

## Investigating the Importance of Enterprise Resourcing Planning in Supply Chain Management Education

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### ABSTRACT

Supply Chain Management (SCM) refers to the coordination and management of all activities involved in the creation and delivery of a product or service, from the sourcing of raw materials to the final delivery to the customer. Enterprise Resource Planning (ERP) is a sophisticated integrated software to manage business processes using a centralized database system. ERP helps manage all aspects of a company's operations, including manufacturing, logistics, finance, and human resources. In this study, we investigate the importance of ERP in SCM higher education. The curriculum of 65 SAP University Alliances member universities, in Southeast region of the United States, was analyzed. 53.85% of the member universities offer an SCM undergraduate major. 6.15% of them offer an SCM minor and 13.85% of them offer an SCM concentration. This study analyzes the use of SAP ERP software in SCM business education.

Keywords: SAP University Alliances, enterprise resource planning, supply chain management

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## INTRODUCTION

### Enterprise Resource Planning

Enterprise resource planning (ERP) is a sophisticated modern software to manage business processes using a centralized database system (Davenport, 2000; Jacobs, & Weston, 2007). SAP, Oracle, Microsoft and Infor are the top vendors on the market (Panorama Consulting Group, 2023). SAP highlights that “ERP is a software system that helps you run your entire business, including processes in finance, human resources, manufacturing, supply chain, services, procurement, and more” (SAP, 2023a). Oracle states that “Enterprise resource planning (ERP) refers to a type of software that organizations use to manage day-to-day business activities such as accounting, procurement, project management, risk management and compliance, and supply chain operations”. A complete ERP suite also includes enterprise performance management, software that helps plan, budget, predict, and report on an organization’s financial results” (Oracle, 2023). While a "core" ERP system manages internal operations, an ERP system can also include or be integrated with other external supply chain systems such as Customer Relationship Management, Supplier Relationship Management, and Product Lifecycle Management.

The integration of ERP in higher education curricula has been considered a critical factor to enhance learning outcomes, especially in the business and information systems fields (Noguera & Watson, 2004; Wijaya, 2023; Zadeh et al., 2020). Students who use ERP systems in business school have been shown to develop a better perception of system usefulness and ease of use, making them more likely to implement and use ERP systems in their future as managers of organizations (Grandón, Díaz-Pinzón, Magal, & Rojas-Contreras, 2021).

SAP University Alliances is an education program sponsored by SAP that enables member universities to educate students using the same SAP ERP system that more than 22,700 companies in more than 140 countries are using (Boykin & Martz, 2004; Vluggen & Bollen, 2005). Although ERP systems are a valuable teaching resource, a number of well researched challenges has limited the number of universities that adopt ERP in their academic programs (Bamufleh, Almalki, Almohammadi, & Alharbi, 2021; Becerra-Fernandez, Murphy & Simon, 2000; Chauhan & Jaiswal, 2016; Costa, Aparicio, & Raposo, 2020). This study is to examine whether the member universities offer any academic undergraduate programs such as a major, a minor, or a concentration. Currently there are 311 member universities in the United States (SAP 2023b). We investigate each supply chain management curriculum in the Region IV(Southeast) of the United States.

### Supply Chain Management

Supply Chain Management is defined by Council for Supply Chain Management Professionals as “the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.”

The objective of SCM is planning, optimizing, organizing, and controlling the movement of goods, services, and information from the point of origin to the point of consumption in order

to meet customer needs and achieve organizational goals. This involves the coordination of all activities involved in the production and delivery of goods and services, including sourcing and procurement, production planning and scheduling, inventory management, transportation and logistics, and customer service.

The nature of SCM is inter-organizational, and it aims to optimize the entire supply chain, from the sourcing of raw materials to the delivery of finished products to customers, in order to minimize costs, reduce lead times, improve product quality, and increase customer satisfaction. Effective SCM requires collaboration and communication among all parties involved in the supply chain, including suppliers, manufacturers, distributors, retailers, and customers. With the increasing globalization of business and advances in technology, SCM has become increasingly complex and important for organizations to succeed in the competitive marketplace.

The use of an ERP system can benefit the processes in supply chain management. First, ERP automates processes and optimizes operations. Second, the collaboration between internal business functions is enhanced. Third, due to the nature of the system, real-time central database is accessible to all departments, providing them with a single and consistent data point. It allows the decision makers to make better decisions due to better forecasts and systemwide optimization of planning. Execution of plans is also supported and enhanced for maximum operational efficiency. Last, the system also provides performance metrics to improve control, improvement, and reporting activities.

The most salient characteristics of ERP in SCM education are its focus on cross-functional business processes, and the integration of information. Internal integration of business processes, information sharing is a key component of effective SCM and has been shown to decrease risk in supply chains (Riley et al., 2016). While a traditional weakness of business education has been the focus on isolated functional tasks, ERP places a focus on the business process, or the sequence of transactions that starts with an original trigger such as a customer order or a demand forecast; and end with some end results such as the demand being fulfilled and the realization of business profit (Kelle & Akbulut, 2005; Park & Kusiak, 2005; Seethamraju, 2012; Wagner et al., 2000).

The full understanding of business processes by managers can greatly enhance organizational success, and the integration of ERP in the SCM curriculum has been shown to enhance this understanding (Boykin & Martz, 2004; Lee, 2008). In addition, the understanding of the business organization as a wholistic system is widely considered to be a key to avoid the functional silo effect and the problem of sub-optimization of internal and external supply chains (Davenport & Brooks, 2004; Seethamraju, 2007). In addition of these characteristics that make ERP systems ideal tools for teaching SCM, there is the fact that ERP is the actual information system used by most companies for their management, which greatly enhances the job readiness of business graduates from day one (Seethamraju, 2007; Vluggen & Bollen, 2005). Based on the benefits of the ERP system and a strong connection with supply chain management, this paper aims to identify whether the SAP University Alliances members offer a supply chain management undergraduate degree such as a major, a minor, or a concentration.

The remainder of the paper is organized as follows. The relevant background is discussed in the next section. The methodology is then described. Results are reported. Finally, conclusions are drawn and future directions are highlighted.

## THE CONTENT OF THE SUPPLY CHAIN MANAGEMENT CURRICULUM

Birou et al. (2022) analyzed the content, coverage, assessment, and gaps of undergraduate supply chain management courses from 79 universities in North America. After evaluating 109 courses, 120 aggregated topics were found. The most common topics include 1) introduction, 2) final exam, 3) inventory management, 4) sourcing process, 5) strategy, 6) supply chain design, 7) forecasting, 8) information technology, 9) logistics, 10) global SCM, 11) network design, 12) distribution strategies, 13) performance management, 14) beer game, 15) SC integration, 16) supplier management, 17) outsourcing, 18) lean, 19) SCM-organization. Each SCM course may include multiple topics. Walden (2020) compared the SCM course syllabi with the systems required for ASCM Enterprise Certification (ASCM 2019), which measures social responsibility, economic sustainability, and ecological stewardship. Walden's study suggested the need for a regular review of the curriculum.

In addition, Lutz et al. (2022) surveyed 112 graduate courses from 61 universities globally and found 114 aggregated common topics. The most common topics include 1) introduction, 2) sourcing process, 3) inventory management, 4) network design, 5) final exam, 6) information technology, 7) strategy, 8) supply chain design, 9) SC integration, 10) forecasting, 11) performance, 12) management, 13) risk management, SCM-organization. Many common topics were found in the studies conducted by Birou et al (2022) and Lutz et al. (2022).

## METHODOLOGY

This study examines the supply chain management programs provided by the SAP University Alliances member universities (SAP 2023b). Out of the 311 member universities in the United States, we focus on the member universities in a region in the United States that contains eight states. We follow FEMA's regional organization to investigate the Region IV (FEMA 2023) member universities. This region includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. In total, there are 65 SAP University Alliances member universities in Region IV. Table 1 (Appendix) shows a list of the members.

Each official website of the member universities is used to explore whether the university provides either a supply chain management major, supply chain management minor, or supply chain management concentration. The pages include the catalog, academic degree programs, school pages, and department pages.

## DATA ANALYSIS

Table 2 (Appendix) shows the descriptive statistics of the analyses. Column 1 in the table includes eight states that are in Region IV of the United States. Column 2 reports the number of member universities in SAP University Alliances. Column 3 lists the number as well as the percentage of member university that provides supply chain management major in each of the eight states. Column 4 shows the number as well as the percentage of member university that provides supply chain management minor in each of the eight states. The last column contains the number as well as the percentage of member university that provides supply chain management concentration in each of the eight states. North Carolina is the state that has the most member universities in the SAP University Alliances. There are 15 member universities in

North Carolina. Kentucky is the state that has the fewest member universities. Only two members are in this state.

Figure 1 (Appendix) shows the percentages of member universities SAP University Alliances that also provides supply chain management major in each state. Besides the State of Mississippi, the percentages ranged between 46.15% and 66.67%. None of the member universities in the State of Mississippi provides the major. Figure 2 (Appendix) indicates that none of the states but Alabama and North Carolina provide the supply chain minor. The percentages are relatively low ranging between 12.5% and 20%. In Figure 3 (Appendix), we see a larger variation for the member universities that provide a supply chain concentration. Kentucky state has more member universities providing an SCM concentration, and the State of South Carolina follows. The member universities in Alabama, Mississippi, and Tennessee do not provide any SCM concentration programs.

The stacked chart in Figure 4 (Appendix) shows the SCM program distribution. The member universities in most of the states commonly offer an SCM major, rather than a minor or concentration. The chart also shows the proportion of the universities that offer only one program (major, minor, or concentration), two programs (major & minor, major & concentration, and minor & concentration), and all three programs (major, minor, and concentration).

We found that 53.85% of Region IV member universities in the SAP University Alliances offer an undergraduate supply chain management major. North Carolina is the state that has the most member universities in the SAP University Alliances, while Kentucky is the state that has the fewest member universities. Even though there are only three member universities at Mississippi State, none of them provides an SCM major. Alabama and North Carolina are the only two states that provide an SCM minor. Most of the member universities provide an SCM major instead of an SCM minor or an SCM concentration.

## LIMITATIONS AND FUTURE DIRECTIONS

A limitation of this study is that the data includes only universities in the SAP University Alliance program. Additional research should be conducted to identify the use of other ERP softwares such as Oracle, Salesforce, Microsoft Dynamics, and others. Furthermore, only 65 SAP University Alliance member universities were examined in this study. Future research can expand the scope of the analyses to include all member universities in the United States or in other parts of the world. Although the study shows that more than half of the member universities offer undergraduate supply chain management programs, the generalizability would be further enhanced when the scope is larger. It is also suggested to analyze the course titles, course descriptions in the catalog, syllabi, etc. to identify the use of adoption of ERP in the courses.



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## APPENDIX

**Table 1: University Alliances Member Universities in Southeast Region.**

STATE	CITY	UNIVERSITY
Alabama	Athens	Athens State University
Alabama	Auburn	Auburn University
Alabama	Huntsville	University of Alabama in Huntsville
Alabama	Mobile	Spring Hill College
Alabama	Mobile	University of South Alabama
Alabama	Montgomery	Alabama State University
Alabama	Montgomery	Auburn University at Montgomery
Alabama	Tuskegee	Tuskegee University
Florida	Daytona Beach	Embry-Riddle Aeronautical University
Florida	DeLand	Stetson University
Florida	Fort Lauderdale	Kaplan University
Florida	Fort Lauderdale	Nova Southeastern University
Florida	Fort Myers	Florida Gulf Coast University
Florida	Jacksonville	University of North Florida
Florida	Miami	Florida International University
Florida	Miami Gardens	Florida Memorial University
Florida	Pensacola	University of West Florida
Florida	Tallahassee	Florida A&M University
Florida	Tampa	University of South Florida
Florida	Tampa	University of Tampa
Georgia	Athens	University of Georgia
Georgia	Atlanta	Clark Atlanta University
Georgia	Atlanta	Georgia Institute of Technology
Georgia	Atlanta	Georgia State University
Georgia	Carrollton	University of West Georgia
Georgia	Cartersville	Georgia Highlands College
Georgia	Dahlonega	University of North Georgia (UNG)
Georgia	Dalton	Dalton State College
Georgia	Kennesaw	Kennesaw State University
Georgia	Lawrenceville	Georgia Gwinnett College
Georgia	Milledgeville	Georgia College & State University
Georgia	Statesboro	Georgia Southern University
Georgia	Valdosta	Valdosta State University
Kentucky	Bowling Green	Western Kentucky University
Kentucky	Murray	Murray State University
Mississippi	Cleveland	Delta State University
Mississippi	Hattiesburg	University of Southern Mississippi
Mississippi	Oxford	University of Mississippi
North Carolina	Boiling Springs	Gardner-Webb University

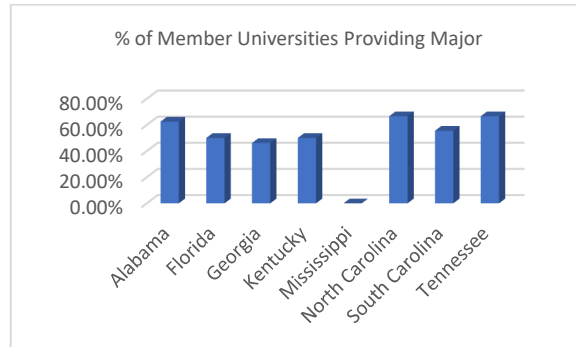


North Carolina	Boone	Appalachian State University
North Carolina	Charlotte	Central Piedmont Community College
North Carolina	Charlotte	University of North Carolina at Charlotte
North Carolina	Fayetteville	Fayetteville State University
North Carolina	Greensboro	Guilford Technical Community College
North Carolina	Greensboro	North Carolina A&T State University
North Carolina	Greensboro	University of North Carolina-Greensboro
North Carolina	Greenville	East Carolina University
North Carolina	Hickory	Lenoir-Rhyne College
North Carolina	High Point	High Point University
North Carolina	Raleigh	North Carolina State University
North Carolina	Raleigh	Wake Technical Community College
North Carolina	Winston Salem	Forsyth Technical Community College
North Carolina	Winston Salem	Wake Forest University
South Carolina	Charleston	College of Charleston
South Carolina	Charleston	The Citadel
South Carolina	Clemson	Clemson University
South Carolina	Columbia	Columbia College
South Carolina	Columbia	Midlands Technical College
South Carolina	Columbia	University of South Carolina
South Carolina	Greenville	Greenville Technical College
South Carolina	Spartanburg	Spartanburg Community College
South Carolina	Spartanburg	University of South Carolina Upstate
Tennessee	Chattanooga	University of Tennessee at Chattanooga
Tennessee	Johnson City	East Tennessee State University
Tennessee	Nashville	Belmont University

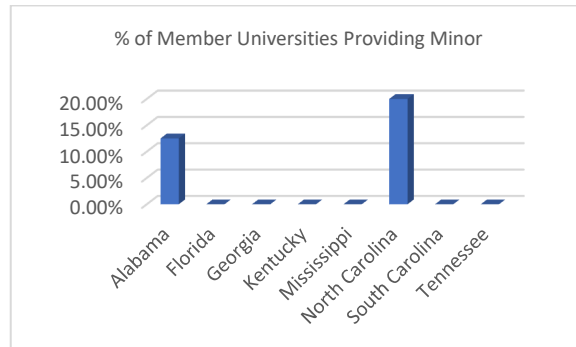
**Table 2: Academic Programs Provided by University Alliances Member Universities**

State	SAP UA members	Major	Minor	Concentration
Alabama	8	5 (62.50%)	1 (12.50%)	0 (0.00%)
Florida	12	6 (50.00%)	0 (0.00%)	1 (8.33%)
Georgia	13	6 (46.15%)	0 (0.00%)	2 (15.38%)
Kentucky	2	1 (50.00%)	0 (0.00%)	1 (50.00%)
Mississippi	3	0 (0.00%)	0 (0.00%)	0 (0.00%)
North Carolina	15	10 (66.67%)	3 (20.00%)	2 (13.33%)
South Carolina	9	5 (55.56%)	0 (0.00%)	3 (33.33%)
Tennessee	3	2 (66.67%)	0 (0.00%)	0 (0.00%)
<b>TOTAL</b>	<b>65</b>	<b>35 (53.85%)</b>	<b>4 (6.15%)</b>	<b>9 (13.85%)</b>

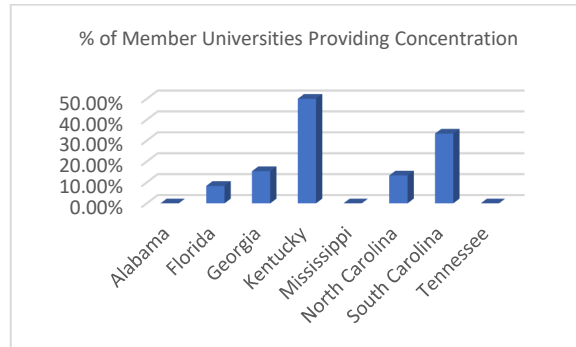
**Figure 1: Percentage of Member Universities that Provides SCM Major**



**Figure 2: Percentage of Member Universities that Provides SCM Minor**



**Figure 3: Percentage of Member Universities that Provides SCM Concentration**



**Figure 4: SCM Program Distribution**

