the inadequacy of one or more measured factors.

The second phase does not dive into details on the obtained results. This is reserved for the discussion section, and it belongs to the third phase.

The third phase included the analysis of the obtained results and a discussion on the results, existing literature, limitations and advantages of the study, and guidelines for future research are conducted. Further, information on the analyzed variables is given in Table 1.

As noted in Table 1, the information systems (IS) variable consists of 13 items, the human resource management (HRM) variable consists of 12 items, the decision making (DM) variable consists of 14 items, and the dependent variable sustainable business performance and competitiveness (SBPC) consists of 20 items. The items are presented within the survey in the Appendix A (Table A1).

Table 1. Analyzed variables and items.

Variable	Information about the Variables and Items (Details in the Appendix A—Table A1)
Information systems (IS) (independent variable)	<p>Overcoming the challenges that enterprises face on the globalized market can be positively affected by information systems [68]. Information systems in the context of this paper includes the aspects of sustainability and business performance improvement [69].</p> <p>Items from IS-1 to IS-13 address the application of IS:</p> <ul style="list-style-type: none"> • in the HRM sector • in the quality sector • in the manufacturing sector • for achieving competitiveness on the market • for decision making by managers • for efficient communication in the enterprise
Human resource management (HRM) (independent variable)	<p>Human resource management in this paper includes HRM practices, which are well established in the existing body of literature but are not analyzed within the context of sustainability and business performance [70,71].</p> <ul style="list-style-type: none"> • Items from HRM-1 to HRM-12 address: • communication between employees and managers • employee skills • employee compensation and rewards • employee training • valuing employee’s suggestions

Table 1. Cont.

Variable	Information about the Variables and Items (Details in the Appendix A—Table A1)
Decision making (DM) (independent variable)	<p>Decision making is viewed in the context of business decision making and involves all business processes as such. Conducting business and managing an enterprise requires effective and efficient decisions that affect the short- and long-term performance of the enterprise [72].</p> <p>Items from DM-1 to DM-14 address:</p> <ul style="list-style-type: none"> • efficient and effective decision making • timely decision making • decision making effect on quality • decision making effect on productivity • decision making effect on HRM • decision making and sustainable development • importance of decision making for conducting a business
Sustainable business performance and competitiveness (SBPC) (dependent variable)	<p>Business performance and competitiveness include a wide array of factors, and sustainable growth is noted in several survey items. Sustainable business performance and competitiveness regards to the long-term results and organic development of business rather than quick short-term improvements.</p> <p>Items from SBPC-1 to SBPC-20 address:</p> <ul style="list-style-type: none"> • employee efficiency and quality of work • sustainable profitability • communication and relation with suppliers • return on investment and financial goals • sustainable revenue growth • sustainable market share (new customers) growth • sustainable competitiveness (keeping existing customers)

4. Results

The first results are from the conducted descriptive statistics. The obtained results are presented in Table 2.

Table 2. Descriptive statistics.

Dimension	Mean (μ)	Standard Deviation (σ)	Cronbach's Alpha
Information systems (IS)	5.12	1.47	0.945
Human resource management (HRM)	5.24	1.53	0.953
Decision making (DM)	5.46	1.38	0.961
Sustainable business performance and competitiveness (SBPC)	5.44	1.08	0.955

Descriptive statistics included the minimum and maximum values within the sample, the mean values (μ), and the standard deviation (σ) values. The standard deviation values are between 1.08 and 1.53. Now, as the data are ordinal in nature, these values are appropriate. Further, in order to confirm that the survey used for the research is reliable, a reliability test was conducted where for each construct the Cronbach's alpha values were obtained. As these values were in the 0.8 and 0.9 range, it is confirmed that the scales for each construct within the survey are reliable.

Next, the results of the correlation analysis are presented. Every measured construct was included in the correlation analysis. Significance was 5%. The obtained correlation coefficients between every measured construct are given in Table 3.

Table 3. Results of the correlation analysis.

	Correlation Analysis			Sustainable Business Performance and Competitiveness (SBPC)
	Information Systems (IS)	Human Resource Management (HRM)	Decision Making (DM)	
IS	1.000*			
HRM	0.599	1.000 *		
DM	0.541	0.725	1.000 *	
SBPC	0.679	0.698	0.696	1.000 *

* Significance 5%.

Based on the results presented in Table 3, there is a strong and positive correlation (0.679) between the two main constructs: information systems (IS) and sustainable business performance and competitiveness (SBPC). The strongest positive correlation coefficient of 0.725 is between human resource management (HRM) and decision making (DM). The lowest correlation coefficient (although still positive and strong) of 0.541 is noted between information systems (IS) and decision making (DM). Further, decision making (DM) and human resource management (HRM) also have a strong positive correlation with sustainable business performance and competitiveness (SBPC) with correlation coefficients of 0.696 and 0.698, respectively.

Correlation does not necessarily indicate causation. However, after analyzing the existing body of literature where the relations of the measured constructs are discussed, it can be argued that there is certain level of causation. A scatter plot diagram was created in order to visually present the relation between the independent variables (IS, HRM, and DM) and dependent variable (SBPC) (Figure 2).

Figure 2. Scatter diagram (SBPC dependent var.; IS, HRM, and DM independent var.).

Furthermore, this present study integrates four constructs into a research framework, where the influence of three constructs (IS, HRM and DM) on sustainable business performance and competitiveness (SBPC) is analyzed. Next, a linear regression analysis was conducted. The results of the linear regression analysis are given in Table 4.

Table 4. Results of the linear regression analysis.

Regression Analysis						
Y	X	β Intercept: 2.0914	p-Value	R ²	F	F Sig.
SBPC	IS	0.187	<0.0001	0.748	175.951	<0.0001
	HRM	0.190	<0.0001			
	DM	0.255	<0.0001			
Y	X		MSE		RMSE	DW
SBPC	IS		0.147		0.383	1.992
	HRM					
	DM					

The model equation for the linear regression with all constructs has the following form: $BPC = 2.091 + 0.187 \cdot IS + 0.190 \cdot HRM + 0.255 \cdot DM + \epsilon$;

Where sustainable business performance and competitiveness (SBPC) was taken as the dependent variable (Y), while the other constructs (IS, HRM and DM) were observed as independent variables. The obtained regression value of $R^2 = 0.748$ indicates a positive and strong relation between the dependent (SBPC) and independent (IS, HRM, DM) variables. Overall, the *p*-values are adequate. The mean squared error (MSE) value of 0.147, and the root mean squared error (RMSE) value of 0.383, as well as the Durbin–Watson (DW) value of 1.992, indicates an adequate model fit.

Additionally, a logistic regression analysis was conducted in four variations in order to obtain additional insight into the researched relations. The first variation included all enterprises regardless of size. The results of the logistic regression analysis for all enterprises (pseudo-R coefficients) are presented in Table 5.

Table 5. Results of the logistic regression analysis—all enterprises (pseudo-R coefficients).

Y	X	R ² (McFadden)	R ² (Cox and Snell)	R ² (Nagelkerke)	AIC	SBC
SBPC	IS	0.192	0.755	0.756	1186.345	1144.957
	HRM					
	DM					

Further, in Table 6, the standardized coefficients of the logistic regression analysis are presented.

Table 6. Standardized coefficients—all enterprises (SBPC as dependent variable).

Independent Variable	Value	Std. Error	Chi-Square	Pr > Chi-Square
Information systems (IS)	1.450	0.133	118.989	<0.0001
Human resource management (HRM)	1.067	0.187	32.411	<0.0001
Decision making (DM)	2.576	0.229	126.577	<0.0001

Based on the results of the logistic regression analysis in Tables 5 and 6, it can be argued that there is a good model fit. More precisely the McFadden's, Cox and Snell's, and Nagelkerke's pseudo R-squared values of 0.192, 0.755 and 0.756, respectively, indicate an adequate fit for every measured construct.

Next, the second variation of the logistic regression is conducted. Here, only the micro enterprises are observed. The results are presented in Tables 7 and 8.

Table 7. Results of the logistic regression analysis—micro enterprises (pseudo-R coefficients).

Y	X	R ² (McFadden)	R ² (Cox and Snell)	R ² (Nagelkerke)	AIC	SBC
SBPC	IS HRM DM	0.459	0.865	0.868	55.550	57.127

Table 8. Standardized coefficients—micro enterprises (SBPC as dependent variable).

Independent Variable	Value	Std. Error	Chi-Square	Pr > Chi-Square
Information systems (IS)	1.624	1.098	2.817	<0.0001
Human resource management (HRM)	1.735	0.984	11.255	0.008
Decision making (DM)	0.985	2.192	12.202	0.056

Next, in Table 8, the standardized coefficients of the logistic regression analysis of micro enterprises are presented.

Based on the results presented in Tables 7 and 8, it can be proposed that there is no significant difference regarding the relation between the independent variables and dependent variables. However, there is one small difference when it comes to the decision making variable. Namely, the significance is 0.056. This indicates that this variable could be removed without heavily affecting the model. Therefore, it can be noted that the model with all enterprises is more fit compared to only the micro enterprises. Such difference is expected in some degree, as micro enterprises have their own specific characteristics.

The third variation of the logistic regression is conducted where only the small- and medium-sized enterprises are observed. The results are presented in Tables 9 and 10.

Table 9. Results of the logistic regression analysis—small- and medium-sized enterprises (pseudo-R coefficients).

Y	X	R ² (McFadden)	R ² (Cox and Snell)	R ² (Nagelkerke)	AIC	SBC
SBPC	IS HRM DM	0.196	0.754	0.755	1006.345	902.957

Table 10. Standardized coefficients—small- and medium-sized enterprises (SBPC as dependent variable).

Independent Variable	Value	Std. error	Chi-Square	Pr > Chi-Square
Information systems (IS)	1.505	0.152	98.211	<0.0001
Human resource management (HRM)	1.172	0.222	28.006	<0.0001
Decision making (DM)	2.370	0.252	88.407	<0.0001

In Table 10, the standardized coefficients of the logistic regression analysis are presented for small- and medium-sized enterprises.

Based on the results presented in Tables 9 and 10, it can be proposed that there is no significant difference regarding the relation between the independent variables and dependent variables when it comes to SMEs compared to all enterprises. As the number of SMEs was highest within the sample, this result was expected. Finally, the fourth variation of the logistic regression analysis was conducted where the large sized enterprises were taken into consideration. The results are presented in Tables 11 and 12.

Table 11. Results of the logistic regression analysis—large enterprises (pseudo-R coefficients).

Y	X	R ² (McFadden)	R ² (Cox and Snell)	R ² (Nagelkerke)	AIC	SBC
SBPC	IS HRM DM	0.237	0.752	0.755	179.456	151.944

Table 12. Standardized coefficients—large enterprises (SBPC as dependent \ variable).

Independet Variable	Value	Std. Error	Chi-Square	Pr > Chi-Square
Information systems (IS)	1.878	0.418	20.161	<0.0001
Human resource management (HRM)	0.502	0.464	12.175	0.002
Decision making (DM)	3.607	0.700	26.584	<0.0001

In Table 12, the standardized coefficients of the logistic regression analysis are noted.

Based on the results of the logistic regression analysis presented in Tables 11 and 12, it can be seen that there is no statistically significant difference between all enterprises and large enterprises. Next, a multicollinearity analysis was conducted in order to determine if there is statistically significant collinearity between the measured constructs. The results are presented in Table 13.

Table 13. Results of the multicollinearity test.

Static	Information Systems (IS)	Human Resource Management (HRM)	Decision Making (DM)
Tolerance	0.635	0.2818	0.311
VIF	1.575	2.548	2.216

According to the results of the multicollinearity analysis, there is no statistically significant collinearity between the measured constructs. This is important as multicollinearity would indicate that one or more independent variables should be removed as they are not statistically significant for modeling the relations between the observed variables. In the next section, the results are discussed in more detail.

5. Discussion

5.1. Findings and Hypotheses

The main objective of the paper was to model the potential influence of information systems (IS), human resource management (HRM), and decision making (DM) on sustainable business performance and competitiveness (SBPC).

The proposed hypotheses were constructed in the context of relations between the independent variables (IS, HRM, and DM), and dependent variable (SBPC). The hypotheses are addressed in accordance with the results of the correlation analysis, linear regression analysis, and logistic regression analysis.

As noted earlier, correlation does not necessarily indicate causation, but rather the strength of association between the noted variables. The theoretical background provides a basis that enables the assumption that the observed variables have potential existing causality between them. The correlation coefficients are in the range of 0.541 (between IS and DM) and 0.689 (between HRM and SPBC), thus indicating that all the proposed hypotheses have failed to be rejected:

Hypothesis 1 (H1). Sustainable business performance and competitiveness (SBPC) is in a positive relation with information systems (IS).

Hypothesis 2 (H2). Human resource management (HRM) has a positive relationship with sustainable business performance and competitiveness (SBPC).

Hypothesis 3 (H3). *Decision making (DM) has a positive relationship with sustainable business performance and competitiveness (SBPC).*

Hypothesis 4 (H4). *Information systems (IS) are in a positive relationship with human resource management (HRM).*

Hypothesis 5 (H5). *Information systems (IS) are in a positive relationship with decision making (DM).*

The correlation coefficient between DM and HRM is 0.725. Therefore, the following hypothesis has failed to be rejected:

Hypothesis 6 (H6). *Decision making (DM) positively affects human resource management (HRM).*

Furthermore, the results of the linear regression analysis are addressed in the context of the proposed hypotheses. SBPC was observed as the dependent variable, while IS, HRM, and DM were observed as independent variables. The percentage of variation value— R^2 of 0.748 indicates a strong positive relation between the observed variables. If we take into consideration that the sample is not small (larger than 40, in this case $n = 184$), the R^2 value is regarded as precise when it comes to how well the model fits the data.

The p -values are less than the significance level of 0.05, therefore, it indicates that there is a statistically significant association between the independent variables and the dependent variable, and the risk is 5% that there is no actual association.

The β values are 0.187 (between SBPC and IS), 0.190 (between SBPC and HRM), and 0.255 (between SBPC and DM). These positive β values indicate a positive influence of the independent variables on the dependent variable. Based on these values an equation was noted: $BPC = 2.091 + 0.187 \cdot IS + 0.190 \cdot HRM + 0.255 \cdot DM + \epsilon$.

Decision making has a stronger positive influence on sustainable business performance and competitiveness, compared to information systems and human resource management. If we consider that information systems often provide support to decision making, and HRM is affected by decision making, then it is expected that the decision making as variable has a significant effect on sustainable development and competitiveness. The linear regression analysis indicates that the following hypotheses have failed to be rejected:

Hypothesis 1 (H1). *Sustainable business performance and competitiveness (SBPC) is in a positive relation with information systems (IS).*

Hypothesis 2 (H2). *Human resource management (HRM) has a positive relationship with sustainable business performance and competitiveness (SBPC).* **Hypothesis 3 (H3).** *Decision making (DM) has a positive relationship with sustainable business performance and competitiveness (SBPC).*

Further, the linear regression analysis does not clearly indicate the relations between IS and HRM; IS and DM; and HRM and DM. Therefore, the following hypotheses cannot be addressed:

Hypothesis 4 (H4). *Information systems (IS) are in a positive relationship with human resource management (HRM).*

Hypothesis 5 (H5). *Information systems (IS) are in a positive relationship with decision making (DM).*

Hypothesis 6 (H6). *Decision making (DM) positively affects human resource management (HRM).*

Next, the results of the logistic regression indicate similar results as the regression analysis regardless of enterprise size. However, when it comes to the proposed model where the dependent variable is SBPC and the independent variables are IS, HRM, and DM, then, according to the AIC (Akaike Information Criterion) values, the model for micro

enterprises has the best fit ($AIC = 55.550$). Afterwards, the model with large enterprises has the second best fit ($AIC = 179.456$). The worst model fit is noted with all enterprises ($AIC = 1186.345$). This was expected in some degree, as each enterprise size group has its unique characteristics. This does not indicate that the model with all enterprises is invalid, but rather it emphasizes the logical outcome that enterprise size makes a difference. It would be interesting to see future research where enterprise sizes are the key observed metric.

5.2. Previous Studies and Importance of Findings

The results are complementary to findings from other studies. This includes the relation between the independent variables (IS, HRM, and DM) and the dependent variable (SBPC).

More precisely, the results are consistent with other studies [73] when it comes to information systems (IS) and its relation to sustainable development and business, and sustainable business performance and competitiveness [74,75]. According to the results, this relation is positive. Similar to the findings in this current paper, information systems have been found to promote and are associated with sustainability and sustainable development in other studies as well [76,77]. Complementary to the results in this study, it was found that information systems within an enterprise have a positive strategic influence on business performance [56].

HRM practices have been found to positively affect sustainable business performance and competitiveness and this is complementary with other studies in this domain [61,78,79]. Human resource information systems represent an integrated mechanism of HRM through information systems [57]. When it comes to the sustainability aspect of HRM, the results in this study are similar to the findings in [59] where it was noted that HRM can be used for implementing a sustainability strategy.

Further, the results in this paper indicate that decision making (DM) has a positive effect on sustainable business performance and competitiveness and this is complementary to the findings of other existing studies [62,80,81].

It is interesting that the existing findings in this domain do not address several variables at once. Especially when they are complementary in nature. Information systems, HRM, and decision making represent core functions in the modern business environment. The existing body of literature does not address IS, HRM, and DM and their influence on SBPC altogether. This paper is unique in that manner as it observed three independent variables (IS, HR, and DM) and their effect on a dependent variable (SBPC). In addition, the inter-relations between the independent variables were noted. There are no other studies that include all the noted variables at the same time in a transitional setting. Therefore, comparing the findings with other studies is based on the assumptions, conclusions, and discussions of previous studies.

The data and statistical tools have proven to be sufficient and other literature regarding Likert-scale items support this notion [82]. Overall, based on the results in this current paper, it can be argued that regardless of the transitional status of this specific country/entity of a developing country (Republika Srpska as an entity of Bosnia and Herzegovina), the positive effects of information systems are present similarly to its presence in developed countries as it was observed within the theoretical framework.

5.3. Limitations, Implications, and Suggestions

The main limitation of this current paper is the lack of a structured meta-analysis in the theoretical section of the paper. In addition, the statistical analysis of the obtained data did not take into consideration the different industries in which the analyzed manufacturing enterprises conduct their business. Non-English literature sources were not equally represented when laying the theoretical background.

Now, as the main objective of this study was to model the effect of information systems on sustainable business performance and competitiveness, the noted limitations do not affect the objective of the study, but they rather outline guidelines for future

research. Overall, the paper provides a solid basis for future studies, and it can be used for comparison with future research results in this domain. Furthermore, based on the obtained results, the following implications and suggestions are noted:

- Enterprises have to evaluate their business processes and identify which can be improved via some form of ICT solution (information systems, cloud infrastructure, etc.);
- Enterprises have to implement ICT solutions with the goal of sustainable development and not only temporary improvements;
- Managers have to address the necessity for adequate HRM practices and effective decision making in the process of making business processes sustainable;
- Promoting sustainability through corporate social responsibility practices could have a positive impact on brand development;
- Information systems should be viewed as an opportunity for achieving competitive ability and sustainability rather than a burden and an unwanted necessity;
- Managers have to demonstrate leadership as all employees have to be involved in the changes that positively affect business sustainability;
- Fellow scholars can address this study for future studies in the domain of information systems and sustainable development in a transitional setting.

Additionally, the paper can be interesting to managers from manufacturing enterprises, but from non-manufacturing enterprises as well. The paper highlights the importance information system application, as well the importance of HRM and effective decision making. The main advantage of the paper is the fairly large sample size and the timing of the study as the coronavirus pandemic emphasized the challenges of the modern business environment. Based on the literature analysis, this approach is not conducted in a transitional economy.

For future research it is recommended to address and note the different industries in which the manufacturing enterprise conducts its business. Meta-analysis with the results of this current paper is proposed. The results could come from a developing country but developed countries would also be interesting. Currently, there are no identical studies compared to this current one. Hence, for future research a similar (not necessarily identical) structured survey could be used in order to obtain data and information on the observed variables. Additionally, specific information system solutions could be examined, and a cross-section analysis could be conducted. This current paper provides a solid basis for the proposed future research.

6. Conclusions

The obtained results within this study indicate that the hypotheses have failed to be rejected. Based on the research results, it can be concluded that information systems (IS), human resource management (HRM), and decision making (DM) as independent variables have a positive and significant impact on sustainable business performance and competitiveness (SBPC) as a dependent variable. The results, on which this conclusion is based, include the correlation analysis, linear regression analysis, and the logistic regression analysis as the main statistical tools for analyzing the obtained data. In addition, descriptive statistics, a multicollinearity test, and a reliability test were conducted in order to determine that the survey and the obtained data are credible. The survey was structured in a manner that no sensitive and private information about the participant were collected.

The originality of the study comes from the analysis of modern business environment factors in a transitional setting. More precisely, IS, HRM, and DM as cornerstone factors of conducting business on the digital age and globalized market are not present nor analyzed in other studies in this manner.

In sum, the paper has a significant contribution to the existing body of literature. The study includes important business constructs, and the data are obtained through a structured research methodology. Fellow researchers and managers can address this paper in order to gain insight into the dynamics of a transitional business environment. The study successfully filled the gap in literature as there is lack of studies which address the relations

of the researched constructs in manufacturing enterprises, which conduct business in a country in transition. The conducted approach is important as it opens doors for future research in this domain. Data from other countries can be analyzed and a meta-analysis of several studies with this approach can be conducted.

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Appendix A

The survey items are presented in Table A1.

Table A1. Survey items.

Participant Demographic Information									
Gender									
(1) Male					(2) Female				
Age									
(1) below 30		(2) between 30 and 50				(3) above 50			
Education									
(1) Elementary					(2) High school				
(3) Bachelor					(4) Masters				
(5) Magistrate					(6) Ph.D.				
Enterprise Information									
Type of enterprise									
(1) Private					(2) Public				
Enterprise size									
(1) micro (0–9 employees)					(2) small (10–49 employees)				
(1) medium (50–249 employees)					(2) large (250+ employees)				
1. Information System Application (IS)									
Below are scale-type questions regarding the application of information systems in the context of conducting business and sustainability. Please select an answer from 1 to 7: 1—I strongly disagree; 3—neutral opinion; 7—I strongly agree									
1.	IS-1	The enterprise has modern information systems.	1	2	3	4	5	6	7
2.	IS-2	Modern information systems are widely used in the enterprise.	1	2	3	4	5	6	7
3.	IS-3	We apply information systems when hiring new employees.	1	2	3	4	5	6	7
4.	IS-4	Information systems are applied in a sustainable manner.							
5.	IS-5	Employees have access to information systems.	1	2	3	4	5	6	7
6.	IS-6	Communication through information systems is widely used in the enterprise.	1	2	3	4	5	6	7
7.	IS-7	All employees are trained to work with information systems owned by the enterprise.	1	2	3	4	5	6	7
8.	IS-8	Information systems are applied in the quality sector.	1	2	3	4	5	6	7
9.	IS-9	Information systems are applied in the human resources sector.	1	2	3	4	5	6	7

Table A1. Cont.

10.	IS-10	Information systems are applied in the manufacturing sector.	1	2	3	4	5	6	7
11.	IS-11	The enterprise invests in modern information systems so it can develop business processes in sustainable manner.	1	2	3	4	5	6	7
12.	IS-12	The enterprise seriously takes into consideration sustainable development through advanced information systems.	1	2	3	4	5	6	7
13.	IS-13	Information systems are applied by both managers and employees.	1	2	3	4	5	6	7
2. Human Resource Management (HRM)									
Below are scale-type questions regarding human resource management (HRM) and HRM practices. Please select an answer from 1 to 7: 1—I strongly disagree; 3—neutral opinion; 7—I strongly agree									
1.	HRM-1	The skills of employees are high.	1	2	3	4	5	6	7
2.	HRM-2	Communication with employees is satisfactory.	1	2	3	4	5	6	7
3.	HRM-3	The employees are satisfied.	1	2	3	4	5	6	7
4.	HRM-4	Employee compensation is in line with the enterprise's profits.	1	2	3	4	5	6	7
5.	HRM-5	The enterprise invests in the sustainable development of skills and knowledge of employees.	1	2	3	4	5	6	7
6.	HRM-6	Suggestions and recommendations from employees are welcome.	1	2	3	4	5	6	7
7.	HRM-7	Raises are frequent and adequate.	1	2	3	4	5	6	7
8.	HRM-8	There are no conflicts in the workplace.	1	2	3	4	5	6	7
9.	HRM-9	Sustainable practices are encouraged among employees.	1	2	3	4	5	6	7
10.	HRM-10	Employees are rewarded for their hard work and commitment.	1	2	3	4	5	6	7
11.	HRM-11	Every new employee goes through adequate training.	1	2	3	4	5	6	7
12.	HRM-12	Every employee has a chance to progress and acquire new knowledge.	1	2	3	4	5	6	7
3. Decision Making (DM)									
Below are scale-type questions regarding decision making in enterprises. Please select an answer from 1 to 7: 1—I strongly disagree; 3—neutral opinion; 7—I strongly agree									
1.	DM-1	Decisions in the enterprise are made effectively.	1	2	3	4	5	6	7
2.	DM-2	Decisions in the enterprise are made efficiently.	1	2	3	4	5	6	7
3.	DM-3	Decisions in the enterprise are made in a timely manner.	1	2	3	4	5	6	7
4.	DM-4	Decisions in the enterprise generally give positive results on the quality of business.	1	2	3	4	5	6	7
5.	DM-5	Decisions in the enterprise generally give positive results on productivity.	1	2	3	4	5	6	7
6.	DM-6	Decisions in the enterprise generally give positive results on human resource management.	1	2	3	4	5	6	7
7.	DM-7	Decisions in the enterprise generally give positive results on quality.	1	2	3	4	5	6	7
8.	DM-8	The time required to make a decision is short.	1	2	3	4	5	6	7
9.	DM-9	Decision making takes into consideration long-term sustainability.	1	2	3	4	5	6	7
10.	DM-10	Decisions are often made with the goal of sustainable development.	1	2	3	4	5	6	7
11.	DM-11	Decisions have a positive effect on the long-term goals of the enterprise.	1	2	3	4	5	6	7

Table A1. Cont.

12.	DM-12	Decisions are an important aspect of the enterprise's business.	1	2	3	4	5	6	7
13.	DM-13	Decision making is essential for the enterprise's business.	1	2	3	4	5	6	7
14.	DM-14	Without good decisions, business performance would be poorer	1	2	3	4	5	6	7
4. Sustainable Business Performance and Competitiveness (SBPC)									
Below are scale-type questions regarding decision making in enterprises. Please select an answer from 1 to 7: 1—very low; 3—neutral opinion; 7—very high									
1.	SBPC-1	Operational efficiency of employees.	1	2	3	4	5	6	7
2.	SBPC-2	Quality of realized work.	1	2	3	4	5	6	7
3.	SBPC-3	Quality of realized services.	1	2	3	4	5	6	7
4.	SBPC-4	Sustained enterprise profitability.	1	2	3	4	5	6	7
5.	SBPC-5	Quality of supplier services.	1	2	3	4	5	6	7
6.	SBPC-6	Communication with suppliers.	1	2	3	4	5	6	7
7.	SBPC-7	Supplier performance (accuracy and delivery time of products and services).	1	2	3	4	5	6	7
8.	SBPC-8	Timely delivery of products and services.	1	2	3	4	5	6	7
9.	SBPC-9	Inventory of unfinished products.	1	2	3	4	5	6	7
10.	SBPC-10	Return on investment.	1	2	3	4	5	6	7
11.	SBPC-11	Achieving financial goals.	1	2	3	4	5	6	7
12.	SBPC-12	Overall business profitability in the long-term.	1	2	3	4	5	6	7
13.	SBPC-13	Sustainable growth of market share.	1	2	3	4	5	6	7
14.	SBPC-14	Annual turnover.	1	2	3	4	5	6	7
15.	SBPC-15	Sustainable growth in revenue from sales of products and services.	1	2	3	4	5	6	7
16.	SBPC-16	Sustainable growth in the number of new customers/services.	1	2	3	4	5	6	7
17.	SBPC-17	Sustainable growth of revenue from sales of products/services to existing customers.	1	2	3	4	5	6	7
18.	SBPC-18	The impact of unfair competition on revenue decline.	1	2	3	4	5	6	7
19.	SBPC-19	Public relations.	1	2	3	4	5	6	7
20.	SBPC-20	Monitoring the needs and desires of consumers.	1	2	3	4	5	6	7

Descriptive statistics (percentages of answers and mean values of variable items) for each survey item is given in Table A2.

Table A2. Survey item descriptive statistics.

Participant Demographic Information		
Gender		
(3) Male—119 answers (64.67%)	(4) MaleFemale—65 answers (35.33%)	
Age		
(4) below 30—22 answers (11.95%)	(5) between 30 and 50—127 answers (69.02%)	(6) above 50—35 answers (19.03%)
Education		
(7) Elementary—0 answers	(8) High school—13 answers (7.06%)	
(9) Bachelor—119 answers (64.67%)	(10) Masters—36 answers (19.56%)	
(11) Magistrate—7 answers (3.80%)	(12) Ph.D.—9 answers (4.91%)	
Enterprise Information		
Type of enterprise		
(3) Private—124 answers (67.39%)	(4) Public—60 answers (32.61%)	

Table A2. Cont.

Enterprise size			
(5) micro (0–9 employees)—35 answers (19.02%)		(6) small (10–49 employees)—38 answers (20.65%)	
(7) medium (50–249 employees)—84 answers (45.65%)		(8) large (250+ employees)—27 answers (14.67%)	
1. Information System Application (IS)			
Below are scale-type questions regarding the application of information systems in the context of conducting business and sustainability. Please select an answer from 1 to 7: 1—I strongly disagree; 3—neutral opinion; 7—I strongly agree			
1.	IS-1	The enterprise has modern information systems.	Mean: 5.43
2.	IS-2	Modern information systems are widely used in the enterprise.	Mean: 5.29
3.	IS-3	We apply information systems when hiring new employees.	Mean: 4.72
4.	IS-4	Information systems are applied in a sustainable manner.	Mean: 5.37
5.	IS-5	Employees have access to information systems.	Mean: 4.75
6.	IS-6	Communication through information systems is widely used in the enterprise.	Mean: 5.25
7.	IS-7	All employees are trained to work with information systems owned by the enterprise.	Mean: 5.15
8.	IS-8	Information systems are applied in the quality sector.	Mean: 5.43
9.	IS-9	Information systems are applied in the human resources sector.	Mean: 5.12
10.	IS-10	Information systems are applied in the manufacturing sector.	Mean: 4.74
11.	IS-11	The enterprise invests in modern information systems so it can develop business processes in sustainable manner.	Mean: 5.03
12.	IS-12	The enterprise seriously takes into consideration sustainable development through advanced information systems.	Mean: 5.24
13.	IS-13	Information systems are applied by both managers and employees.	Mean: 5.12
2. Human Resource Management (HRM)			
Below are scale-type questions regarding human resource management (HRM) and HRM practices. Please select an answer from 1 to 7: 1—I strongly disagree; 3—neutral opinion; 7—I strongly agree			
1.	HRM-1	The skills of employees are high.	Mean: 5.46
2.	HRM-2	Communication with employees is satisfactory.	Mean: 5.57
3.	HRM-3	The employees are satisfied.	Mean: 5.10
4.	HRM-4	Employee compensation is in line with the enterprise’s profits.	Mean: 5.75
5.	HRM-5	The enterprise invests in the sustainable development of skills and knowledge of employees.	Mean: 5.24
6.	HRM-6	Suggestions and recommendations from employees are welcome.	Mean: 5.08
7.	HRM-7	Raises are frequent and adequate.	Mean: 5.16
8.	HRM-8	There are no conflicts in the workplace.	Mean: 5.12
9.	HRM-9	Sustainable practices are encouraged among employees.	Mean: 4.40
10.	HRM-10	Employees are rewarded for their hard work and commitment.	Mean: 5.43
11.	HRM-11	Every new employee goes through adequate training.	Mean: 5.37
12.	HRM-12	Every employee has a chance to progress and acquire new knowledge.	Mean: 5.19
3. Decision Making (DM)			
Below are scale-type questions regarding decision making in enterprises. Please select an answer from 1 to 7: 1—I strongly disagree; 3—neutral opinion; 7—I strongly agree			
1.	DM-1	Decisions in the enterprise are made effectively.	Mean: 5.23
2.	DM-2	Decisions in the enterprise are made efficiently.	Mean: 5.77
3.	DM-3	Decisions in the enterprise are made in a timely manner.	Mean: 5.35
4.	DM-4	Decisions in the enterprise generally give positive results on the quality of business.	Mean: 5.41

Table A2. Cont.

5.	DM-5	Decisions in the enterprise generally give positive results on productivity.	Mean: 5.37
6.	DM-6	Decisions in the enterprise generally give positive results on human resource management.	Mean: 5.75
7.	DM-7	Decisions in the enterprise generally give positive results on quality.	Mean: 5.21
8.	DM-8	The time required to make a decision is short.	Mean: 5.34
9.	DM-9	Decision making takes into consideration long-term sustainability.	Mean: 5.43
10.	DM-10	Decisions are often made with the goal of sustainable development.	Mean: 5.65
11.	DM-11	Decisions have a positive effect on the long-term goals of the enterprise.	Mean: 5.43
12.	DM-12	Decisions are an important aspect of the enterprise's business.	Mean: 5.60
13.	DM-13	Decision making is essential for the enterprise's business.	Mean: 5.46
14.	DM-14	Without good decisions, business performance would be poorer	Mean: 5.18
4. Sustainable Business Performance and Competitiveness (SBPC)			
Below are scale-type questions regarding decision making in enterprises. Please select an answer from 1 to 7: 1—very low; 3—neutral opinion; 7—very high			
1.	SBPC-1	Operational efficiency of employees.	Mean: 5.52
2.	SBPC-2	Quality of realized work.	Mean: 5.76
3.	SBPC-3	Quality of realized services.	Mean: 5.42
4.	SBPC-4	Sustained enterprise profitability.	Mean: 5.45
5.	SBPC-5	Quality of supplier services.	Mean: 5.51
6.	SBPC-6	Communication with suppliers.	Mean: 5.64
7.	SBPC-7	Supplier performance (accuracy and delivery time of products and services).	Mean: 5.66
8.	SBPC-8	Timely delivery of products and services.	Mean: 5.60
9.	SBPC-9	Inventory of unfinished products.	Mean: 5.43
10.	SBPC-10	Return on investment.	Mean: 5.24
11.	SBPC-11	Achieving financial goals.	Mean: 5.48
12.	SBPC-12	Overall business profitability in the long-term.	Mean: 5.36
13.	SBPC-13	Sustainable growth of market share.	Mean: 5.12
14.	SBPC-14	Annual turnover.	Mean: 5.34
15.	SBPC-15	Sustainable growth in revenue from sales of products and services.	Mean: 5.28
16.	SBPC-16	Sustainable growth in the number of new customers/services.	Mean: 5.23
17.	SBPC-17	Sustainable growth of revenue from sales of products/services to existing customers.	Mean: 5.68
18.	SBPC-18	The impact of unfair competition on revenue decline.	Mean: 5.41
19.	SBPC-19	Public relations.	Mean: 5.28
20.	SBPC-20	Monitoring the needs and desires of consumers.	Mean: 5.16

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