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Abstract— **Educational success is a global issue for human societies in our Volatile, Uncertain, Complex and Ambiguous (VUCA) world. Access to quality education is the fourth sustainable development goal set by United Nations member countries. Unfortunately, educational systems have generally a performance deficit. To change this situation, we assume in this paper that they could benefit from some technical contributions developed initially for commercial supply chains to optimize the production flow of goods and services. To this end, we study the transposition of the well-known Supply Chain Operations Reference model (SCOR) to educational systems which manage flows of learners. Indeed, the path that a learner follows is a succession of business processes from one educational organization to another that constitute an educational chain that could be improved through the Educational Supply Chain Operations Reference (EducSCOR) model we developed in this paper. It proposes a hierarchical structure of the educational business processes and a set of associated performance indicators allowing quick and effective assessment of educational systems and their networks. A first application case to a big French educational system dedicated to apprenticeship training is proposed to highlight the potentialities of the proposal.**

I. Introduction

Education is the primary factor in the calculation of the human development index [1]. The level of development of a population or nation can be judged on the performance of its educational system [2]. And yet, studies such as Ball [3], Coco [4] or Klein [5] have demonstrated the poor performance of most educational systems, especially in the way of assessing its success and the incidence of wastes in higher education. Therefore, there is room for improvement of these systems to perform better. Since educational systems can now be viewed as engineering systems defined as a combination of components that work synergistically to collectively perform a useful function, it is possible to consider a systems' engineering approach to achieving this goal. Specifically, educational systems could be viewed as

systems that transform a flow of people without capabilities into a flow of people with capabilities. To do so, they must pass through a set of successive subsystems. As such, if we consider that a supply chain is defined as such, educational systems can be seen as supply chains defined by the APICS dictionary [6] as "the global network used to deliver product and services from raw materials to end customers through an engineered flow of information, physical distribution, and cash" . The hypothesis that leads to this research work is to consider that educational systems could be significantly improved by being managed as supply chains or something close to it. In practice, our research question is: Can a flow and network approach, inspired by Supply Chain Management practices, improve the performance of educational systems? As a first step towards this goal, this paper develops a conceptual framework capable of designing and analyzing educational actors by mapping key educational processes, resources and flows with the aim of improving their performance. The paper is structured as follows. First, a brief review of the literature will remind the key features of an education system and demonstrate the relevance of drawing a parallel between education system management and supply chain management. This section will also provide an overview of the current performance of these systems and the potential avenues for improvement. Second, a proposed framework, directly inspired by the Supply Chain Operations Reference (SCOR) model, will be developed, including the main generic business processes on one hand, and the main key performance indicators on the other hand. Third, an illustrative case based on a French educational system is presented to show the applicability, to highlight the first benefits, and to discuss the limitations of the solution. Finally, after a brief conclusion, a series of research perspectives are developed.

II. Background

A. Characteristics of education systems

An educational system is an organization whose objective is to transmit knowledge This knowledge can be broken down into know-how, which constitutes the capacity of an

individual to carry out certain tasks, and life skills, which allow this same individual to find his place in human society. Thanks to the educational system, each human being who benefits from it will follow year after year a path designed by his elders, which allows him to experience different learning that is necessary for life in a community, for his personal development and for the needs of society. At the global level, a sequence of knowledge acquisition has been established in parallel with the growth of people. This sequence allows for international comparisons (OECD, 2018) and is generally built in three stages, primary, secondary, and tertiary education. In countries with developed or emerging economies, we find nursery schools for early childhood care and at the other end of the chain, we find higher education whose mission is, for example in France, to contribute to the success of students, to the development of research and the dissemination of knowledge, to the growth and competitiveness of the economy as well as other objectives voted by the political authorities [7]. Educational institutions must constantly question the way in which the transformation of learners into citizens capable of responding to the needs that society requires for its proper functioning is organized. Thus, in Figure 1, we can schematize an educational system by an elementary brick with objectives and resources according to the IDEF0 formalism [8]. At the input we have non-knowing and unskilled people and at the output we have knowing and capable people. Over the years people will come and go through this sequence of elementary bricks of educational organization.
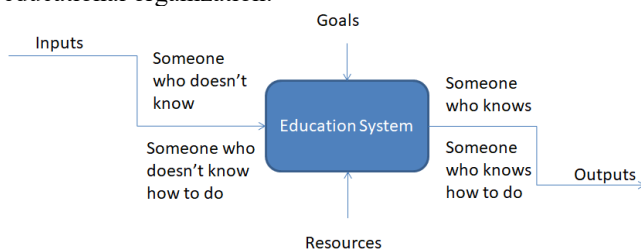

Figure 1 : diagram of a basic brick of an educational system

Educational systems are transforming as technology advances. The know-how of artisanal teaching is becoming industrialized, standardized, and hybridized with pedagogical engineering techniques [9]. Training paths are gradually giving learners the opportunity to choose and build their own learning vectors thanks to new personal learning environment tools [9]. This phenomenon is like a trend towards product customization that will be found in the production of complex manufactured goods.

Educational systems contribute greatly to the development of human societies. Everyone benefiting from access to education will follow a succession of processes that need to adapt to their environment to remain aligned with the aspirations and objectives that states set for themselves.

B. Performance status and areas for improvement

Improving society is an ambitious, complex, and ongoing activity. The United Nations (UN), in collaboration with the International Labor Office (ILO), developed the Human Development Index (HDI) as a complement to the Gross Domestic Product (GDP) measure, which is a partial measure of progress [10]. The HDI is a synthetic index that considers quality of life (gross national income per capita in purchasing power parity), health status (life expectancy), and education received (expected and average years of education) [1]. Education is one of the important parameters that will influence the quality of life of human beings and by construction of the society.

Today, one way to measure the performance of the education system is through comparative studies by the Organization for Economic Cooperation and Development (OECD), which publishes the Program for International Student Assessment (PISA) study every three years, which assesses the quality, equity, and efficiency of school systems by testing cohorts of students according to a standard [2]. Another way to evaluate an education system is to look at the fate of students by generation [11].

To improve an education system, multiple indicators are produced to measure the different influencing factors that will or will not lead to the achievement of objectives. The performance of the system can be measured at different scales in relation to a survival or attrition rate in an age group (percentage of change of orientation or discontinuation of study per year), the success rate in exams, employability, productive efficiency (allocative and technical), the adequacy between supply and demand for training, the production of knowledge (number of patents), and the capacity of companies to absorb people leaving the system [12]. The financial performance of the system is evaluated by calculating rates of return based on a balance of costs and benefits calculated according to three different methods: the discounting process, the shortcut method [13] and the Mincer equation [14]. Teacher performance is encouraged by monetary and non-monetary variables and an efficiency wage indicator [12]. The performance of the economic environment of the education system can be organized around three types of models, the centralized model, the evaluative state model, and the quasi-market model [12].

Beyond performance measurement, it is important to design or make training systems agile, i.e., to be able to evolve ideologies, culture, organization of structures with their skills and capacities, management practices, and, of course, techniques and tools [15]. Some jobs practiced today will no longer exist in a few years, just as some jobs have not yet been invented. Governments must be attentive about the basic knowledge taught, as it determines whether or not learners will find it easy to orient themselves or retrain throughout their working lives. Education is the first factor of the HDI, and education systems have been evaluated internationally for more than 20 years now, but only on the results of school skills at a given age. Performance indicators are benchmarks to measure the evolution of organizations that must adapt to changes as in the production of goods and services.

Since 2018 the ISO 21001 standard proposes a management system for education and training organizations [32]. This regulatory framework sets out requirements and recommendations that converge towards common goals to the EducSCOR proposal. For example, reference is made to process management, a continuous improvement cycle, a risk-based approach or the development of a strategic vision of the organization. We will look at what contributions each of the systems makes and how to make the most of their complementarities.

C. Reference to supply chain management

To maximize the number of graduates from a training pathway, we benefit from the work of O'Brien and Deans [16] who proposed strategic planning to meet the needs of all the actors in the educational chain, i.e., employers, students, university staff, schools, colleges. They emphasize that "for a strategic alliance to be successful, both parties must experience a satisfactory exchange". This approach is inspired by the principles of Lean Management which defines supply chain management as "having the right product, in the right place, at the right time, at an acceptable price, and in the right quantity" [17]. This work also notes that these quality characteristics are not sufficient to maintain a competitive advantage. Improving the dialogue between supply chain stakeholders to focus on the needs of the end customer will create value in terms of knowledge, skill, and money. Value creation in supply chain management is becoming increasingly important as it significantly changes the way each country produces and consumes. Originally, supply chain management concepts apply to the management of order flows, materials, and the means to achieve them from a business logistics perspective, but they can also be applied to refugee supply flows [18] or patient flows [19] for instance.

To assess the performance of each pipeline within an institution of higher education, Jauhar [20] described what an Education Supply Chain Management (ESCM) and research model could look like, notably by including environmental criteria. They also proposed an education supply chain diagram in which traditional supply chain management actors are included. However, their work focused on comparing the results of two methods, the data envelopment analysis, which allows for the comparison of production units, in this case branches within a university, and the differential evolution method, which is a metaheuristic. These evaluations, differentiated on three efficiency criteria, allow for an estimation of the performance of the different streams, which will be used by administrators to review their strategy to improve the university and thus direct efforts to resolve dysfunctions or possibly review budgetary needs.

On a larger scale, Ramzi [21] studied the possibility of studying the entire educational system in Tunisia as a network, dividing schooling into three parts (primary, secondary, tertiary), integrating input and output data and also using the data envelopment analysis method. This work puts into perspective the need to design a form of synchronization throughout the chain to obtain an optimized result and highlights the importance of preparing learners to move from one level to another to minimize losses. This type of analysis makes it possible to propose a diagnosis and to outline avenues of improvement to be developed.

For many years, researchers have drawn on supply chain management techniques to address problems and propose solutions to improve educational systems [16], [21]. More recently, Toledo Muñoz [22] proposed to design a new strategy for education supply chain management using Value Stream Mapping tools that would reduce cycle times by focusing the organization on value creation and the Supply Chain Operations Reference (SCOR) model [22] that would be used to structure, standardize, plan, and synchronize the education supply chain. They also propose the use of a multi-criteria selection grid to choose the most appropriate methodological instrument in relation to the decision makers' objectives. Similarly, Toledo Muñoz [22] highlight the use of simulation tools to model behaviors and measure performance, as well as to make predictions and anticipate the impact that leaders' decisions could have on organizational outcomes. On their side, Class [23] studied supply chain management from the perspective of open knowledge as a common that needs to be thought of around three postures that are co-creation, agile design, and authority. The research work identifies the values that will allow to maintain and increase the capacity of skills and know-how in a socio-economic context where change has become the norm. The open movements taken as a model generate value through a four-step process: moving forward by differentiating, transcribing the value generated, framing the social value, and evaluating the value. This structure also consists of empowering learners who, by being actors in the educational chain, will be able to create their own training paths. One of the advantages demonstrated is a reduction in costs, thanks to the generalization of pedagogical tools and the digital management of educational information systems. In terms of modeling, ones proposed to design a network represented by routes for the flows and nodes for the plants and thus to work on the bottlenecks that this new type of organization would generate for sure.

Table 1 summarizes major research works that have been done to improve education systems based on the supply chain management analogy. Most of the topics focus on performance indicators without considering a complete view of the network, as particularly proposed by the SCOR model.

Articles	Supply Chain Management Tools or practices						
	Plan / connect / synchronise	Lean tools	Processes and flows	Statistics	Performance Indicator	SCM for education	Processes frame
Mincer 1974				X			
Ball 1987	X		X		X		
O'Brien 1996	X		X		X		
Dialga 2016					X		
Jauhar 2017			X	X	X	X	
PISA 2018				X			
Ramzi 2019			X	X	X	X	
Toledo Muñoz 2020	X	X	X		X	X	proposal to research
Ngamboe 2021			X	X	X		
Class 2021	X	X	X		X	X	

Table 1 : references on the evolution of research topics in training systems optimization

D. Research Statement

Recent research by Class [23] and Toledo Muñoz [22] referring to the uses of supply chain management tools in educational systems consider modeling an open education supply chain prototype or propose to draw inspiration from the SCOR model used to create value, as it seems relevant to carry out research work to develop a frame of reference that would promote the synchronization of educational systems.

These are the major insights we considered to define our research statement. Our research question can be formulated as follows: Can a flow and network approach, inspired by Supply Chain Management practices, improve the performance of educational systems? More specifically, we propose to work on the transposition of the SCOR model to educational systems as a chain of transmission of knowledge and know-how.

III. PROPOSAL: THE EDUCSCOR MODEL

A. The SCOR model

According to the Association for Supply Chain Management (ASCM) (formerly APICS), supply chain management is the "design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand, and measuring performance globally" [6].

When studying the network, it will be necessary to define its scope, how it will be coordinated, and its life cycle. Supply chain management studies material flows, inventories, resources, equipment, supplies, services, and information systems to obtain gains that will be progressive according to the level of maturity of the organization put in place [24] Possible benefits can be financial, budgetary, qualitative, ergonomic, individual and/or collective.

According to the ASCM, the SCOR model describes the business processes associated with all phases of satisfying a customer's request. The model itself is organized around the six main business processes: plan, make, deliver, return and enable with these process building blocks, the SCOR model can be used to describe very simple to very complex supply chains using a set of common definitions across different industries. Today, public, and private organizations or companies around the world use the model as a basis for global or site-specific supply chain improvement projects.

When analyzing how an organization operates, the SCOR model [24] helps to frame the description of the organization with a common vocabulary, structure, and indicators that enable easier communication between partners in a value chain. It also allows prioritizing four levels of structure. The first concerns the major successive processes that make up the organization's flow. The second level details the sub-processes. The third describes the elementary activities which are performed while the fourth defines the tools chosen to perform.

B. EducSCOR architecture

Inspired by the structure of the initial SCOR model, we define an Educational Supply Chain Operations Reference (EducSCOR) model composed of 4 levels of process granularity as shown in Figure 2.

The first level describes the generic macroscopic business process of any kind of educational systems. These business processes have been defined as follows (cf. Figure 3):

- Plan the activity of the organization. Planning is the most transversal process in organizations, it is a strategic, tactical and operational decision, i.e., a forecast of objectives, means and expected results in time to satisfy needs at the lowest cost. It must

consider the constraints of task succession or scheduling and capacity constraints over time [25].
- Select future learners. Selecting learners is one of the functions of educational systems [26] and corresponds to the growing needs of developed societies to employ people who have acquired knowledge and skills that are increasingly greater in quantity and complexity
- Train learners according to their needs. Training is the activity that consists in transmitting knowledge, know-how and developing the capacities of adaptation and cooperation that allow individuals to live. The training processes are heterogeneous according to the objectives sought, as well as the pedagogical practices. The training of an individual can take place throughout his or her life [27].
- Evaluate learners' capabilities. Assessment is a way of attesting to skills and abilities to perform different tasks [28].
- Enable activities and foster a virtuous circle. Enabling involves managing organizations, ensuring that value and competencies are created, and making sure that the organization is on a virtuous path. [29], [30].
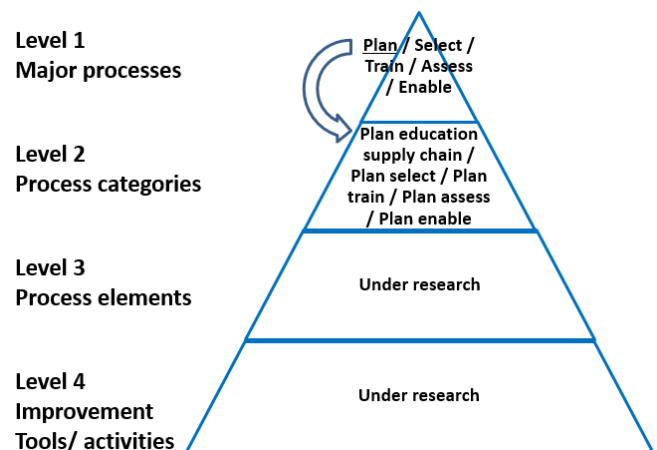

Figure 2 : breakdown of EducSCOR's process levels

Thus defined, the EducSCOR allows mapping out an educational organization that considers the learner's journey as a step forward only. This makes a strong difference with the original SCOR model which includes potential returns, i.e., unsold, or non-conforming products for instance. We must notice that we voluntarily kept the concept of planning as a core business process of the EducSCOR. Actually, as explained by Campusano and Mula [31], this enables the creation of added values compared to non-synchronized organizations. Consequently, it appears as a strong prerequisite for improving the performance of any education system.
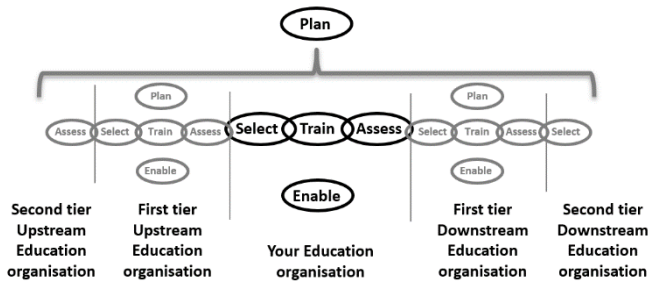
Figure 3 : EducSCOR scheme

The second level of the EducSCOR model develops the sub-processes, also in a generic way. Figure 4 proposes a set of sub-processes according to the five business processes defined for the level #1. These sub-processes have been mainly selected based on the initial SCOR model [24] and information gathered from practitioners. As for the original SCOR model, we have chosen a similar coding system as

the tools used to perform the activity in practice. These two levels of granularity will be developed in further research.

C. Performance Measures

Table 2 shows our proposal for the performance indicators of the EducSCOR inspired from the SCOR model. In light orange are indicated the process properties that are evaluated. In blue are referenced the performance indicators for level 1 processes. In white are referenced the level 2 performance indicators. In the SCOR model there are ten performance indicators for processes, forty-one for level 2 sub-processes and thirty-five for level 3 sub-process elements. For this work, we focused on level 1 and 2 only, the third level will be investigated in further research. The chosen indicators must be objective, i.e. with measurable criteria and the ability to be monitored over time. The coding of the performance indicators proposed here is strictly the same as that of the SCOR model.

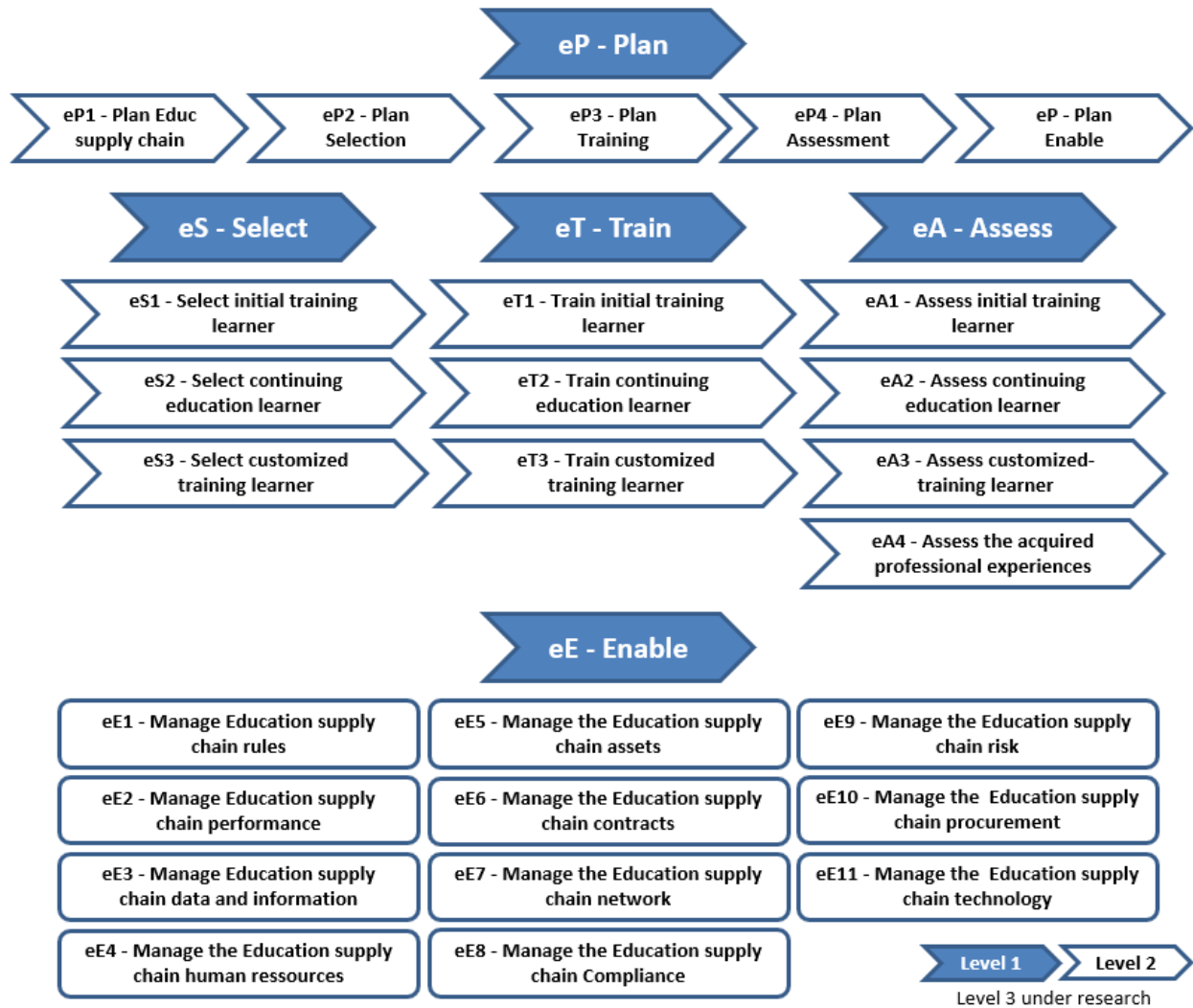The main performance properties of the indicators are defined

Figure 4 Overview of level 1 and 2

follows: "e" is for EducSCOR, P/S/T/A/E are for the first letter of the macro business process (level#1) and the number is for the number of the sub-process in the glossary.

The third level will describe the detailed activities of each sub-process and the fourth level will make the emphasis on

as follows:

- Reliability is the ability to meet a target over time and is measured statistically. Comparing the SCOR model's level 1 reliability objective of "perfect order fulfillment" with the EducSCOR's proposal of

"perfect course fulfillment" seems appropriate, as well as that of Level 2.

- Responsiveness is for an organization a speed capacity to respond to change. Here again the comparison of the proposed indicators to an educational organization seems to fit. Indeed, it is important for an organization to monitor the time resources it invests in its processes.
- Agility is the ability to respond to change. These indicators, which for example can refer to a fluctuation in staffing levels, are very useful for a training center that can anticipate the reduction or deployment of allocated resources and their consequences.
- Costs are the sum of the expenses incurred in the production or distribution of a good or service. The cost indicators are like those observed in business.
- Efficiency of asset management is the maximization of the ratio between the means allocated and the results. These indicators are hardly considered in educational organizations, and this type of decision support tool should be a contribution for the leaders of educational organizations in order to improve budgetary arbitration.

We have proposed a full set of indicators for the level 1 and 2 inspired by the SCOR model. Nevertheless, future work will be to evaluate their relevance and to assess whether other types of indicators specific to the education sector would be appropriate, such as the measurement of learner well-being or any other indicator that would make it possible to detect situations that need to be addressed in order to achieve system performance.

EducSCOR nomenclature proposal
Reliability
RL.1.1 - Perfect execution of train courses
RL.2.1 - Percentage of successful graduation
RL.2.2 - Graduation performance at date
RL.2.3 - Documentation accuracy
RL.2.4 - Perfect condition
Responsiveness
RS.1.1 - Training completion cycle time
RS.2.1 - Selection cycle time
RS.2.2 - Training Cycle Time
RS.2.3 - Evaluation Cycle Time
Agility
AG.1.1 - Upside education supply chain adaptability
AG.2.1 - Upside adaptability (Select)
AG.2.2 - Upside adaptability (Train)
AG.2.3 - Upside adaptability (Evaluate)
AG.1.2 - Downside education supply chain adaptability
AG.2.4 - Downside adaptability (Select)
AG.2.5 - Downside adaptability (Train)
AG.2.6 - Downward adaptability (Evaluate)
AG.1.3 - Overall value at risk
AG.2.7 - Upstream, downstream and learner risk ratings
AG.2.8 - Value at risk (Plan)
AG.2.9 - Value at risk (Select)
AG.2.10 - Value at risk (Train)
AG.2.11 - Value at risk (Evaluate)
AG.2.12 - Time to recovery
Cost
CO.1.1 - Total education supply chain management costs
CO.2.1 - Cost to plan
CO.2.2 - Cost to select
CO.2.3 - Cost to train
CO.2.4 - Cost to evaluate
CO.2.5 - Risk Mitigation Costs
CO.1.2 - Cost of training
CO.2.6 - Direct labor cost
CO.2.7 - Direct material cost
CO.2.8 - Indirect cost related to production
Asset Management Efficiency
AM.1.1 - Payment cycle time
AM.2.1 - Inventory days of supply
AM.2.2 - Days payable outstanding
AM.1.2 - Return on educational supply chain fixed assets
AM.2.3 - Educational supply chain revenue
AM.2.4 - Educational supply chain fixed assets
AM.1.3 - Return on working capital
AM.2.5 - Accounts payable (Payables outstanding)
AM.2.6 - Accounts receivable (Sales outstanding)
AM.2.7 - Inventory

Table 2 : Proposed EducSCOR performance indicators

The EducSCOR schema, and the hierarchical levels of processes with their performance indicators could be a framework that will allow:

- Better short-, medium- and long-term planning for the institutions.
- Increased efficiency and internal management of each link in the education chain.
- Comparison and improvement of processes between systems through a common vocabulary.

IV. USE CASE

In order to assess the relevance of the EducSCOR model for structuring the processes of educational systems, we apply a 5 steps approach to a French educational organization:

1. Compare the processes and performance indicators used by the organization with the ones structured by the EducSCOR.
2. Make recommendations for process and performance indicators improvement within the organization.
3. Assess the current performance of the organization based on the EducSCOR performance indicators.
4. Implement the recommendations within the organization.
5. Assess the performance of the organization and compare it with the initial performance based on the EducSCOR performance indicators.

The next subsection introduces the considered educational system, and the following subsection describes the results of the first two steps of the approach which are the one presented in this paper.

A. The Association Ouvrière des Compagnons du Devoir et du Tour de France

The Association Ouvrière des Compagnons du Devoir et du Tour de France (AOCDTF) is an organization whose objective is to transmit manual skills and professional knowledge through travel. It allows each of its members to progress to the maximum of their possibilities.

Over the decades, the Compagnons du Devoir have developed a network of companies that welcome young workers who are training in the trade of their choice. In order to meet the needs of accommodation, catering and professional promotion, reception structures with, in most cases, training workshops have been built. Approximately 10,000 learners per year are welcomed in 183 accommodation points, including 58 "Compagnons' houses" with training facilities.

The association therefore has three main functions that generate its financial resources: training, catering and accommodation for its beneficiaries.

The sustainability of the organization was identified during a statistical study on the flow of learners over 30 years that were carried out in 2020, notably because the association has always entrusted the positions of trainers and managers of its companion houses to young people from the training cycle. While the organization is growing, the number of the latter remains constant, causing a difficulty in recruiting the managers that the movement needs. This situation evokes a performance deficit between the inflow and the outflow of the system although the success rates in the exams are decent. Indeed, there is a difference between passing an exam and obtaining the title of Companion. The latter is obtained by traveling and proving one's skills to one's peers through the successful completion of daily community tasks and the completion of a so-called reception work that will show the skills acquired over time. Another important issue identified during the assessment of the organization carried out by the author is to reduce its carbon footprint which is sensitive to the increase in energy prices due to the large number of real estate infrastructures and the very large number of kilometers traveled by the learners to carry out their training.

Since April 2021, a working group has been meeting weekly to look for root causes using different problem-solving methods such as the "Ishikawa diagram", the 5 Whys method, and systemic analysis based on the work of Donella Meadows

(1999), which allows the solutions with the most impact to emerge thanks to the iceberg model and the concept of leverage points to solve a problem. This work has identified nine themes for improvement that need to continue to be explored.

To ensure its sustainability, the AOCDTF needs to maximize the number of people per age group who are able to develop skills that will enable them to perform their intended end-of-course assignments as trainers and facility managers. The association also needs to undertake a continuous improvement process to reduce its carbon footprint.

B. Applicability

To perform the first step of our EducSCOR model assessment approach, we analyzed in what extend the processes and performance indicators recommended by the proposed EducSCOR model are applied by the AOCDTF organization. For the processes, the maturity of each EducSCOR process at the AOCDTF organization has been described according to the following 5 states of maturity:

- Missing: The process does not exist at all.
- Informal: The process exists, is performed, but is not formalized.
- Formalized: The process exists, is performed, is formalized, but there is no performance indicator defined to evaluate it.
- Not Evaluated: The process exists, is performed, is formalized, there are performance indicators defined to evaluate it but which are not used.
- Evaluated: The process exists, is performed, is formalized, and there are performance indicators to evaluate it which are used.

The results of the processes analysis are synthesized in Figure 6. We can see that over the 26 processes from level 2, 9 are informal, 8 are formalized, 2 are not evaluated, and only 7 are evaluated. Most select and train processes are evaluated. The assess processes are mostly formalized but not evaluated. Most plan and enable processes are either informal or formalized but not evaluated. Therefore, based on the EducSCOR model proposal, the recommendations for the AOCDTF organization would be to upgrade all those processes to the "evaluated" maturity level.

For the performance indicators the analysis has simply been to identify if the ones recommended by the EducSCOR are used by the AOCDTF organization. The results are synthesized in Table 3. We can see that for level 1 processes performance indicators, 8 are missing and 2 are used, and that for level 2 processes performance indicators, 19 are missing and 15 are used. Therefore, based on the EducSCOR model proposal, the recommendations for the AOCDTF organization would be to implement and use the 27 performance indicators recommended by the EducSCOR model.

This situation puts into perspective the potential added value that should be brought by the proposed EducSCOR that will help identify the gaps to fill and thus potentially improve the performance of the organization.
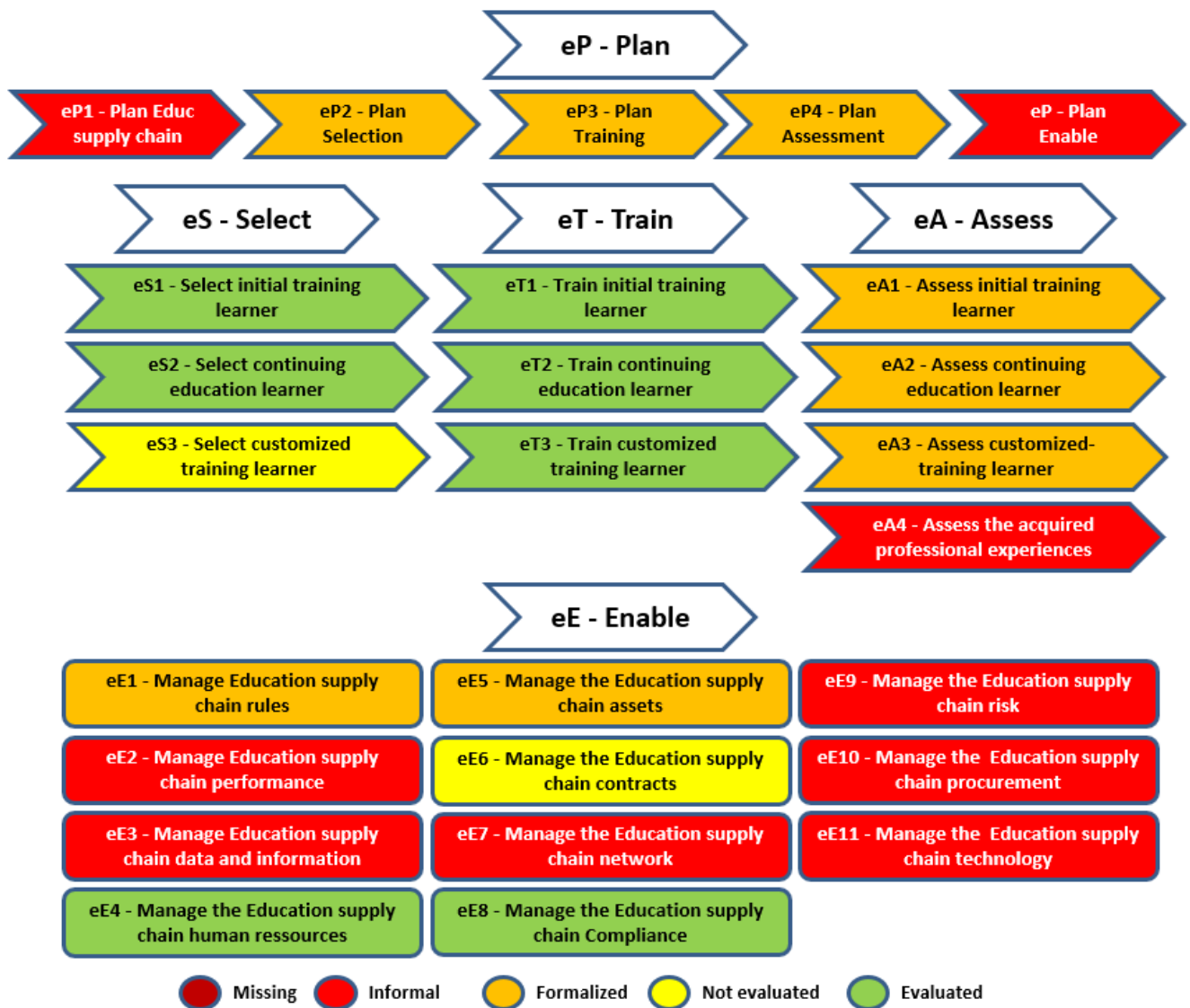
Figure 5 : Evaluation of AOCDTF processes in relation to the EducSCOR proposal

KPI	Missing	Present	Total
Level 1	8	2	10
Level 2	19	15	34
Total	27	17	44

Tableau 3: Table of performance indicators at the AOCDTF in relation to the EducSCOR performance indicators

As part of the research, it is expected that the AOCDTF leadership will produce an analysis that will allow them to better understand the mechanisms that make failure or success possible within the organization, as well as recommendations that will be submitted for arbitration. And now that the first 2 steps of our EducSCOR model assessment approach have been performed, the last 3 ones still need to be undertaken for completing the entire approach and validate the EducSCOR proposal.

I. CONCLUSION AND PERSPECTIVES

Education is an important factor in the human development index. Educational systems are a succession of processes that need to adapt. For several decades, research to improve education systems has been undertaken. In this work we have focus on educational systems as a flow of people as well as an organization, getting inspiration from knowledge developed for supply chain management. The main focus has been on the SCOR model which suggests interesting avenues to explore in order to acquire a common language for the performance of educational organizations and thus improve interactions between stakeholders in the educational system. The overall research question of our research project aims to address is the following: Can a flow and network approach, inspired by Supply Chain Management practices, improve the performance of educational systems? As a first step toward answering this research question, this paper proposed to work on the transposition of the SCOR model to educational systems as a chain of transmission of knowledge and know-how. The EducSCOR model was proposed,

structured around hierarchical process levels and their performance indicators. The EducSCOR propose a new reading grid of the processes and performance of educational organizations and aims to be adaptable to any training system. It could be a reference framework to improve the interactions between institutions, professional channels, parents, children, taxpayers, states. The actors of the educational chain would then be better synchronized, connected, flexible and more open. All in our collective interest and in the interest of future generations.

There are still a number of research avenues to be addressed to complete this work. The level 3 processes of the EducSCOR model still need to be designed along with their performance indicators. Further work should focus on the evaluation of the potential outcomes that would come from the use of the EducSCOR model. Part of it should come by undertaking the last 3 steps of the EducSCOR model assessment approach mentioned in the use case section. Finally, by representing the educational systems as a supply chain, a question that will have to be studied is the question of defining who the customer to satisfy is. It might be the one who pays, the one who receives the service, another stakeholder, or even a combination of stakeholders.

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