

GLOBAL VERSUS LOCAL FOCUS OF ENTERPRISE INFORMATION SYSTEMS:  
A FRAMEWORK BASED ON DIMENSIONS OF  
COMMONALITY/DIFFERENTIATION,  
SINGLE VENDOR/MULTIPLE VENDORS,  
AND VANILLA/CUSTOMIZATION

by

Duy T. Dang

Submitted in partial fulfillment of the  
requirements for Departmental Honors in  
the Department of Information Systems  
and Supply Chain Management  
Texas Christian University  
Fort Worth, Texas

May 4, 2015

GLOBAL VERSUS LOCAL FOCUS OF ENTERPRISE INFORMATION SYSTEMS:

A FRAMEWORK BASED ON DIMENSIONS OF  
COMMONALITY/DIFFERENTIATION,  
SINGLE VENDOR/MULTIPLE VENDORS,  
AND VANILLA/CUSTOMIZATION

Project Approved:

Supervising Professor: Jeffrey Stratman, Ph.D.

Department of Information Systems and Supply Chain Management

Daniel Chen, Ph.D.

Department of Information Systems and Supply Chain Management

Randal Lewis, M.B.A

Department of Management, Entrepreneurship and Leadership

## ABSTRACT

Business Information Systems, especially the Enterprise Resource Planning (ERP) products have increasingly played an important role in the business world. They have raised the values of products and services to a new height by enabling companies to capture, store, process, and manipulate large amount of data from all parts of the companies in a distinctively better, faster, and less expensive manner compared to doing them manually. However, the low price for such great value come with a cost: inflexibility. Most ERP vendors choose to design their products to fit a large number of businesses so that they can sell to more while having to incur the very high cost of software development only once. Unfortunately, this also means that in order to use these systems, companies have to do business according to the way the systems are designed to support, risking losing their uniqueness and potential competitive advantages. This problem is even greater for mid to large sized companies that have multiple different business practices maintained by different internal units. They are forced to make a difficult but critical decision: choose the most reasonable middle point between a highly-compatible low-cost global system (all internal units use the same ERP products) and a costly dynamic local system (each unit chooses its own system) that perfectly support the original business practice of each company unit. This research synthesizes the relevant knowledge from prior work done by other researchers in the information systems field into an easy-to-follow and executable decision tree framework. This framework is aimed to help mid-sized companies with limited Information Technology resources to better decide the recommended level of global and local focus of their systems.

## 1/ Introduction

Information technology has been well known for its capability to manipulate and transport data in a much faster and more efficient manner than when done manually. Companies quickly realized that this capability can connect all of its stakeholders (management, employees in different departments and locations, customers) on an unprecedented level despite physical distance. This connectivity can bring about enormous benefits by coordinating and synchronizing all activities of companies' once so scattered and separate resources, making them more effective and efficient in achieving companies' common goals.

Understanding this as one of the most important roles of IT in companies, technology companies have designed multiple ERP systems (Enterprise Resource Planning) that can be used to record, reflect, and direct all informational aspects of a whole global enterprise from supply chain and manufacturing management to accounting and financial management. These systems provide a single touch point for managers, employees and customers to see the detailed operations of an enterprise in real time so that they can align their individual effort better with the enterprise-wide effort.

However, the implementation of these pre-made globalized systems is not totally harmless for a business. There is a common misleading belief that the more unified an enterprise system is in terms of database and functionality on a global scale, the better that system is. One hundred percent globalization can be best in the aspect of speed, consistency, and efficiency. However, in terms of some important business goals and strategies, this "best" is questionable. ERP system/software vendors, IT consulting companies, and businesses may put too much weight on integration and streamlined business processes when creating, marketing and selecting ERP packages or its components for adaptation into companies. Since it is very expensive to

create a full-fledged ERP system, software companies try to make its product adaptable to as many companies as possible by doing research on the operations and business processes of a wide range of companies and industries to create systems that support “best practice” operations in industries. Most companies can only afford these premade systems for their low prices and high support. But here arises a shortcoming: adapting to the new system’s “best practice” processes entails giving up on a company’s local and probably unique way of doing business that may not be supported by the rest of the global system. This abandonment of old processes is likely to entail a short-term loss in employees’ efficiency and potential loss of competitive advantage, which may continue into longer term. Furthermore, disruption of the old processes can impact customer facing processes and directly affect the companies’ image as well as bottom line.

Researchers have studied how various aspects (business processes, customers, employees, management, and strategies) of a business are influenced and changed when an information system is pushed into the organization (Marchewka, 2006). Usually, ignoring the possible local losses from ERP systems, these studies focus on how to further realize the benefits of enterprise-wide integration, automation and collaboration. The true question is when it will be worth it to pay the high price to get a system that fits business to the local level. This research looks for an answer to this question by considering three pair of choices: commonality or differentiation (global data repository or not), single vendor or multiple vendors (one single software package for all units of business or several software modules selected separately based on how they fit specific local business functions - sometime called "best of breed" approach), and vanilla or customization (use the bought software as it is or create new functions/create whole new software). As there are middle points between a fully global system and a fully local

system, I will develop a framework with insights from other researchers' work related to this topic to provide a recommendation as to where a good mid-point for a company can be in different situations. This will be a value-based framework to try to suggest the right level of locality of an enterprise-wide information system.

The paper will proceed as follows. Firstly, important concepts such as locality and commonality will be defined to provide readers with the necessary background to understand subsequent sections. Secondly, the research methodology will be developed to answer the research question of what is the best level of locality of an enterprise wide IT system. Third, the literature review section will detail relevant findings and shortcomings from previous research related to this study's question. Fourth, based on findings in previous sections, I will reorganize the concepts in order to build a decision tree that can help businesses make better decisions relevant to the research question. Finally, suggestions for further research are offered.

## 2/ Critical terms and concepts explanation:

First, one needs to understand the concept of a subunit of a business in order to clearly understand what a local system and a global system are. Goodhue and Gattiker's definition of business subunit includes: "manufacturing plants or different functional departments of a business (Gattiker & Goodhue, 2005, p. 560)." A business is usually made up of multiple smaller parts – called departments. According to [humanresources.about.com](http://humanresources.about.com) website, departments are entities that organizations form in order to "organize people, reporting relationships" usually "by functions such as human resources, marketing, administration, and sales" or "anyway that makes sense for the customer. (Heathfield, 2015, p. 1)" When a company reaches a certain size and expands into multiple locations, these departments are further divided geographically into smaller units. These are business subunits.

According to Law (2009), a global information system is “an organized collection of telecommunications equipment, computer software, data, and personnel designed to capture, store, update, manipulate, analyze, and display on computer a broad range of information about worldwide business activity” (Law, 2009, p1). In other words, this system is designed to best support a worldwide business activity as a whole spanning multiple locations. A local system is, on the other hand, designed to best support specific individual pieces of a worldwide business. A local system’s top priority is to mirror the business practice of each piece rather than to connect those pieces to mirror the whole global business. An analogical view to the difference between a local and global system is how we find a single line to connect multiple dots on a plane. A complicated curve line that goes through every single point is like a local system fully matching each business piece. A simple straight trend line that goes close to all points but truly goes through only some or none of them is like a global system connecting all business pieces tightly and effectively but supporting each piece to only a limited level. Each piece may even have to move to touch the trend line while they might be best left where they were. The pieces that are outside of the “confidence interval” are likely to experience significant local losses.

A global IT system entails multiple unique benefits for a business: full integration of data, seamless operation and automation, high speed in generating useful and obtaining needed information, effortless collecting of data for the whole business, consistent data at every access point.

A local IT system has its own unique advantages. It can accurately reflect the business practices of a particular business subunit, thus, offering high speed and effectiveness as well as efficiency within that particular business subunit. The level of accuracy is moderate if the local system (chosen to best fit local practice) is vanilla and is high if the local system is customized or

built up from scratch. However, for the business processes that span across multiple subunits such as marketing, accounting, and internal audit, employees will have to take on a lot of manual work or the company must create a large number of interfaces to make different sub-system talk the same language with the main one (master system). Interface creation is significantly difficult and it also makes upgrades much more time consuming and risky. But if we choose to truly alternate the whole enterprise-wide system to gain the capability that can specifically address the need of that particular function, it may lead to unnecessary waste of system capacity (since there must be synchronized data types and programmed features which are not used by other databases supporting other business locations).

There are multiple decisions that affect how global or local a system is. This study focuses on three following decisions (or dimensions) and their implications on the global/local level of an enterprise wide system: Commonality against Differentiation, One vendor against multiple vendors, and Vanilla against Customization.

For the first dimension, Commonality and Differentiation refer to the database of the Information System. A common (or integrated) database stores all operating data of a company across subunits in a uniform way and is accessible to all subunits without any replication. A common database enables executives to instantly get query-able information about any part of the company. On the other hand, a differentiated database maintains many small local and separate databases with different data structures and data supporting separate local subunits. A global information system will need to have a common database while a local information system may involve differentiated database. For example suppose a foreign government requires only a local system of a global company to store all data about its workers' and employees' medical conditions for appropriate selection of insurance policy. Since it will be unreasonable to

enable new data table fields to store these new data for the company's whole global information system, this company is likely to maintain a separated database to accommodate authority's request without disrupting the whole global system.

For the second dimension, usually a software vendor will have a collection of different program modules corresponding to a company's different functions and departments. Underlying these modules is usually a common database. Different vendors' products can be designed to communicate and work with one another with or without a common database. While choosing only one vendor (single vendor) can offer a company standardization in systems functionalities and data structures, combining products from multiple vendors (choosing the "best" vendor for each type of functionality or location) can more closely support the diversity of local business practices.

For the third and also last dimension, vanilla refers to the use the vendors' systems as they are originally designed while customization is changing the usage, functionality, or data structure of a vendor's system, or even designing and creating a whole new system that specifically fit a unique local business practice.

### 3/ Methodology

Fundamentally, what I am looking for is how to make a business decision. A decision making process involves using analysis to determine which actions to take to eliminate the gap between the current and the desired future state. So in the business world, the decision makers must first know what the business's present characteristics are (the current) and what they are expected/desired to become (the future). After that, the decision maker will need to analyze both

the current and the future to determine what actions can transform the current into the future by testing those actions to see if they will direct the current toward to right future.

All the knowledge I gather will be from prior works done by researchers around the world. In the case of this research, I am looking at two actions (global system vs. local system) measured by three dimensions (common/differentiation, single vendor/multiple vendors, and vanilla/customization).

Then I look for the current characteristics of the business (the current) that will affect how these two actions affect the performance of a company as suggested by previous relevant research (these will be discussed in section 4).

After that, I look for the performance of the business (the future) created by the influence of these actions on the current characteristics.

Finally, I will create a decision tree to help decision makers move from what they know: "what current do they have?" and "what future do they want?" to what they don't know but desire to: "what action should they take now?"

#### 4/ Literature reviews

A company's current: Literatures discussing variables that are characteristics of a company that may determine how the choice of commonality vs. differentiation influence that company's MOVs (Measurable Organizational Values) variables in term of magnitude and direction.

Anderson, Banker and Ravindran (2006) identify a characteristic of firms that can help determine the value that comes from an investment in IT innovation. That characteristic is complementary resources or the "resources needed to exploit IT innovation: physical (plant),

customer relationship, brand-name, know-how” (Anderson et al., 2006, p. 1363). In addition, these resources can be hard to imitate by competitors, making the benefits obtained hard to replicate as well. In other word, complementary resources are those that help the firm realize the most value from IT innovation in the most sustainable way. The implication is that if a firm can choose a system (whether it is global or local) that reflects the power of its unique complementary resources, the value could be more strategic.

Anderson et. al. (2006) also observed Information Technology's influence on many companies in different industries and the corresponding monetary impact. The study discovers that significant increase in firm value and earnings is mainly evident in "transforming industries" where IT was considered to have a “transforming influence – altering traditional ways of doing business” (Anderson et al., 2006, p. 1363). An example of a transforming industry is retail where the application of IT has given rise to online retail and a threat to brick and mortar businesses. Now, the ability to use an IT solution smartly and strategically becomes one of the core competitive advantages of any retailer. IT is their potential key to surpassing competitors and dominating market share. Besides transforming industries, the study also identifies two other concepts: automating industries and informationing industries. Automating industries are industries that use IT only for automating otherwise manual tasks. Informationing industries are industries that use IT to better capture and retrieve valuable information about the business situation to make better decision. As a result, the implication here is that a transforming industry business is more likely to have its competitive advantages influenced by the IT systems. Another implication, though quite subtle, is that a business that uses IT to transform its business processes rather than just for automation and information is more likely to have its competitive advantage influenced by its information system. Therefore, transforming businesses may benefit more from

a local information system that closely and accurately reflect their unique business processes on a local level.

Westerman and Cotteleer (1999) suggest that accounting is the function that usually requires a fully common system across all business subunits. The management team of Tektronix, the subject company in this case study, made a quick and firm decision of separating the order fulfillment systems of its business subunits in three different countries (maintain a local order fulfillment information system) while keeping a single common accounting system across all business units (global accounting system). The reason is that despite spreading across different countries, a global company is still one unified entity with a group of investors to answer to about its financial performance. No matter where the revenues stream or costs come from, the investors and high level executives of the company will want to know how it is performing as a whole entity to make strategic decision that can maximize the total performance, which may involve sacrificing certain areas. That's why a common accounting system is likely to be needed for any company.

Gattiker and Goodhue (2005) examined the effects of ERP systems on the performance of companies in the post-implementation period, in contrast to the study case about Tektronix's ERP implementation period. This approach offers more realistic and convincing data because actual benefits are recorded. The results are invaluable to my research question. The study confirmed its own hypothesis that there is a positive relationship between the total amount of benefits of a highly global enterprise system and the level of interdependence among the enterprise's components (sub-unit). In other word, the less dependent one sub-unit is on another, the less local benefits a global system connecting the two sub-unit can bring about. The level of interdependence between a company's subunits (can potentially be measured in terms of the

amount of data shared or number of shared tasks in common process) will influence the level of benefits that each subunits realize from an integrated system and ultimately the total benefits that an enterprise can realize (the sum of all benefits to all of its subunits) (Gattiker & Goodhue, 2005).

For an example of a dependent business subunit, the business subunits within marketing and manufacturing divisions of a made-to-stock company have mostly separate business processes. While marketing deals with customer relationship, sales forecasting, and customer demand analysis, manufacturing only cares about scheduling and managing resources to produce pre-designed products. There are few common processes or shared tasks. However, there is quite frequent and very important data sharing between marketing and manufacturing: sales forecast/ordering records (from Marketing to Manufacturing) and manufacturing schedule/available manufacturing capacity (from Manufacturing to Marketing).

For an example of highly independent business process, consider the order fulfillment system in a department store in Vietnam and a department store in Canada. There is no need for direct data shared between them and also activities in either store have no direct immediate influence on that of the other.

Lastly, a critical point in this research is the distinction between the sum of local benefits and global benefit. In this research, global benefits are defined as any benefits that can be obtained from the whole system connecting all business subunits. An example of a global ERP benefit is the ability to gather demand data of all subunits instantly for central reporting purposes. Another example is the better visibility of orders from other plants in the company - perhaps with decreased expediting and overtime as a result. An example of a local benefit is the

streamlined system connection to local third-party suppliers (obtained by using the same ERP system with these suppliers).

Abdel-Kader and Nguyen (2011) looked into how companies with high agility (with a need to modify their systems regularly) choose and manage their information systems. The study's topic is tightly related to my research question because it casts light on how companies succeed in increasing the flexibility of their systems to support new business practices or local government's requirements in the most effective and efficient manner. If we consider their old practice supported by the old system is the practice of a business's first subunit and the new practice requiring a new system is the practice of that business' second subunit, the decision Abdel-Kader and Nguyen (2011) were observing is similar to what this research is interested in.

The study found that Enterprise Systems seem to enable agility and flexibility within limits – the maximum flexibility offered by setting configurations and add-ons. Therefore, companies first need to look at all capabilities offered by ERP packages to see if the ERP system can satisfy both global and local needs. The most popular options picked by business managers are: capabilities already built in to the package but not previously used (if applicable, this option can maintain a highly global system while supporting different local functionalities); using “add-on” systems available on the market that easily interfaced with the existing enterprise system; and utilizing vendor provided “patches” that automatically updated the code. In the case these three options are not applicable because the difference between the two business practices are too fundamental, managers turn to the following options: leveraging globally consistent integrated data already available, customize existing code, and/or develop custom systems from scratch.

Identify what is competitive advantage?

Porter (1985) happens to support and further the point made by Gattiker and Goodhue (2005). Technology has a very “pervasive impact” on business (Porter, 1985). It has effects everywhere in the value chain: firm infrastructure, human resources, technology management, procurement, and supply chain. Therefore, it is easy to understand that the tight dependence of different business units on one another strongly encourages the tightly integrated and common system connecting them. However, Porter has gone further and recognized the dependence of an IT system’s components/modules on technologies from both partners and customers. The study mentioned an example of dependence on partner’s system: American Airline uses the Sabre reservation system to “lease terminals to travel agents” and the same system is also used internally for “ticketing, issuing boarding passes, and route scheduling (Porter, 1985, p. 169).” An example of dependence on customer’s system would be when an important and frequent Business customer use SAP ERP to link all shipping and ordering data with a business’s compatible SAP ERP system. That business should generally hesitate to change into a system that will risk disrupting the connection and business processes with its business customer’s system and risk losing an important revenue stream.

Porter (1985) also identifies two general components of competitive advantage: cost and differentiation (or uniqueness) as well as their drivers: economy of scale, learning, pattern of capacity utilization, linkages, interrelationships, integration (economies of joint operation), timing, discretionary policies, location, and institutional factors. Therefore, in order for an IT system change to be able to affect the competitive advantage of a company, it must first change at least a business process related to one of these drivers. These drivers provide a rough systematic scan to check if a business process will play a significant role in the performance of a company (Porter, 1985).

A company's future: Literature discussing variables representing a company's MOVs (measurable organization values - either financial or non-financial) that are influenced by the choice between a global and a local system

This section will present discussion about strategic goals of IT in terms of performance, financial return and costs. Performance considers users' needs, business goals, stakeholders, business processes from executive/managers and power-users.

Westerman and Cotteleer (1999) offered ideas and reasoning about what kind of system should be global and unified in a company (accounting because of the needs to have instant unified financial information for decision making) and what could be partially local or separate (ordering systems for separate departments because of the unavoidable difference in business practices of different product lines). Overall, the executives in the company in this case study totally preferred vanilla and tried to be as vanilla as possible throughout the project. The study briefly mentions that the preference of vanilla over customization and best of breed (Differentiation) is due to the executives' awareness of the extremely high cost associated with implementing and maintaining a non-common (highly local) system and of its questionable benefits of retaining a business competitive advantage. Tektronix's executives recognize a separation between conventions/familiar ways of doing business and real business competitive advantages. Most of the time, when a business process is different from the functionalities of a prepackaged software system, it is because of the former rather than the latter (Westerman & Cotteleer, 1999). Therefore, changing business process to adapt to the prepackaged system is usually the best approach. In addition, the study also focuses on project management aspects of implementing ERP, suggesting that decisions on the type of Enterprise System can influence the IT system implementation and maintenance (upgrade, maintain) aspects of a business.

In general, this study contains three ideas that could be used to create a decision-making support framework: global/local level depends on business needs (accounting vs order fulfillment), there are great costs associated with implementing and maintaining a local systems, and it is important not to confuse business competitive advantages with “the way we’ve always done business” when deciding whether to change a business process to adapt to prepackaged system.

Gattiker and Goodhue (2015) examined the benefits of an ERP system in the post-implementation period. They identified three main benefits from the whole enterprise system: better information (data quality), more efficient internal business processes (task efficiency), and better coordination between different units of the firm (coordination improvements). However, the research discovered how the last benefit (coordination improvement) may be undermined by current business characteristics. The mismatch between these current characteristics and the choice of commonality/differentiation can create “suboptimal business process(es),” “dependence on employee work-around” (using the system in unintended ways), and employee inefficiencies (Gattiker & Goodhue, 2005, p. 567). The study also made a good point that the benefits of an enterprise system as a whole comes from the sum of benefits for all business sub-units (intermediate benefits at local level) (Gattiker & Goodhue, 2005). Therefore, in order to understand the whole, we need to understand how each business sub-unit is benefiting from the system.

A study by Hendricks, Singhal, and Stratman (2007) listed out the benefits (MOVs) of a totally common ERP system: eliminate the need for costly creation and maintenance of complex and sometimes manual interfaces linking different systems, automate transactions across functions, reduce “order cycle times (the time from when an order is placed until the product or

service is delivered” resulting in “improved throughput, customer response times, and delivery speeds,” and “reduce cash-to-cash cycle times and the time needed to reconcile financial data at the end of the quarter or year” by automating financial transactions. For the bottom line, the ERP system will typically decrease operating capital and human resource cost in the financial function by ensuring that all levels of managing, communication (with customers/clients), and planning are based on updated and synchronized data resources, which reflect the accurate “operating conditions of the firm” (Hendricks et al., 2007, p. 68).

Abdel-Kader and Nguyen (2011) stated that “the common approach in investigating ERP success based on non-financial perspectives was to evaluate the success through a pre-defined group of measures” (p. 4) which supports this research’s future sections. It is important for the companies to define their own success factors because successes are not always financial and the same for all companies. The research found that two of the important system characteristics considered by small companies are cost and risk. The managers also favor customizing and new software development because they are aware that such systems will provide the “most relevant and necessary function” (Abdel-Kader & Nguyen, 2011, p. 11). Small companies’ managers follow cost priority by developing their own systems to avoid “high cost of big ERP vendor” and “high risk of small ERP vendor” (Abdel-Kader & Nguyen, 2011, p. 11). To also cut cost in the process, managers usually consider outsourcing the new system creation order to software companies. This research is relevant to my research topic because a small company in a single location is similar to a large enterprise’s isolated small business subunit that is looking for a customized system. The business priorities and system development options presented in this research can be utilized when evaluating the influence of a local system on a business subunit.

5/ Develop a schema that can take into account issues found and assist users in making an informed and systematic decision on the choice.

After reading the current literature, I am more confident that most researchers provide little thought to how to deliver a system that can work with and facilitate the competitive difference of local business subunits as a benefit itself rather than as an irremovable obstacle to realizing the full benefit of a global system. There are some thoughts and reasoning for the choice of giving up a completely global system but the choices are not viewed in a unified and compatible framework. Therefore, the collective knowledge about the three dimensions cannot be easily combined and applied to other cases and companies. This section develops a way of reorganizing the current disconnected pool of ideas and concepts into a concise decision-making framework for the search of the recommended level of global/local property for an IT system.

The first subsection - "Future" will discuss the goals of businesses, helping a user determine what they value: for example whether they seek immediate improvement in business performance or prefer strategic investment that sacrifices short term profit for potential enormous long term benefits. Secondly, the "Current" subsection will define, organize, and visualize the current characteristics of the firm so that users can make an informed decision towards achieving their goals for the future.

### Future

For the future, the company must list out its long term and short term goals and strategies in order to know what kind of system it needs to achieve those goals and satisfy those strategies. The goals can be inferred and reorganized from the "Future" subsection of the literature review section. The strategies could be to be the leading edge innovator with very flexible and responsive business processes or to operate with the lowest cost possible to offer the lowest price

in the market. These goals and strategies depend a lot on the industry, structures of the company, and the market it is serving. The following goals are presented in the studies by Westerman and Cotteleer (1999), Abdel-Kader and Nguyen (2011), Hendricks et al. (2007).

Business goals from developing an information system can vary across businesses:

- Avoid system development cost and risk by eliminating the need for costly creation and maintenance of complex and sometimes manual interfaces linking different systems

- Maintain or gain business competitive advantage

- Reach high visibility and connectivity for the whole world-wide company by maximizing global benefits: automating transactions across functions, reducing “order cycle times (the time from when an order is placed until the product or service is delivered) to have “improved throughput, customer response times, and delivery speeds,” and “reduce cash-to-cash cycle times and the time needed to reconcile financial data at the end of the quarter or year” by automating financial transactions (Hendricks et al., 2007, p. 68)

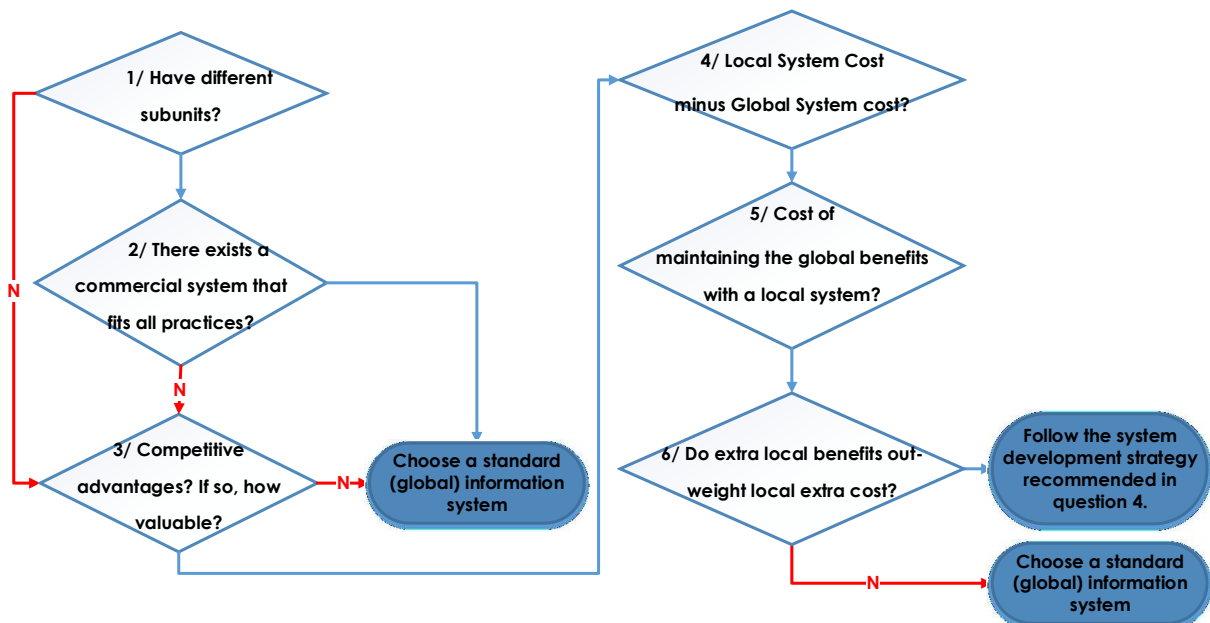
## Current

The following decision tree’s questions are based on the consideration of various factors that can influence the benefits and cost related to the level of global/local property of an information system. These factors are synthesized from the literature reviews of work done by: Porter (1985), Anderson, Banker, and Ravindran (2006), Westerman and Cotteleer (2006); Gattiker and Goodhue (2005); Abdel-Kader and Nguyen (2011).

The decision process will let a completely global system be the standard or default system. The answers to the questions will determine how far the company is justified to move

away from this standard system toward a more local system and pay for the cost incurred in the process.

Following is a chart showing a general map of the questions in this decision tree. The diamond shape represents a question. The round-cornered rectangle represents a decision. The blue line (without the word N) leads to the next step if the answer to the previous question is “Yes.” The red line (with the word N) leads to the next step if the answer to the previous question is “No.”



\*The first thing to consider is if there exists a gap between new system capacity and practice.

1/ Does your business have multiple subunits that have different business practices?

Answers:

.No -> question 2

.Yes -> question 3

2/ Is there at least a prepackaged vendor-sold system with capacities and functions acceptably (determined by your opinion) representing your business's practice?

Answers:

.No -> question 3

.Yes -> Choose that common, single vendor, and vanilla system (a global information system)

\*Then the different business practice must be considered against Porter's (1985) drivers for cost and uniqueness as well as other factors to determine whether it could be competitive advantage or just a normal way of business that can be replaced with industry best practice for the same or superior result.

3/ Are the different business practices competitive advantages or your familiar ways of doing business?

Answer these sub-questions to have a better foundation for answering question 3:

\*3.1/ Is your different business practice related to cost and differentiation (or uniqueness) as well as their drivers: economy of scale, learning, pattern of capacity utilization, linkages, interrelationships, integration (economies of joint operation), timing, discretionary policies, location, and institutional factors? Is your current system the same as or compatible with the current or future systems of your partners and customers?

Answers:

.No -> More likely to be a non-critical business practice

.Yes -> More likely to be a competitive advantage

\*3.2/ Is the industry that your company is in considered as Transforming, Informationing, or Automating industries?

Informationing and Automating -> More likely to be a non-critical business practice

Transforming -> More likely to be a competitive advantage

\*3.3/ Does your company have unique complementary resources to support your different business practice? The resources will ensure that the value obtained from maintaining such practice is more strategic and significant.

Answers to question 3:

.No (after answering above sub-questions, you can decide that this business practice is not a business competitive advantage) -> Choose a common, single vendor, and vanilla system (a global information system)

.If the general answers to these questions does not convince you that your different business practice is not a competitive advantage worth maintaining, then use the following table to calculate the sum of local value that your different practice will bring about. However, this calculation will be done indirectly by calculating what the company will lose if it does not choose a system that can fully support this practice. This is so that we do not take into account the benefits that are covered by any system either global or local.

Table 1's first column includes all business locations. Its first column includes functionalities/departments. Within each functionality/department name, all applicable modules from all vendors being considered are listed. In this way, each cell or group of cells (in case there

are multiple applicable modules from multiple vendors for each functionality) within the table represent a business subunit (identified horizontally by location and vertically by functionality). If there are three system alternatives of the same function/department, e.g. ordering system (SAP, Oracle, and Salesforce), we will group them together. Inside each cell, we will input the financial and non-financial impacts on this subunit's financial performance. These values can be determined by removing from your business sub-unit its applicable competitive advantages listed in the sub-questions and calculating the possible loss from this removal. Last but not least, these numbers will be determined by users in terms of their desired value. For example, a user can put a higher weight on a practice due to its long-term future benefits if his/her top goal is security for the future existence of the company. These benefits may also be converted into monetary form and be discounted over a chosen number of years into the future.

Table 1:

|                               | <b>Accounting module</b>   | <b>Order Fulfillment module</b>  |  |  |
|-------------------------------|--|--|--|--|
| <b>Vendors</b>                | <b>SAP</b>   | <b>SAP</b>   | <b>Oracle</b>  | <b>Salesforce</b>  |
| <b>Retail stores in Japan</b> | Financial/Non financial impact if using this software rather than another that fully supports this sub-unit's business practice. | Financial/Non financial impact if using this software rather than another that fully supports this sub-unit's business practice. | Financial/Non financial impact if using this software rather than another that fully supports this sub-unit's business practice. |  |
| <b>Retail stores in US</b>    | Financial/Non financial impact if using this software rather than another that fully supports this sub-unit's business practice. |  |  | Financial/Non financial impact if using this software rather than another that fully supports this sub-unit's business practice. |

Answers to question 3:

.No (after filling in the above table, you can decide that this business practice is not a competitive business advantage) -> Choose a common, single vendor, and vanilla system (a global information system)

.Yes (It is a competitive advantage) -> Question 4

4/ How much is the cost of building a local system that supports your business practices (subtracting cost of a totally global system so that we do not take into consideration the cost of any systems either global or local)?

Answer these sub-questions to determine a recommended system development options:

\*4.1/ (Common, one vendor, vanilla) Does at least one of the Enterprise System Products in consideration provide function/data flexibility for specific subunits while still maintaining one ERP package?

No -> Question 4.2

Yes -> The company should buy/utilize capabilities already built into the package but not previously licensed/used, 3rd party “add-on” systems available on the market that easily integrate with the existing enterprise system, and/or vendor provided “patches” that automatically updated the code.

Extra costs incurred to implement this system mostly include the price of the unused capabilities/3rd party add-on systems/vendor-provided patches and the cost of installation/functionality/product support.

\*4.2/ (Common, multiple vendors or customization) Can the Enterprise System Products in consideration provide adequate function/data flexibility for specific locations while still maintaining a centralized common/integrated database?

No -> Choose a differentiated systems from multiple vendors or choose customization/new system development. Make sure to choose the vendors whose systems fit the largest numbers of sub-units because there could be groups of subunits that have similar business practice (common groups), which means they can share the same ERP systems. Choosing the same software for each common group will reduce the number of different systems and thus reduce the need to create API or medium software between them.

Extra costs incurred to implement this system include the cost of buying products from multiple vendors (minus the cost of buying large subscription/ large number of product licenses from one vendor), the cost of developing API or medium systems to link separate systems together, and the costs to hire contractors, 3rd party companies, and/or internal IT resources to develop a new system.

Yes -> Choose among the ERP systems in consideration. Connect them by leveraging globally consistent integrated data already available, customizing existing code. Choose the systems and/or design new systems/software products so that they fit the largest numbers of sub-units possible because there could be groups of subunits that have similar business practice (common groups), which means they can share the same ERP systems. Choosing the same software for each common group will reduce the number of different systems and thus reduce the need to create API or medium software between them.

Extra cost incurred to implement this system mostly include the costs to hire contractors, 3rd party companies, and/or the cost of using internal IT resources to develop a new system that use the same database as the ERP system.

Answer to question 4:

.Calculate the cost of developing the recommended system

5/ How significant are the global benefits threatened by the choice of such a system? What is the cost to maintain these global benefits by resorting to work-around, customized API, and/or customized software?

Consider the size and the nature of business functions to determine the global benefits of a global system connecting all business sub-units. A greater company size (ex: number of locations) suggests greater potential global benefits. Some business functions benefit more from a global system than other functions. An example is the Accounting function & Order Fulfillment System (real case company in Westerman & Cotteleer's (1999) study). The accounting function will need updated financial information from all sub-units of the whole enterprise in a regular, accurate, and convenient manner. Therefore, the accounting function will have great global benefits from a global information system. In contrast, Order Fulfillment will not have much global benefits because a location's order fulfillment team generally does not tend to regularly communicate and collaborate with other locations' teams.

If after considering the size and the business functions' nature, you still prefer a more detailed and systematic way of calculating global benefits, use table 2 to determine the dependency level among all sub-units and the corresponding impacts on global benefits. The

more dependent a sub-unit is on another, the more global benefit that a global system connecting the two sub-units can bring about.

Table 2 is designed to demonstrate the level of dependency between each pair of sub-units which is influenced by the amount of data shared and the number of tasks shared between them. The first column lists all locations of the business. The second column lists, for each business location, all applicable functionalities/modules. This is the same for the first and second rows but all the contents are transposed into rows rather than columns. This table lets users input and visualize the dependency relationships between all business subunits. The impact (financial and non-financial) can be determined by considering the cost of suboptimal business processes between two subunits and the costs of customizations/interfaces due to a lack of a global system connecting them. Last but not least, similar to table 1, the impact will be determined by users in terms of their desired value and the non-financial benefits may also be converted into monetary form and be discounted over a chosen number of years into the future.

|                            |                                | <b>Retail stores in US</b>  | <b>Retail stores in Vietnam</b>   |   |   |
|----------------------------|--------------------------------|---|---|---|---|
|                            | <b>Functionalities/Modules</b> | <b>Accounting</b>   | <b>Order fulfillment</b>  | <b>Accounting</b>   | <b>Order fulfillment</b>  |
| <b>Retail stores in US</b> | <b>Accounting</b>              | -Amount of data exchanged:<br>-Amount of task shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. | -Amount of data exchanged:<br>-Amount of task shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. | -Amount of data exchanged:<br>-Amount of task shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. | -Amount of data exchanged:<br>-Amount of task shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. |
|                            | <b>Order fulfillment</b>       | -Amount of data exchanged:  | -Amount of data exchanged:  | -Amount of data exchanged:  | -Amount of data exchanged:  |

|                                 |                   |   |   |   |   |
|---------------------------------|-------------------|---|---|---|---|
|                                 |                   | -Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common.                                | - Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common.                               | - Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common.                               | - Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common.                               |
| <b>Retail stores in Vietnam</b> | <b>Accounting</b> | -Amount of data exchanged:<br>- Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. | -Amount of data exchanged:<br>- Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. | -Amount of data exchanged:<br>- Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. | -Amount of data exchanged:<br>- Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. |

|  |                          |   |   |   |   |
|--|--------------------------|---|---|---|---|
|  | <b>Order fulfillment</b> | -Amount of data exchanged:<br>- Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. | -Amount of data exchanged:<br>- Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. | -Amount of data exchanged:<br>- Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. | -Amount of data exchanged:<br>- Number of tasks shared:<br>-Impact (Financial and Non-financial) if these subunits' systems are not common. |
|--|--------------------------|---|---|---|---|

Answer to question 5:

The sum of the impact numbers in all cells.

6/ Is the value of this business competitive advantage greater than what the company will lose to maintain it with a local system?

The value of the business competitive advantage is determined in question 3.

The loss for the company is determined in question 4 (extra cost to develop a local system) and 5 (global benefits given up in exchange for local system).

Compare the value with the loss.

Answer to question 6:

.No -> Choose a global information system

.Yes -> Follow the system development strategy recommended in question 4.

**Bibliography**

Abdel-Kader, M., & Nguyen, T. P. (2011). An Investigation of Enterprise Resource Planning

Implementation in a Small Firm: A Study of Problems Encountered and Successes

Achieved. *International Journal of Enterprise Information Systems*, 7(1), 18-40.

Anderson, M. C., Banker, R. D., & Ravindran, S. (2006). Value implications of Investments in

Information Technology. *Management Science*, 52(9), 1359-1376.

Gattiker, T. F., & Goodhue, D. L. (2005). What happens after ERP implementation:

Understanding the impact of interdependence and differentiation on plant-level outcomes.

*MIS Quarterly*, 29(3), 559-585.

- Heathfield, S. M. (2015). *What is a Department?* Retrieved March 29, 2015, from  
humanresources.about.com:[http://humanresources.about.com/od/glossaryd/f/department.  
htm](http://humanresources.about.com/od/glossaryd/f/department.htm)
- Hendricks, K. B., Singhal, V. R., & Stratman, J. K. (2007). The impact of enterprise systems on  
corporate performance: A study of ERP, SCM, and CRM system implementations.  
*Journal of Operations Management*, 25(1), 65-82.
- Law, J. (2009). *A Dictionary of Business and Management* (5 ed.) - Global Information System.
- Marchewka, J. T. (2006). *Information Technology Project Management*. John Wiley & Sons,  
Inc.
- Porter, M. E. (1985). *Competitive Advantage*. New York: The Free Press, Collier Macmillan  
Publishers.
- Westerman, G., & Cotteleer, M. (1999). Tektronix, Inc.: Global ERP Implementation. *Harvard  
Business School Publishing*.
- Wood, A., & Dell, R. (2006). Current issues: Implementing successful information technology  
solutions. *American Water Works Association*, 98(11), 32-34.