RICHTMANN
P U B L I S H I N G

The Balanced Score Card as a Predictor of Supply Chain Improvement for ACES Peru, 2022

Roberto Daniel Souza Galo

Jesús Fernando Bejarano Auqui

Yngue Elizabeth Ramírez Pezo

Universidad Peruana Unión,
Carretera Central Km 19.5 Ñaña,
Chosica, Peru
*Corresponding Author

Abstract

The application of Balance Score Card (BSC) and Supply Chain (SC) as structured methods of strategic analysis is scarce and controversial in the business management of some companies, except in large industries competing in the globalized market. The objective of the study was to analyze the Balance Score Card as a predictive tool to improve the Supply Chain (SC) of the company ACES Peru, 2022. The study evaluates the BSC variables and the five dimensions of the CS variable: Supply, production, storage, transportation and distribution, a total of 24 items on a Likert scale. A total of 260 responses were collected from those who participated in the survey. Statistically, exploratory factor analysis, Varimax factorial rotation, KMO, CFI, TLI and RSMA tests were used. The results show that BSC was not a significant predictor of CS; however, the BSC variable is a significant predictor of the dimensions of the CS variable. In these circumstances the BSC model assumes the role of evaluator of the management strategies developed in ACES and improver of the predictor level of CS and its dimensions.

Keywords: BSC, CS, strategy and business management

1. Introduction

The continuous search for and implementation of new and more effective methods and practices of business management and measuring organizational performance has been the result of visible changes in business activities, which in recent decades have accentuated the urgent need for change and improvement both for the operating results and for the financial system of the company itself. The research is related to the topic of Balance Score Card (BSC) and Supply Chain (SC), which can be defined as effective tools to evaluate the efficiency of business management and supply chain performance linked to the business process to increase competitive advantage (Mañay et al., 2020).

As they enter the market, customers are becoming increasingly sophisticated in their demands and are strongly influenced by information technology and knowledge. Currently, companies participate in the market by offering traditional service, little used and integrating tools such as BSC

and CM at the expense of adopting new management practices that improve the financial situation. According to (Diaz & Marrero, 2014) the continuous search and application of new and more effective management techniques and practices to plan and measure organizational performance should be the result of a visible change in the business scenario, however, for decades companies have an urgent need to change and improve the operations of organizations as well as financial systems. From this, it follows that the use of BSC and CS is increasingly based on business management and decision making (Garcia et al., 2022, these control tools systematize and control the implementation of influential management strategies). Faced with this problem, companies are constantly facing new challenges to make fundamental changes in their structure, strategy and way of working in order to provide the market with high quality products and efficient services that meet customers' consumption expectations. Furthermore (Bisbe & Barrubés, 2014) this management tool must be organized in such a way that it transmits information from the top down, providing useful information for decision making by all the people in the organization and from the bottom up to achieve the objectives, mission and vision provided by the company.

Based on this scenario, the study is conducted because ACES lacks integration, coordination and rationality in its processes, due to the lack of logistics management methods that facilitate its design and management, avoiding the necessary integration between its elements. The processes in BSC and CS did not determine the adequate implementation of the strategic objectives of the organization, so their contribution to the strategic direction of the company is unknown. This fact motivates to raise the research problem: Is the Balance Score Card a significant predictor tool for the improvement of the Supply Chain of ACES Company, Peru, 2022? In addition, it was considered appropriate to conduct the research, to analyze the Balance Score Card as a predictor tool to improve the Supply Chain of ACES Company, Peru, 2022. In this way, the justification of the research is based on the theoretical perspective, since the findings obtained will act as an informative resource for future studies carried out with the implementation and use of BCC and CS tools.

2. Literature Review

2.1 Balance Score Card

Since the late 60's, the questioning of traditional accounting as a method to verify business growth has arisen. The technological, socio-cultural and political change of the 70s, has generated a global and dynamic environment for companies in which competition became increasingly holistic (Gago & Vitson, 2023, the Balance Score Card is a holistic approach to evaluation, control and rational decision making). This scenario has led to changes in business management, in its control, costing and manufacturing systems. Products have shorter life cycles where business success is linked to customer satisfaction, innovation, quality, delivery time flexibility, among others, which affects productivity and market penetration (Costa et al., 2015).

The Balance Score Card (BSC) or Balanced Scorecard (BSC) emerged in the 1990s with (Kaplan and Norton, 1992). This is the result of a study of 200 companies, sponsored by KPMG in 1990 called "Measuring the performance of the company of the future". This study attempted to answer questions arising from the challenges companies face in creating value when they focus solely on financial valuations without emphasizing non-financial aspects. The study highlighted the importance of achieving a balance between short-term and long-term objectives for financial and non-financial measures. Since then, its evolution has been rapid in the business scenario (Carvajal et al., 2022). Business analysis not only improved accounting work but also business management strategies (Araújo et al., 2011). Thus BSC has become an integral part of any bank's work, because it is an integrated system and under its umbrella there are many important subsidiary control systems represented by accounting, financial and administrative control systems (Al-Hawatmed & Al-Hawatmed, 2016). Therefore, banks should cooperate with them if they want to prepare transparent and high quality financial statements. There are banks that work in the financial sector, because they

emphasize the social, local and global levels and the market focuses on them and the gradual increase of investment, they are important banks all the time because they bet on banking assets and the prevention of illegal methods makes them more in need of protecting the assets of banks (Mustafa & Dammak, 2023). The BSC is a tool that is presented as one of the most used in business management. It analyzes dimensions or focuses on different agents and can guide objectives, indicators, goals and action plans in a coordinated manner. It has a "linkage" of the network of indicators, both at the strategic and operational levels of the organization (Frezatti et al., 2014). It is an important element for the implementation of management strategies. It is a method of obtaining and classifying information generated by management control systems. It is developed from the base to the highest levels of management providing a global perspective of the company with the objective of facilitating decision making in order to carry out a correct management of the company (in this regard Romani et al., 2022) considers that the BSC is a management tool that interrelates objectives, indicators, goals and initiatives with the vision of the company and its strategy). In addition, it serves as a communication channel between the different levels of the company, whether horizontal or vertical, and informs the evolution of the strategy and business objectives. It is useful in the communication of the mission and strategy that the company has, which means an important element in the measurement of the degree of achievement of institutional objectives (Díaz & Marrero, 2014). It has the potential to contribute to a better implementation of the strategy by measuring and monitoring results (Bisbe & Barrubés, 2012).

2.2   The Balance Score Card as a business management model

It is considered a management model or tool that allows the measurement and management control of areas considered critical, and is applicable to the entire organization, in order to increase its profitability and optimization (Mendoza, 2015). In fact, an organization that uses process-based tools will achieve business profitability.

According to (Sanchez et al., 2015), the BSC approach, objectives, factors and indicators are structured in four main interrelated groups, each of which represent different perspectives of the company to entrepreneurs that allow them to examine their companies by establishing objectives from four different perspectives that provide answers to four basic questions (Figure 1):

1. **Financial perspective.** To maximize shareholder value through performance measures that reflect the growth and sustainability of the business, what should we do and what financial goals should we set, and how should the company present itself to its shareholders and investors to be financially successful? According to (Esteban et al., 2022) public or private funders want to know all the intricacies of each structure in order to be able to demonstrate that their resources have a measurable impact and that they are part of a meaningful institution in the ethical sense of the intervention.

2. **Customer perspective**. To achieve the financial objectives, strong emphasis must be placed on keeping current customers and acquiring new ones in the future, what should we do and how do we measure our preposition of value for the customer, how should the company appear to its customers to achieve its mission? According to (Ramos et al., 2020) this perspective has the attributes of service quality, image and customer relationships. The objectives and indicators in this vision are related to the social impact or the satisfaction that the organization obtains from the results..

3. **Perspective of innovation, learning and growth.** In this category, the business needs to focus especially on this area if it wants long-term results, what aspects are critical to maintain such excellence, how will the company maintain its capacity, improving and changing to achieve its mission, and what strategic resources of all kinds are available to the company: people, competencies, skills and technology? In addition (Murillo, 2020) believes that this perspective describes the intangible assets (human capital, information capital and organizational capital) that are necessary to create strategies, create customer value and,

consequently, achieve financial goals.

4. **Internal process perspective.** Strategic objectives should be determined that are related to the important operations of the organization to satisfy customers and shareholders, in what must the company be excellent in order to satisfy shareholders/investors and customers? In this scenario (Kaplan & Norton, 2004) consider that this perspective describes the important actions that the organization must take to satisfy customer needs. It is determined by these operational decisions that affect the shareholder's investment plan.
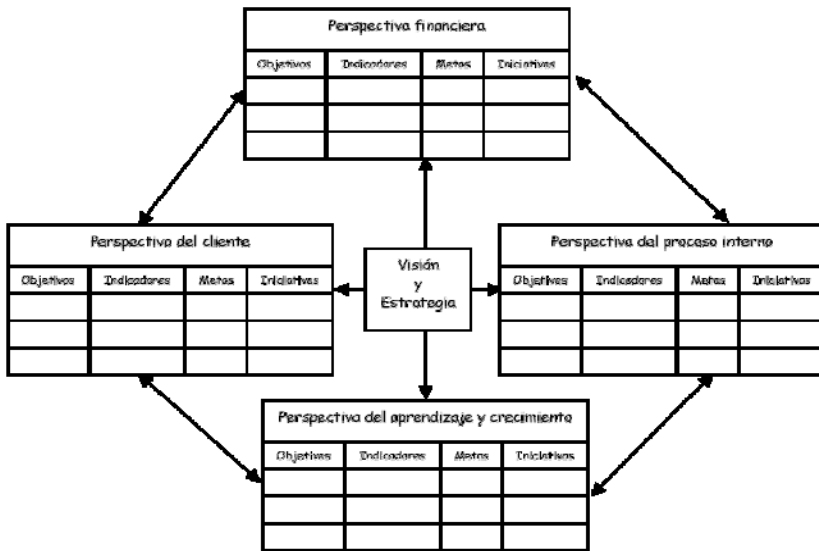

Figure 1. Balance Score Card taken from Costa et. al (2015) and Kaplan and Norton (1992).

Figure 1 shows that the perspectives correspond to the different groups that make up the performance analysis in any organization. They frame the strategic objectives, their indicators and goals and the strategic projects to be considered by companies (Carvajal et al., 2022). Some benefits generated by this model include: They develop a comprehensive approach to plan, evaluate, and direct people towards the company's strategy. They help define new ways to achieve customer and shareholder objectives. They are changing the way they measure and manage business from a tangible and intangible approach. Finally, it is a tool to mobilize people for the fulfillment of the organization's mission.

2.3 Supply chain

The system in the supply chain is made up of stocks or flows for the acquisition, storage and transformation of inputs into outputs (Hernández et al., 2017). The flow channel represents the sequence of manufacturing and logistics steps until the product reaches the market. Competitiveness depends on the logistics efficiency of the supply chain (Balza-Franco & Cardona-Arbelaez, 2020). The objective of a supply chain should be to maximize the total value generated. The value that a supply chain generates is the difference between what the final product is worth to the customer and the costs that the chain incurs to fulfill the customer's request. For most supply chains, value will be closely correlated with supply chain profitability (also known as supply chain surplus), which is the difference between the revenue generated by the customer and the total cost of the supply chain

(Chopra & Meindl, 2008). The modern globalized environment changed the traditional actors of business rivalry from a competition between individual organizations to one between supply chains, integrated by multiple companies that guarantee the flow of the product (Morcillo-Bellido, 2018).

The main axes of the supply chain are the suppliers, the transformation and distribution areas. The integrated work of these three components allows the product to reach the final consumer. Therefore, many organizations have their supply area as a competitive advantage (Pérez, 2020). It is considered that the supply chain is composed of various stages, in which different links participate, giving activities such as supply, production, storage, transportation, distribution and customer (Gutierrez, 2021 and Garcia, 2018). The main symptoms of inefficiency of companies that lose profitability in their supply chain are excess inventories, breakage of sales due to lack of product, late deliveries, delay in the production schedule, lack of components and materials, lack of synchrony between sales, level of customer service, constant staff turnover, lack of automation in processes, shortage and cost of human talent, among others (Torres & Calsina, 2020).

During the last two decades, supply chain management has become an important research topic in the business literature. It has also been shown that well-managed supply chains can provide competitive advantages for organizations, regions and countries (Vinajera-Zamora et al., 2020). A supply chain consists of all those parties involved, directly or indirectly, in satisfying a customer's needs and expectations. The supply chain includes not only the manufacturer and supplier, but also transporters, warehousers, retailers and even the customers themselves (Manrique et al., 2019). Suppliers are individuals or organizations that offer, grant or lease the raw material. Manufacturers are those who transform raw materials and inputs into finished products. They are the ones who manage the logistics. Customers and their satisfaction are the business objective, and they expect a good distribution channel. Another important element of the supply chain is communication. A supply chain is dynamic and involves a constant flow of information, products and funds between the different stages (Chopra & Meindl, 2008). The integration of processes in a supply chain improves its level of competitiveness, generating products in the required quantity, conditions and time, at a low cost. (González et al., 2018).

2.4 Factors relevant to supply chain development

Supply chains must be managed, which means organizing, planning, directing and controlling all phases of their integration. However, the supply chain planning phase in companies has proven to be an underdeveloped topic (Calderón et al., 2017). Most business units, are part of a supply chain with informal links, which generates an inefficient use of resources and has a negative impact on profitability. (Banda et al., 2022) to reduce these inefficiencies in supply chains and assume an operability, two factors have been studied: The support part and the technical part.

1. The support part is based on three factors: strategy, organizational structure and organizational culture, constituting the basis of a continuous improvement process. According to (Mendez, 2019) culture and strategy are two concepts that have been used in recent decades for the management of organizations that play an important role in the strength of the current organizational structure. The emergence and use of these concepts makes it a topic of interest in education, discussion and top management, where knowledge and intelligence of business management is important. In fact (Bejarano et al., 2023) highlights that business intelligence is a set of skills that a business organization has or collects to find, collect, interpret and prepare information and information decision support necessary to create and implement a competitive strategy. Business intelligence is not limited to a strict management of science and technology. But a comprehensive understanding of the process enables entrepreneurs to make decisions such as market size, assumptions about potential projects, regulatory and social frameworks, and the forces of supply and demand that affect business competitiveness.

2. As far as the technical part is concerned, this is integrated by the identification of its flows

and its subsequent improvement process. The identification of the chain flows is made up of five factors: First, the process and sub-process networks. In this regard (Peralta, 2021) considers that the integration of the various processes of the company contributes to the global vision of the company; this global vision allows structuring the scorecards, as well as coordinating the activities developed at the different levels of the company. Second is the recording of information. Third are the information management systems. In other words (Vásconez et al., 2020) it improves business performance while making information accessible and proactive for informed decision making. Fourth, it refers to the requirements of the necessary personnel. Accordingly (Rodriguez & Calcerrada, 2020) state that companies that want to remain competitive in the long term must develop differentiation strategies in their recruitment and selection processes for qualified and sufficiently motivated employees to ensure proper integration into the business value chain. Five refers to the external collaborators that are required for the supply chain to be effective, efficient and competitive. Indeed (Bautista-Santos et al., 2015) the basis of external cooperation is the exchange of information, functions, knowledge and business processes in order to create competitive advantage in the supply chain, which includes employees, customers, suppliers and partners. Partner collaboration begins with the recognition that the success of each member depends on the satisfaction of other members and customers. Thus, the factors studied are necessary and required for the development and implementation of the supply chain in an integrated, sustainable and competitive manner.

3. Methodology

The fact that the Balanced Scorecard as a management control tool is a complex phenomenon that is not yet fully represented in companies prevents them from measuring the performance of financial and non-financial indicators and using them as a predictor to improve the supply chain (Pasache & Neyra, 2022). To better understand the problem under study it is necessary to collect, analyze and process data to empirically confirm the importance of companies' investments in the implementation of the CMI to monitor all company parameters and get a real picture of what, happening inside the company, and externally. To this end, a research question was formulated: Is the Balance Score Card a significant predictor tool for improvement of the Supply Chain of the ACES Company, Peru, 2022? which the research work gave an answer in the structural model of Figure 2.

We searched for research articles in scientific databases such as Scopus published in the last 5 years in the top quartile (Q2, Q3 and Q4) that provided information on the variables under investigation.

4. Participants

The participants in this study were ACES executives and clients. The study was conducted between January and March 2022. Non-probability sampling was used for convenience. The measurement instrument was applied to Questionpro software and QR codes or links were distributed at staff meetings scheduled for this purpose, and the links were shared virtually to the samples for convenience through emails and social networks.

5. Instrument Validation

The validity of the items of the instrument for each variable was validated considering its content and semantics by videoconference through two focus group sessions using the Zoom platform. This focus group was formed by four professional experts in management and marketing with three years of experience in BSC and Supply Chain. The experts evaluated the content, relevance, clarity and sufficiency of the questions for each variable. Subsequently, recommendations for improvement of

the questionnaire and its scales were taken into account, confirming the content validity of the instrument.

To measure the BSC variable construct, the dimensions of financial perspective, customer perspective, process perspective and learning and development perspective developed by (Sanchez et al. (2016) and (Kaplan & Norton (1992) were used. This instrument consists of 11 items. The items use a format represented by scales with 4 responses where 0 - 25% represents does not belong and 76 - 100% if it belongs.The BSC variable was explored through an exploratory factor analysis with the objective of identifying and understanding its internal structure. Principal component analysis was used together with Varimax factor rotation. The Kaiser Mayer Olkin test revealed that the values of the BSC variable were greater than 0.7 (KMO= 0.944) indicating that the matrix is factorizable. In determining the number of factors, it was observed that only one factor underlies the items. The least squares method and Varimax rotation were used to estimate this. The one-factor analysis explains 67.07% of the variance of the BSC construct. In addition, the composite reliability (CR) was found to be 0.91, the average variance extracted (AVE) is 0.50 and the construct reliability (CA), measured by Cronbach's alpha is 0.950 as shown in Table 1.

Table 1. Reliability and Validity of the BSC Constructs (n = 260)

Constructs	Factor loadings	Communalities	CR	AVE	CA
CM1 Profitability per customer (ROI)	0.768	0.590	0.91	0.50	0.950
CM2 Revenue percentages	0.760	0.578			
CM3 Service sales growth rate	0.841	0.707			
CM4 Level of satisfaction with the service	0.781	0.610			
CM5 Level of satisfaction with the process	0.863	0.744			
CM6 Perception of the value proposition	0.796	0.633			
CM7 Biosafety processes of the service	0.873	0.762			
CM8 Percentage of annual employee training courses	0.836	0.699			
CM9 Level of employee satisfaction	0.766	0.586			
CM10 Level of knowledge about the company's business philosophy and strategic plan CM11 Level of knowledge about the company's business philosophy and strategic plan	0.831	0.691			

To measure the second construct of the supply chain variable, we worked with the dimensions of supply, production, storage, transportation and distribution developed by (Cardenas (2017) and (Lozano (2017). This instrument contains 24 items. The items employ a format represented by scales where 1 represents never and 7 always. The study determined that the CS variable is factorizable, since the Kaiser Mayer Olkin test showed values greater than 0.8. (KMO = 0.902). The composite reliability (CR) of the constructs was found to be greater than 0.7; the mean variance extracted varies between 0.498 and 0.517; the reliability of the constructs obtained by Cronbach's alpha ranges between 0.817 and 0.889 as can be seen in Tables 2 and 3.

Table 2. Composite reliability, mean variance extracted and variable reliability. CS (n = 260)

Constructs	CR	AVE	CA
Supply	0.809	0.517	0.819
Production	0.832	0.498	0.889
Storage	0.799	0.500	0.847
Transportation	0.835	0.506	0.821
Distribution	0.836	0.505	0.817

Table 3. CS Constructs

BUILDINGS	ABA	PRO	WARE	TRA	DIS	COMMUNITIES
Aba1: Plan the supply/purchase of materials and inputs for manufacturing.	0.768					0.823
Aba2: Know the number of orders for the month.	0.760					0.794
Aba3: Use techniques to make short, medium or long term demand forecasts.	0.841					0.681
Aba4: Involves their suppliers and/or customers in their materials planning.	0.850					0.801
Pro1: Knows and explains the flow of incoming and outgoing materials in their production processes.		0.796				0.616
Pro2: Determine a minimum stock for the production of your items.		0.873				0.743
Pro3: Evaluate the ability of suppliers to meet their production plans.		0.836				0.706
Pro4: Determine the shrinkage levels that are likely to arise from the production of each garment.		0.766				0.761
Pro5: Anticipate the impact of unplanned orders on production planning.		0.880				0.733
Warehouse1: Are spaces for receiving raw materials and products with frequencies available?			0.715			0.651
Warehouse2: Warehouse areas are signposted.			0.723			0.712
Warehouse3: The location of raw materials and finished products in the warehouses is organized and allows them to be quickly located and dispatched.			0.778			0.729
Warehouse4: The available warehouses are suitable areas for heavy products arriving from abroad.			0.761			0.710
Tra1: The company has optimal route plans for order delivery.				0.803		0.685
Tra2: The company has contingency plans to serve the customer in case the product arrives defective.				0.647		0.569
Tra3: The company meets product delivery deadlines.				0.681		0.653
Tra4: Product shipments arrive in good condition				0.735		0.658
Tra5: The company has means of transportation to move the goods and is reliable				0.748		0.598
Dis1: You know the process of delivering orders to customers and what kind of follow-up is done to the shipment					0.659	0.725
Dis2: They establish delivery routes for orders and how customers can follow up on their orders					0.672	0.789
Dis3: They know the criteria for rating the carrier and what indicators exist that measure delivery time					0.558	0.742
Dis4: Identify how they proceed in billing their customers and at what point the billing is sent out					0.662	0.777
Dis5: Establish control methods prior to shipment of orders to avoid returns					0.628	0.731
Dis6: The customer follows up on their orders according to order order order.					0.548	0.657

6. Data Collection

To collect the information, a quantitative analysis survey was designed for the General Manager, Sales Manager and Purchasing Manager, clients of ACES based on the dimensions of the variables. The questionnaire was stored in Questionpro software, which included an informed consent section for the purpose of the study, allowing participants to participate freely and voluntarily by answering the questions in the questionnaire. To be assured that their data would be treated anonymously and only for research purposes. After accepting consent, participants answered the survey questions virtually according to the schedule. A link to answer the survey questions was shared virtually via WhatsApp (Table 4).

Tabla 4. Research technical data sheet

Ítem	Description
Geographic scope	Lima, Peru
Sample size	260
Type of sampling	For convenience
Data collection	Through Questionpro.
Data collection period	January - March, 2022.
Statistical analysis	EFA[1], CFA[2], SEM[3]

1EFA: Exploratory factor analysis 2CFA =Confirmatory factor analysis 3SEM= Structural equations

7. Results

To test the hypothesis, structural equation analysis was performed according to management perceptions, using Amos V26 statistical software. Table 5 shows the results obtained, where no significant relationship was found between BSC and CS ($\beta = 0.147$) ($p > 0.05$). On the other hand, the correlation between the sourcing dimension and scorecard was positive, significant ($p < 0.05$) and weak ($\beta = 0.119$). Similarly, the production, storage, transportation and distribution dimension had a weak correlation ($\beta < 0.3$) significant ($p < 0.05$) with the scorecard variable (BSC).

Table 5. Hypothesis test result

Predictor		Standard parameter estimates	Hypothesis
Dependent variable	Independent variable		
Supply chain (SC)	Balanced Scorecard (BSC)	0.147	Ha
Supply (Aba)	Balanced Scorecard (BSC)	0.119[++]	Ha$_1$
Production (Prod)	Balanced Scorecard (BSC)	0.123[++]	Ha$_2$
Storage (Warehouse)	Scorecard (BSC)	0.149[++]	Ha$_3$
Transportation (Tranp)	Scorecard (BSC)	0.139[++]	Ha$_4$
Distribution (Dist)	Balanced Scorecard (BSC)	0.109[++]	Ha$_5$

Figure 2 shows the BSC structural model and the CS variables. The initially achieved goals did not meet the established criteria, so the items belonging to dimension 03 "distribution" (storage 4, distribution 4, distribution 5 and distribution 6) were eliminated. The new measures obtained were: $\chi 2/gl = 1.413$; CFI = 0.918, TLI = 0.910, SRMR = 0.077 and RSMA = 0.065. From these estimates, it was found that the BSC variables were not significant predictors of CS ($p > 0.05$); however, the BSC variable is a significant predictor of the dimensions of the CS variable ($p < 0.05$).
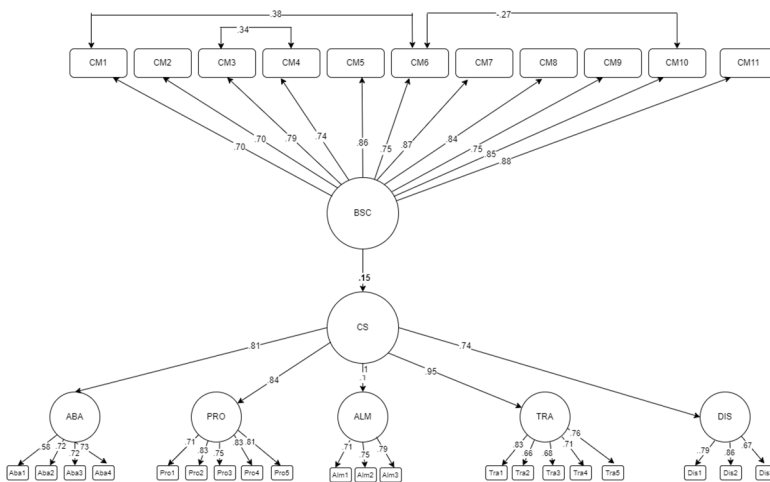

Figure 2: Conceptual model - Balance Score Card and Supply Chain Scorecard

The BSC and the CS variables were analyzed by exploratory factor analysis to identify and understand their internal structure. Principal component analysis and Varimax factor rotation were used. The Kaiser Mayer Olkin test yielded values for the BSC variable (KMO= 0.944) higher than 0.7, indicating that the matrix is factorial. Similarly, when determining the number of factors, it was recognized that behind the items there is a factor; the least squares method and Varimax rotation were used for its

estimation. The factor analysis explains 67.07% of the variance of the BSC construct. On the other hand, it was found that the composite reliability (CR) was 0.91, the average variance extracted was 0.50 and the construct reliability by Cronbach's alpha was 0.950 as shown in Table 6.

Table 6: Reliability and validity of the constructs of the balance score card

Constructs	Factor Loadings	CR	AVE	CA
Scorecard		0.91	0.50	0.950
SC1	0.768			
SC2	0.760			
SC3	0.841			
SC4	0.781			
SC5	0.863			
SC6	0.796			
SC7	0.873			
SC8	0.836			
SC9	0.766			
SC10	0.831			
SC11	0.880			

For the supply chain variable, the perceptions of general management (KMO = 0.843), sales management (KMO = 0.902), and purchasing management (KMO = 0.936) were considered. The validity and reliability of each construct was measured individually based on the perception of the surveyed areas. As shown in Tables 6, 7 and 8.

For the perception of general management, the weights of the factor loadings range from 0.548 to 0.880. The composite reliability (CR) has values greater than 0.7; the reliability of the constructs using Cronbach's alpha is greater than 0.8. Finally, it was found that the production construct has a mean variance extracted of 0.498; this is the minimum value reached in five constructs and the maximum value corresponds to supply.

Table 7. Validity and reliability of supply chain constructs - General Management

Perceptions	Constructs	Factor Loadings	CR	AVE	CA	Perceptions	Factor Loadings	CR	AVE	CA
	Supply		0.809	0.517	0.819	*Transportation*		0.835	0.506	0.821
	Sup1	0.768				Tra1	0.803			
	Sup2	0.760				Tra2	0.647			
	Sup3	0.841				Tra3	0.681			
	Sup4	0.850				Tra4	0.735			
General Management						Tra5	0.748			
	Production		0.832	.498	.889	*Distribution*		0.836	0.505	0.817
	Pro1	0.796				Dis1	0.659			
	Pro2	0.873				Dis2	0.672			
	Pro3	0.836				Dis3	0.558			
	Pro4	0.766				Dis4	0.662			
	Pro5	0.880				Dis5	0.628			
	Warehousing		0.799	0.500	0.847	Dis6	0.548			
	Ware1	0.715								
	Ware2	0.723								
	Ware3	0.778								

In the perception of sales management, Cronbach's alpha construct reliability and composite reliability were found to be greater than 0.7. Values lower than 0.7 but higher than 0.4 were found for factor loading, ranging from 0.488 to 0.834. Finally, the constructs supply, storage and distribution have a mean variance extracted of about 0.5.

Table 8. Validity and reliability of supply chain constructs - Sales Management

Perceptions	Constructs	Factor Loadings	CR	AVE	CA	Constructs	Factor Loadings	CR	AVE	CA
	Supply		0.797	0.499	0.848	*Transportation*		0.764	0.501	0.851
	Sup1	0.488				Tra1	0.797			
	Sup2	0.714				Tra2	0.663			
	Sup3	0.772				Tra3	0.581			
	Sup4	0.589				Tra4	0.824			
Sales Management						Tra5	0.599			
	Production		0.854	0.500	.865	*Distribution*		0.734	0.499	0.757
	Pro1	0.738				Dis1	0.570			
	Pro2	0.676				Dis2	0.706			
	Pro3	0.778				Dis3	0.704			
	Pro4	0.623				Dis4	0.744			
	Pro5	0.627				Dis5	0.747			
	Pro6	0.494								
	Warehousing		0.747	.498	.861					
	Ware1	0.778								
	Ware2	0.834								
	Ware3	0.707								

In terms of the perception of purchasing management, the factor loadings range between 0.699 and 0.850. The overall reliability of the constructs is higher than 0.7. These values are acceptable, in agreement with what was stated by (Yang & Green, 2015). On the other hand, Cronbach's alpha reliability exceeds the minimum acceptable value (0.70). Finally, the production and distribution constructs have a mean variance extracted close to 0.5 (Table 9).

Table 9: Validity and reliability of the supply chain constructs - Purchasing Management

Perceptions	Constructs	Factor Loadings	CR	AVE	CA	Constructs	Factor Loadings	CR	AVE	CA
	Supply		0.832	0.500	0.883	*Transportation*		0.832	0.500	0.910
	Sup1	0.753				Tra1	0.778			
	Sup2	0.807				Tra2	0.785			
	Sup3	0.706				Tra3	0.810			
	Sup4	0.835				Tra4	0.805			
	Sup5	0.741				Tra5	0.852			
Purchasing Management	*Production*		0.893	0.499	.865	*Distribution*		0.798	0.498	0.884
	Pro1	0.761				Dis1	0.699			
	Pro2	0.757				Dis2	0.677			
	Pro3	0.850				Dis3	0.828			
	Pro4	0.815				Dis4	0.732			
	Pro5	0.729				Dis5	0.778			
	Warehousing		0.799	.500	.856					
	Ware1	0.801								
	Ware2	0.747								
	Ware3	0.811								

8. Discussion

The results obtained reveal the absence of a significant correlation between the Balanced Scorecard (BSC) and the Supply Chain (SC) ($\beta = 0.147$) ($p > 0.05$). These findings disagree with the results obtained by (Balakannan et al., 2016), who identified a significant relationship between both variables

when considering the perceptions of employees of multinational companies. The disparity could be attributed to the inclusion of this factor in their research. On the other hand,(Ahmad & Zabri, 2018) argue that the BSC is not appropriate for small companies, as is ACES Peru, and suggest that its usefulness is limited to specific supply chain activities. Likewise, (Tomas & Hult, 2008) identified a positive impact of the Supply Chain (SC) on the Balanced Scorecard (BSC), encompassing the four elements of balanced scorecard performance: customer performance, financial performance, internal process performance, and innovation and learning performance. Hult argues that this impact is magnified to a greater extent for companies operating in dynamic environments. Furthermore, (Edmond & Soliman, 2014) emphasize that the quality of knowledge and understanding of the Balanced Scorecard within an organization are key determinants of its positive impact. Finally, it is inferred that the lack of correlation could be explained by the diversity of factors and conditions that influence the relationship between the BSC and CS, such as company size, operating environment and management quality.

As for the main finding of this study, it could be attributed to the deficiencies identified in ACES Peru, which were previously pointed out as shortcomings in terms of integration, coordination and rationality in its processes. These deficiencies, in turn, could derive from various factors, such as the lack of communication and collaboration between the different departments, the absence of a culture oriented towards continuous improvement, and the insufficiency of adequate tools and resources.

In addition, it is stressed that the Balanced Scorecard, by focusing on planning and monitoring strategic business objectives, has limitations in addressing the inherent complexity of the Supply Chain, which involves numerous actors and processes. Thus, while the BSC can be a valuable starting point for SC optimization, it fails to provide a comprehensive view of the system as a whole. Ultimately, the possibility arises that, although the BSC has had a positive influence on the Supply Chain, this influence was not evident in the analysis performed.

9. Conclusions

The BSC tool is not just an estimate because it allows the different levels of business management to focus on the most important aspects of the organization. Today, topics such as competitiveness, productivity, business management capabilities, economic development plans, marketing strategies, benchmarking, outsourcing, innovation, organizational culture, etc. appear on the form. The only way to provide a good organizational solution is confusion and bewilderment when using any of them, so BSC is presented as a predictor of CS improvement for ACES business development.

Defining key processes to ensure that new knowledge comes out and changing inaccurate information leads to better management. In many cases, what is observed and experienced today is the attachment of people to tradition, extreme behavior, maintenance and development of successful solutions of the past, not the complex business vision of the 21st century. The BSC assumes the role of the strategic management system, with CS being immersed in it.

Based on this scenario, what is ACES' strategy for change in the 21st century? The answer is a comprehensive business proposal that focuses on the short and long term and defines: what? and how? to produce. To develop the competitiveness of the organization, the BSC is used as a management evaluation tool for both the company and national competitiveness.

Finally, the results indicate that no significant relationship was found between BSC and CS (β =.147) (p>0.05). However, the BSC variable significantly predicts the dimensions of the CS variable. In order to achieve a more convenient analysis of the management performed by the work teams, it is possible to determine the need to change, replace or add business management strategies to more conveniently analyze the management performed by the work team. In view of the above, the BSC model was created. It served as a basis for evaluating the measures to be developed by ACES to improve the predictive level of the CS dimensions. We can state that the BSC is a management system that is based on the dedication and involvement of all employees to achieve the success and objectives of the company.

10. Recommendation

> ➤ ACES management must establish a management strategy that is not a set of rules to follow, but a philosophical approach to the business. Executives must first think strategically and then apply the process called for by BSC.
> ➤ Management must define roles and tasks to make the company more efficient and communicate that BSC is a predictor of CS with implications for short and long term business plans.
> ➤ Management should invest in staff training in BSC and CS so that employees can identify with the company's organizational culture and participate in the global marketplace with a greater competitive advantage.
> ➤ Management must involve all employees because the BSC requires integration. Regardless of their position in the organization chart, everyone has to work on the change processes and achieve the company's objectives.
> ➤ Management should prioritize the management process by identifying the most urgent and essential needs and goals of the company.
> ➤ Management and its technical team should verify that the BSC management process is being followed and evaluate its performance.

11. Implications

This article recommends ACES to design BSC and use CS to improve business performance and reduce the risk of its market share. Contrary to the fact that the BSC model is a complex tool related to the management of large companies, it is offered as a predictor of CS dimensions and a strategy to improve the company's financial plan.

There are studies that show the benefits of the BSC as a management measure. In this sense, CS and its dimensions are important indicators through which new companies can accept, reject or assume that the implementation of an intelligent administrative management can generate income and obtain a financial balance that allows the company to participate in the continuity of the market, with less risk and payment capacity. This article argues that the relevance of what is measured will vary for each BSC model and business model. Given the information available, ACES must develop and manage not only the key aspects for attracting new customers, but all aspects that can concretize and develop what is intended in the business model.

The practical implication is the recommendation to give the Balanced Scorecard (BSC) a role as a component, instead of considering it as a single solution. It is advocated to promote the integral implementation of the BSC, with the active participation of all organizational levels, and its combination with other improvement strategies, such as the adoption of a logistics management system. This comprehensive approach entails the definition of specific key performance indicators (KPIs) for the Supply Chain (SC), as well as the promotion of effective collaboration between the various departments involved in the Supply Chain. The implementation of these strategic measures is postulated as a potential way for ACES Peru to optimize the integration, coordination and rationality of its processes, factors which, in turn, can have a positive impact on the effectiveness of Supply Chain management. In this sense, it is proposed that the coordinated implementation of these practices can contribute to enhance operational efficiency and organizational synergy in the field of logistics and supply chain management of the aforementioned entity.

References

Ahmad, K., & Zabri, S. M. (2018). The deployment of performance measurement system under the supply chain management environment: The case of Malaysian manufacturing companies. *Management and Production Engineering Review, 9*(1), 3–12. https://doi.org/10.24425/119395

Al-Hawatmed, O., & Al-Hawatmed, Z. (2016). aluación de unidades de control interno parala eficacia del control financiero en las unidades administrativas del gobierno: un estudio de campo enJordán. *European Scientific Journal*, *12*(13).

Araújo, R. P., La Torre, J. M., López, A. M., & Bastos, S. (2011). El clima organizacional en el diseño del Balanced Scorecard: Evaluación psicométrica de un instrumento de medida. *Contabilidade Vista & Revista*, *22*(1), 107–141. https://www.redalyc.org/pdf/1970/197017517005.pdf

Balakannan, K., Nallusamy, S., Chakraborty, P. S., & Majumdar, G. (2016). Performance evaluation of supply chain and logistics management system using balanced score card for efficiency enhancement in Indian automotive industries. *Indian Journal of Science and Technology*, *9*(35). https://doi.org/10.17485/ijst/2016/v9i35/100836

Balza-Franco, V., & Cardona-Arbelaez, D. (2020). La relación entre logística, cadena de suministro y competitividad: una revisión de literatura. *Rev Espacios*, *41*(19), 179–196. https://www.revistaespacios.com/a20v41n19/a20v41n19p13.pdf

Banda, H., Garza, R., & Cepeda, L. (2022). Cadena de suministro para pequeñas y medianas empresas de servicios industriales: Desarrollo y aplicación de modelo de gestión. *Revista Venezolana de Gerencia*, *27*(97), 274–28. https://doi.org/org/10.52080/rvgluz.27.97.19

Bautista-Santos, H., Martinez-Flores, J., Fernandez-Lambert, G., Bernade-Loranca, M., Sanchez-Galvan, F., & Sablon-Cossio, N. (2015). Integration model of collaborative supply chain. *Scielo DYNA*, *82*(193). https://doi.org/org/10.15446/dyna.v82n193.47370

Bejarano, J., Ruiz, A., Rodriguez, R., & Aguado, B. (2023). The Entrepreneurial Ecosystem in the Eastern Cone of Lima as a Predictor of Competitiveness and Sustainable Development. *Revista Administrative Sciences*, *13*(1), 12. https://doi.org/org/10.3390/admsci13010012

Bisbe, J., & Barrubés, J. (2012). El Cuadro de Mando Integral como instrumento para la evaluación y el seguimiento de la estrategia en las organizaciones sanitarias. *Revista Espanola de Cardiologia*, *65*(10), 919–927. https://doi.org/10.1016/j.recesp.2012.05.014

Bisbe, J., & Barrubés, J. (2014). El Cuadro de Mando Integral como instrumento para la evaluación y el seguimiento de la estrategia en las organizaciones sanitarias. *Revista Española de Cardiología*, *65*(10), 919–927. https://doi.org/10.1016/j

Calderón, M., Roark, G., Urritia, S., Paravié, D., & Rohvein, C. (2017). Metodología para la clasificación y diagnóstico de cadenas de suministro. *Revista Ciencias Estratégicas*, *25*(38), 279–298.

Cárdenas, C. (2017). *La gestión de cadena de suministro: el modelo scor en el análisis de la cadena de suministro de una pyme de confección de ropa industrial en lima este*. Pontificia Universidad Católica del Perú.

Carvajal, G., Chávez, A., Velásquez, M., & Nogueira, D. (2022). Cuadro de Mando Integral: una mirada desde su evolución. *Revista Venezolana de Gerencia*, *27*(97), 244–256. https://doi.org/org/10.52080/rvgluz.27.97.17

Chopra, S., & Meindl, P. (2008). *Administración de la cadena de suministros. Estrategia, planeación y operación* (3° ed). Editorial Pearson. http://up-rid2.up.ac.pa:8080/xmlui/bitstream/handle/123456789/1340/Administración de la cadena de suministro.pdf?sequence=1&isAllowed=y

Costa, C., Domínguez, J., Hernández, J., Leiva, A. M., & Verdú, F. (2015). Cuadro de Mando Integral (Balanced Scorecard). *Lab. Tecnicas Aplicadas de Gestion*, *1*(1), 1–42. http://www.ucipfg.com/Repositorio/MAES/MAES-03/Unidad4/Cuadro_de_Mando_Integral_(Balance Scorecard).pdf

Diaz, A., & Marrero, F. (2014). El modelo SCOR y el Balanced Scorecard, una poderosa combinación intangible para la gestión empresarial. *Scielo Visión de Futuro*, *18*(1).

Díaz, A., & Marrero, F. (2014). El Modelo Scor y el Balanced Scorecard, una poderosa combinación intangible para la gestion empresarial. *Red de Revistas Científicas de América Latina, El Caribe, España y Portugal*, *18*(1), 36–57. https://www.redalyc.org/articulo.oa?id=3579/357933894002

Edmond, J., & Soliman, F. (2014). The impact of balance score card implementation on supply chain firms. In *Business Transformation and Sustainability through Cloud System Implementation* (pp. 240–257). IGI Global. https://doi.org/10.4018/978-1-4666-6445-6.ch016

Esteban, L., Botija, M., & Ochando, M. (2022). Medición para el cambio en entidades sociales: La elaboración de un Cuadro de Mando Integral. *REVESCO. Revista de Estudios Cooperativos*, *142*, 1–15. https://doi.org/org/10.5209/REVE.84394

Frezatti, F., de Souza, D., Capuano, A. P., & de Camargo, M. J. (2014). O Papel Do Balanced Scorecard Na Gestão Da Inovação. *Revista de Administração de Empresas*, *54*(4), 381–392. https://doi.org/10.1590/s0034-759020140404

Gago, S., & Vitson, T. (2023). Survey-based Evidence on Positive Synergies between Adaptive Cultureand a Balanced Scorecard. *Revista de Contabilidad*, *26*(1), 111–123.

Garcia, E., León, F., Carrasco, Y., & Cabanillas, S. (2022). Cuadro de mando integral y calidad de vida urbana: Estrategias para el desarrollo local. *Revista de Ciencias Sociales, 18*(5), 246–255.

González, A. D., Aponte, B. J., González, A. J., & Vásquez, F. D. (2018). Procesos de negocio de la cadena de suministro avícola. *Revista Venezolana de Gerencia*, 23(82), 479–495. https://doi.org/10.31876/revista.v 23i82.23762

Gutiérrez, G. A. (2021). *Estudio de la cadena de suministro de alimentos perecederos* [Universidad de Lima]. https://repositorio.ulima.edu.pe/bitstream/handle/20.500.12724/13303/Gutierrez_Estudio-cadena-suministro.pdf?sequence=1&isAllowed=y

Hernández, O., Jiménez, J. A., & Marín, T. (2017). Proveedores y modelos de gestión en la cadena de suministro: Pymes manufactureras de Aguascalientes (México). *Revista Faccea, 7*(1), 21–28. http://www.udla.edu. co/revistas/index.php/faccea/article/view/649

Kaplan, R., & Norton, D. (1992). *The balanced scorecard- measures that drive performance* (pp. 71–79). Harvard Business Review.

Kaplan, R., & Norton, D. (2004). Mapas Estratégicos: convirtiendo los activos intangibles en resultados tangibles. *Barcelona: Ediciones Gestión 2000.*

Lozano, B. (2017). *Cadena de suministro en una empresa importadora de herramientas para la industria metalmecánica,lima2017.* Universidad Norbert Wiener.

Mañay, L., Guaita-Pradas, I., & Marquez-Perez, I. (2020). Análisis comparativo de los modelos de la cadena de suministro: ABC, BSC Y SCOR. *Universiitat Politecnica Ded Valencia, 16*(2).

Manrique, M. A., Teves, J., Taco, A. M., & Flores, J. A. (2019). Gestión de cadena de suministro: una mirada desde la perspectiva teórica. *Revista Venezolana de Gerencia, 24*(88). https://doi.org/10.37960/revista.v24i88.30168

Mendez, C. (2019). Elementos para la relación entre cultura organizacional y estrategia. *Scielo Revista Universidad y Empresa, 21*(37). https://doi.org/org/10.12804/revistas.urosario.edu.co/empresa/a.7681

Mendoza, J. (2015). *Aplicación de Balanced Scorecard en el proceso de gestión de la empresa Procesos Textiles E.I.R.L* [Universidad Nacional de Trujillo]. http://dspace.unitru.edu.pe/bitstream/handle/UNITRU/3586/TESIS MAESTRIA JANNIE CAROLL MENDOZA ZUTA.pdf?sequence=1&isAllowed=y

Morcillo-Bellido, J. (2018). Sostenibilidad en la cadena de suministro: evidencias del sector minorista español. *360: Revista de Ciencias de La Gestión, 3*(1), 18–38. https://doi.org/10.18800/360gestion.201803.001

Murillo, L. (2020). Cuadro de Mando Integral para la gestión del impacto social en organizaciones de empleo inclusivo. *CIRIEC-España, Revista de Economía Pública, Social y Cooperativa, 98*, 153–188. https://doi.org/o.7 203/CIRIEC-E.98.13368

Mustafa, A., & Dammak, S. (2023). THE MEDIATING ROLE OF THE BALANCED SCORECARD IN THE RELATIONSHIP BETWEEN INTERNAL CONTROL AND THE FINANCIAL REPORTS QUALITY. *International Journal Of Pofessional Businees Review, 8*(1), 01–11. https://doi.org/org/10.26668/businessr eview/2023

Pasache, M., & Neyra, L. (2022). Percepción de Balanced Scorecard en trabajadores de una universidad privada de Lima, 2020. *Revista Cuvana de Educación Superior, 41*(2).

Peralta, H. (2021). Diseño e implementación del cuadro de mando integral (CMI) para mejorar la gestión empresarial en una empresa de fabricación de tintas para el sector gráfico ubicada en la ciudad de Lima. *Scielo Industrial Data, 24*(2). https://doi.org/org/10.15381/idata.v24i2.18942

Pérez, R. (2020). *Gestión de la cadena de suministros. Revisión bibliográfica desde la logística y la cadena de abastecimiento* [Universidad Tecnológica del Perú]. https://repositorio.utp.edu.pe/bitstream/handle/20.5 00.12867/3959/Roger Perez_Trabajo de Investigacion_Bachiller_2020.pdf?sequence=1&isAllowed=y

Ramos, I., Madrigal, A., Gónzalez, O., Figueredo, R., Rodriguez-Gallo, Y., Barroceta, C., & Gómez, Y. (2020). El Cuadro de Mando Integral como herramienta para gestores deportivos: un acercamiento desde el béisbol cubano. *SPORT TK: Revista Euroamericana de Ciencias Del Deporte, 9*(2), 7–16.

Rodriguez, J., & Calcerrada, S. (2020). La importancia de gestionar el proceso de reclutamiento, selección y socialización en el sector del autobús: un caso de éxito. *Revista Espacios, 41*(3), 18.

Romani, L., Botija, M., & Ochando, M. (2022). Medición para el cambio en entidades sociales: La elaboración de un Cuadro de Mando Integra. *REVESCO. Revista de Estudios Cooperativos, 142*, 1–15. https://doi.org/org/10.5 209/REVE.84394

Sánchez, J. M., Vélez, M. L., & Araújo, P. (2015). Balanced Scorecard para emprendedores: desde el modelo Canvas al cuadro de mando integral. *Revista Facultad de Ciencias Económicas, 24*(1), 37–47. https://doi.org/10.18 359/rfce.1620

Sánchez, J., Vélez, M., & Araújo, P. (2016). Balanced scorecard para emprendedores: desde el modelo canvas al cuadro de mando integral. *Revista Facultad de Ciencias Económicas, XXIV*(1), 37–47.

Tomas, G., & Hult, M. (2008). Supply chain orientation and balanced scorecard performance. In *Article in Journal of Managerial Issues* (Vol. 109). https://www.researchgate.net/publication/285722066

Torres, N., & Calsina, W. H. (2020). Modelo de gestión de la cadena de suministro y la rentabilidad de los principales laboratorios farmacéuticos del Perú. *Industrial Data*, *23*(1), 53–72. https://doi.org/10.15381/idata.v23i1.16265

Vásconez, F., Oleas, M., Bastidas, E., Vásquez, E., & Condo, L. (2020). La gestión de la información y del conocimiento en empresas industriales. *Revista Espacios*, *41*(19), 309–319.

Vinajera-Zamora, A., Marrero-Delgado, F., & Cespón-Castro, R. (2020). Evaluación del desempeño de la cadena de suministro sostenible enfocada en procesos. *Estudios Gerenciales*, *36*(156), 325–336. https://doi.org/10.18046/j.estger.2020.156.3699

Yang, Y., & Green, S. (2015). Evaluation of structural equation modeling estimates of reliability for scales with ordered categorical items. *Methodology: European Journal of Research Methods for the Behaviooral and Social Sciences*, *11*(1), 23–34. https://doi.org/org10.1027/1614-2241/a000087