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## BUSINESS PROCESS AUTOMATION



*A Framework for Combining Best and Next  
Practices for the Agile Organization*

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### INTRODUCTION

Agile enterprises must adapt to continually changing business environments in order to survive in the long term. To do so they have to combine best and next business practices. Best practices ensure efficiency; next practices really lead to competitive advantages.

Traditional business process automation solutions, like ERP, SCM, or CRM systems focus on the implementation of best practices. Next generation process automation enables the implementation of next practices at an economically acceptable cost level. This is possible through a flexible integration of business process definition and software application support. The appropriate software

support must be dynamically adaptable to the business processes definition so that it supports the execution of enterprise specific processes.

Business process models reflecting best and next practices drive the configuration of next generation process automation solutions which “orchestrate” the appropriate application support. They become the critical link between strategy and execution.

## **BUSINESS AGILITY THROUGH BEST AND NEXT PRACTICES**

Enterprises have to innovate continuously in order to survive on the long term. It is not sufficient just to implement best business practices or to reduce cost. Best practices may ensure an efficient survival of the organization, but not real success. Real progress is made through innovation. Innovation is key in the agile organization. And innovation requires the vision, development, and execution of next business practices, resulting in new processes. Successful enterprises have to combine best and next practices to achieve business process excellence and with that competitive advantages (Scheer, Business Process Engineering, 2003).

### **Innovation requires next business practices**

An enterprise can drive innovation in various ways. The key types of innovation are

- Product innovation
- Collaboration innovation
- Process innovation.

These types of innovation are interrelated and together comprise a continuously evolving business model. Each influences the others. Product innovation may also imply collaboration and process innovation and so on. The types of innovation and their interrelations are visualized in Figure 1.

The classic form of innovation is product innovation. The term product is here used in a wide sense including goods, services, rights, or any other offering that is sold on the market (Kirchmer, Market- and Product-Oriented Definition, 1999). Product innovation means that a new product is brought to the market or the features of an existing one are increased or improved. A new digital camera may have a better resolution and an easier integration with a PC, a car, an advanced

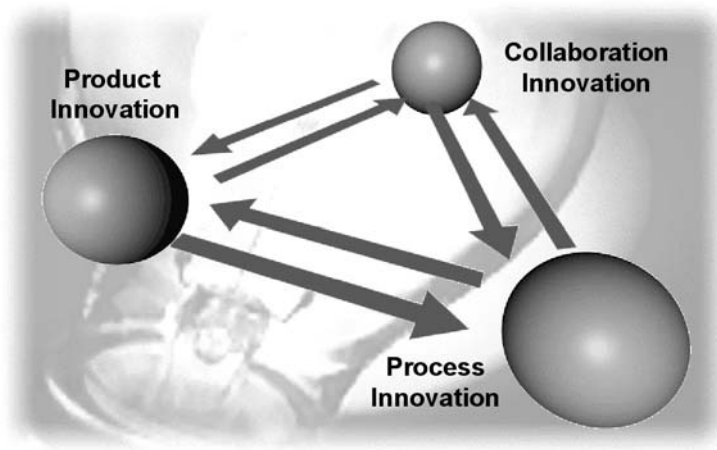


Figure 1. Types of Innovation

on-board computer, or a consulting company offers a new service solution focused on the Sarbanes-Oxley act.

*Collaboration Innovation* has become more and more important. Henry Chesbrough in his book, “Open Innovation—The New Imperative for Creating and Profiting from Technology” points to the increasing wisdom for collaboration with external partners to maintain corporate innovation in the face of increasingly complex challenges and business processes. New forms of collaboration result in competitive advantages, e.g. new offerings. An example for this type of innovation is the “On Star” services GM first offered in the Cadillac Escalade. Through On Star the driver can connect to a service office. There they locate the car, give directions or offer concierge services. The car itself was not really an innovation when it came to the market, but the combination with On Star was. This innovation was possible through a unique collaboration between a care company and a wireless network phone company. The collaboration innovation resulted in an enhanced offering, a product innovation.

The third type of innovation is process innovation. In this case innovation is driven through new or uniquely improved business processes. Companies like Dell, Amazon.com, or Ebay are built entirely on the basis of process innovation. Dell didn’t invent the PC, but a new process of bringing it to market; Amazon didn’t invent the book but a new way of selling it; and Ebay offers a new, unique way of participating in auctions. New processes lead in those cases to a new way of collaboration and new offerings. The availability of a new technology can also drive new or adapted business processes. As corporations explore and adopt RFID technology, for example, the knife-edge of competitive advantage in the market place may well depend on who first devises the most effective business process

model to incorporate the information available from this technology. It is not at all clear that companies have yet achieved high levels of ROI from the introduction of mobile technologies. From our perspective this failure by companies to exploit thus far the opportunities made possible through such technologies is due to the lack of business process research and analysis.

In general each type of innovation impacts the business processes in place. This is obvious in the case of process innovation. But also a new form of collaboration requires the appropriate new processes, in this case inter-enterprise processes. And new or modified products that have to be produced and brought to the market may result in new marketing, sales, production, or distribution processes. Those innovation driven processes are most likely to be unique when they are first implemented. Therefore they require next business practices since best practices are not available for those business processes. The agile organization has to be able to adopt next business process practices quickly and effectively.

## **Efficiency requires best business practices**

However, innovation is not necessary in all areas of an organization. Otherwise the agile organization wouldn't be affordable. In contrary: many consulting research projects have shown that often 80% or more of the business processes of a company can be standardized based on industry best practices without any impact on the desired competitive advantages of an organization. This reduces cost and risk for implementation and management of those processes (Kirchmer, Brown, and Heinzl, 2002) (Kirchmer, 1999).

Typical examples for the use of such best practices are processes that are highly influenced by legal regulations, e.g. in the field of finance, accounting, or human resources administration. In general it wouldn't make sense to invent new processes in those areas; but also in areas that are widely recognized as important for creating competitive advantages, the implementation of best practice business processes can make sense. The distribution processes of a supply chain may be crucial and very unique for some pharmaceutical or consumer packaged goods companies. They may be less relevant for an enterprise in the capital goods industries. Here the use of best practices is the most efficient solution.

Industry organizations like the Supply Chain Council develop best practice reference models that allow the efficient and effective use of such business process standards. An example for such a reference model is shown in Figure 2. The SCOR reference model structures the supply chain processes on higher levels based on best practices, and leaves on the lowest description level the appropriate choice of a company specific execution of those processes, including the implementation of new processes.

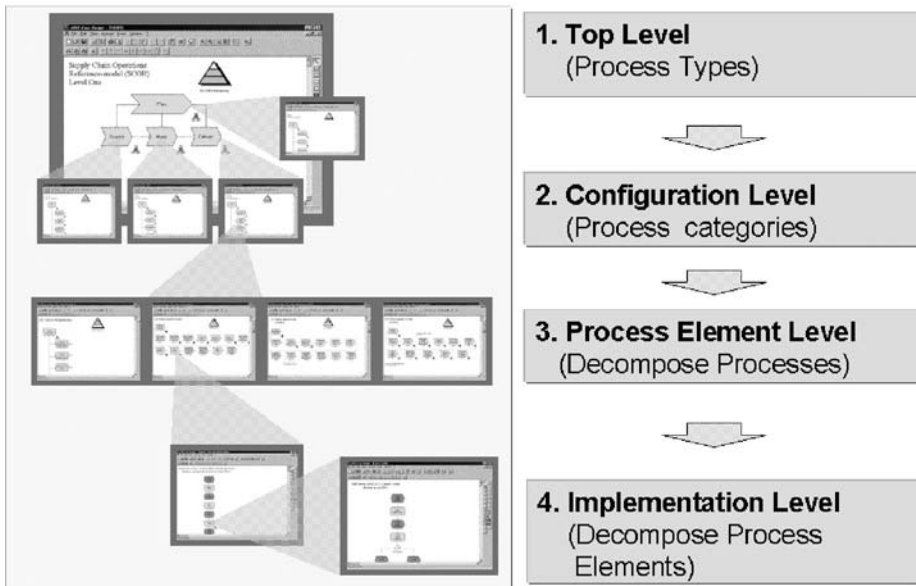


Figure 2. SCOR reference model—best practice model for the supply chain

The systematic use of such best practice models is key for an organization to efficiently reach the necessary process improvements in areas in which they do not need to achieve special competitive advantages. Here a company has to make sure to be at least as good as the competition and this with as little effort and additional resources as possible. To try to define next practices in those areas would lead to unnecessary cost and therefore even impact the business situation of an enterprise negatively. The efficient and effective application of best practices often becomes an important competitive advantage of the agile organization.

## BUSINESS PROCESS AUTOMATION AS ENABLER

Best and next business practices have to be identified, combined, and then effectively implemented in the agile organization. This requires a systematic approach to business process lifecycle management. A framework that enables such an approach is the ARIS House of Business Process Excellence. It orchestrates the design, implementation, execution and control of business processes based on best and next practices.

However, the desired business results can finally only be fully achieved if the execution of the processes is successful. Widely used standard application software

solutions, like ERP, SCM, or CRM systems such as those provided by SAP support the execution of processes—but lead in general to the realization of best practice scenarios. The implementation of next practices requires flexibility in execution that up to now has not been available or only available at an unacceptable cost. As a result many processes are not or not sufficiently automated (Kalakota and Robinson, 2003), so that they cannot be executed and changed with the speed necessary in an agile organization. Results are reduced performance and productivity. Therefore the use of new business process automation technologies becomes crucial: They deliver the flexibility in the process execution necessary to implement new business process practices at an acceptable cost level.

## Business process lifecycle management

An enterprise prepared to adapt to business processes *on the fly* can respond quickly to changing business environments, triggered through events like new or changing customers, suppliers, or other market partner requirements, new or modified market offerings, changing legal regulations, availability of new or improved technologies, outsourcing of specific activities, mergers and acquisitions, new business models, or cultural differences in various locations. Business process based organizations that practice business process lifecycle management gain a distinct advantage in the market over competitors who are not as responsive or agile. The prize is the ability to fulfill short-term needs and maintain long-term success.

Recent software advances permit the automated and responsive management of business process lifecycles. For example, the entire lifecycle of business processes can be managed based on the ARIS house of Business Process Excellence shown in Figure 3 (Scheer and Jost, 2002) (Kirchmer and Scheer, 2003), leading to a process centered organization. While specific to the ARIS software, this model allows us to examine the *process of process management*.

Business process management starts on the strategy level of an organization. Here a planned innovation is identified and the resulting business process structure and strategy as well as the business goals are defined. Processes that require next business practices in order to lead to competitive advantages are identified. Then the underlying application system architecture is worked out accordingly. The guideline for a process-centered organization is defined.

This guideline is passed from the strategy layer to the process specification layer. On this level the blueprint for the resulting business processes is specified, using techniques like simulation or ABC costing. Processes reflecting next practices are designed *de novo*. The specification of best-practice based processes

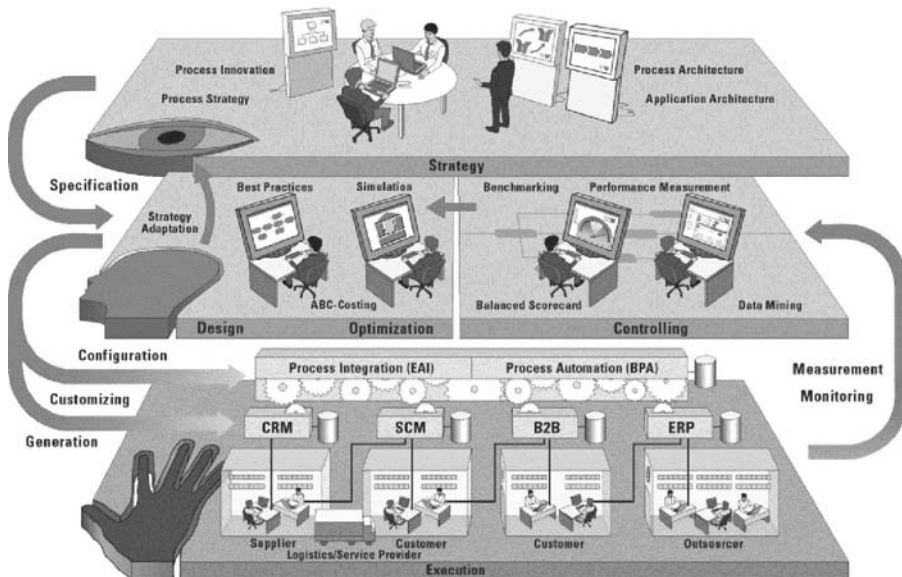


Figure 3. ARIS House of Business Process Excellence

can be supported by using the already mentioned reference models. On the specification layer all the necessary business processes are described in detailed so that this description can be used to drive the process execution. The result is a blueprint consisting of business process models.

Based on these process models the implementation of all physical and information processing activities is carried out, within and across enterprises. Here processes are either executed using standard application packages like ERP, SCM, or CRM systems that generally support best practice processes, or processes must be executed based on more flexible application solutions that can reflect necessary next practice approaches. These are next generation business process automation solutions.

The processes that are actually executed are measured and controlled on the so-called controlling level. If there are differences observed between planned key performance indicators (KPIs), defined based on the goals identified on the strategy level, and the actual values, either a continuous improvement process is initiated through the process specification layer or the situation is resolved on a strategic level, if the business environment has changed significantly.

All the design and specification as well as the controlling activities can be supported by business process management solutions like the ARIS Process Platform. These solutions also drive the process execution that may be based on traditional process automation or next generation process automation solutions.

## **Process automation based on standard applications**

During the last ten to fifteen years, more and more business processes have been supported by standard software solutions including SAP ERP, SCM, or CRM systems (Kirchmer, 1999). This has numerous advantages compared to individually developed software systems. A key advantage of these traditional process automation solutions is that they do not only deliver a technology to execute a specific process. Standard software also supplies best business practices, included in the software.

The successful use of standard solutions like ERP systems implies also the definition and execution of business processes according to the software solution. Standard software systems include a process definition that is typically coded in the software. Depending on the vendor, this may allow no or only minor changes of the process definition. Modifications to the process logic of the software result in tremendous cost and may limit the effectiveness of the solutions. Many unsuccessful implementations of standard software solutions can be traced to one of two causes. The first cause is a lack of realization on the part of the customer that their business processes will change—usually for the better. A second cause is a desire on the part of the customer to so modify the process in the solution, typically in an attempt to preserve pre-implementation processes that the benefits of the solution are compromised.

Those process definitions delivered through standard software are more and more often described in so called software reference models. Those software reference models document the best practices supported by the application system. An example is the SAP R/3 reference models. Next business practices are generally not supported. The reason therefore is that they require new processes that nobody thought of during the standard software development. Only when a next practice becomes over time a best practice it will be included in the traditional software solution. The fix integration of process definition and software technology in traditional standard software systems is visualized in Figure 4.

Although application software systems like, for example, SAP's mySAP allow the customizing of thousands of tables to influence the process logic, resulting in alternatives in reference models, it still just reflects various best practices. If a customer does not want to follow the project logic of an ERP or other standard software system, this can cause challenges which can only be resolved through major software development investments, not only for the development of additions, but also for their integration and maintenance. This leads to dramatically increased total costs of ownership. As a result, new business processes used not to be supported appropriately by traditional software solutions. This situation did not permit improvements of productivity and performance based on next practices.

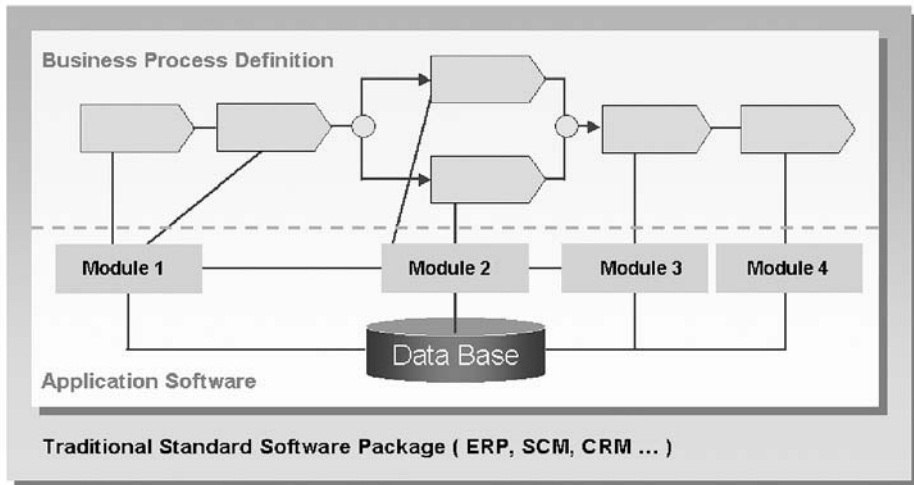


Figure 4. Traditional standard software: fix integration of process definition and software.

Therefore next business practices have to be supported through new software architectures, through next generation process automation, which ensures the necessary flexibility, combined with an acceptable cost. This is a key enabler of the agile organization.

## Next generation process automation

The basis of the next generation of business process automation is the separation of the application software itself, the integration technologies, and the business process design. The application software provides the needed functionality to support a business process. The integration technologies, often called business process automation engines, consist logically of a workflow component that enforces the necessary process logic, and a data integration component, so called enterprise application integration (EAI), that ensures the availability of the required data. This structure is shown in Figure 5.

New business processes are defined in process models, representing the process definition. Based on the models the workflow engine is configured more or less automatically. This is possible though the use of standards for developing the process models, like the business process modeling language “BPML” (<http://www.BPMI.org>) or the business process execution language “BPEL” (Business Process Execution Language). These standards ensure that the workflow engine *understands* the process definition.

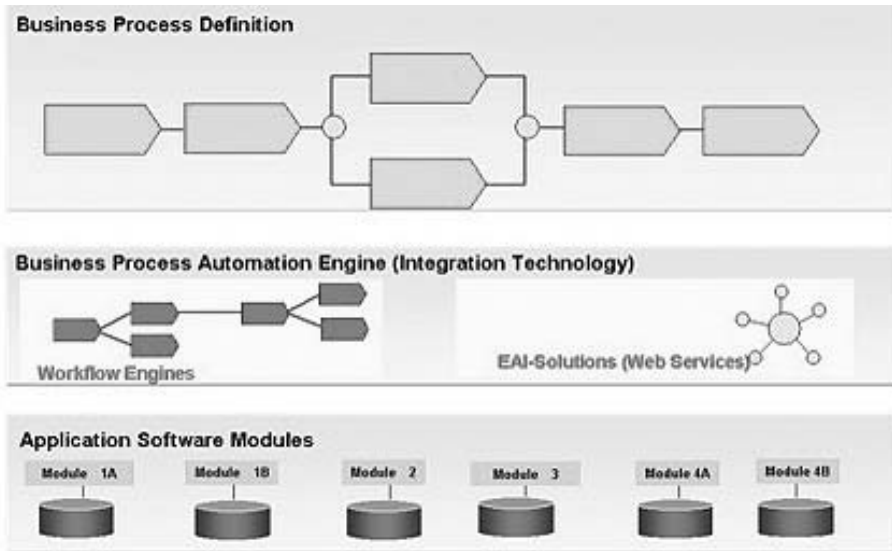


Figure 5. Components of next generation process automation:  
Process definition, integration, application

The workflow engine then *organizes* when which application functionality is needed, and activates it accordingly. The *EAI environment* ensures the availability of the necessary data, which is transformed into a neutral format so that it can be forwarded from one application to the next, as required through the process definition. This procedure is visualized in Figure 6.

This next generation business process automation is technically implemented based on new software architectures. Existing application may be split or combined in order to deliver the appropriate functionality needed in various processes. The application functionality combined with the involved data and the logical procedure of applying the functionality on the data is often called a *component*. Such a component delivers a *service* that then can be used by another component, according to the defined business process logic. This allows an integration of applications without using difficult to maintain interfaces. If such a service is offered through the Internet using specific standardized protocols, it is called a *web service*. IT architectures that support such flexible, next generation business process automations are called Enterprise Service Architectures (Kalakota and Robinson, 2003) (Woods, Enterprise Service Architectures, 2003). These next generation process automation environments deliver the flexibility necessary for supporting next business practices at an acceptable cost level. Existing application software is used as far as possible; only really missing functionality has to be developed. No specific interfaces are to be developed and maintained which again reduces the total cost of ownership (Woods, 2003) (Bruckert and Grasman,

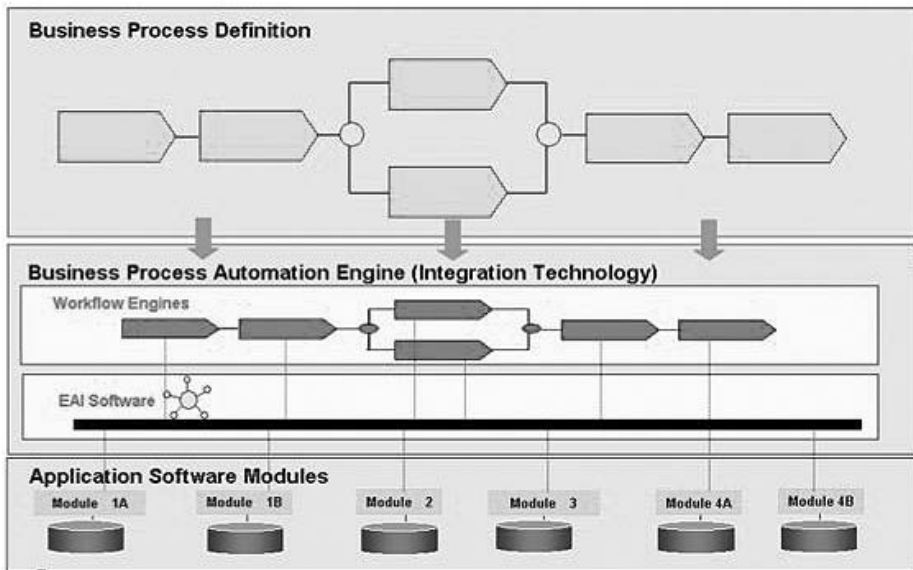


Figure 6. Next generation process automation: how it works

2003:8-9). Therefore next generation process automation environments are a key enabler for the agile organization.

Next generation process automation solutions can be used to support processes within an enterprise or across multiple enterprises. Thus they enable intra- and inter-enterprise processes.

However, such automation solutions require a very thorough process definition. The development of appropriate business process models is key for the successful use of such process automation solutions and with that for the execution of the defined process strategy. The agile enterprise requires detailed process design and the documentation in formal process models.

SAP NetWeaver and its integration with the ARIS Business Process Platform is an example of an IT environment that supports such an automation of next generation process automation (Bruckert and Grasman, 2003:10-11). The processes are defined in the ARIS Design environment. Based on the process models the XI-Process Automation engine is configured, so that it calls the appropriate application components during the process execution. After the execution the business performance of the process (cycle times, frequencies) is measured through the ARIS Process Performance Manager. This environment is shown in Figure 7. Microsoft, IBM, Oracle, BEA, and numerous smaller vendors build and deliver similar solutions (Schulte, 2003).

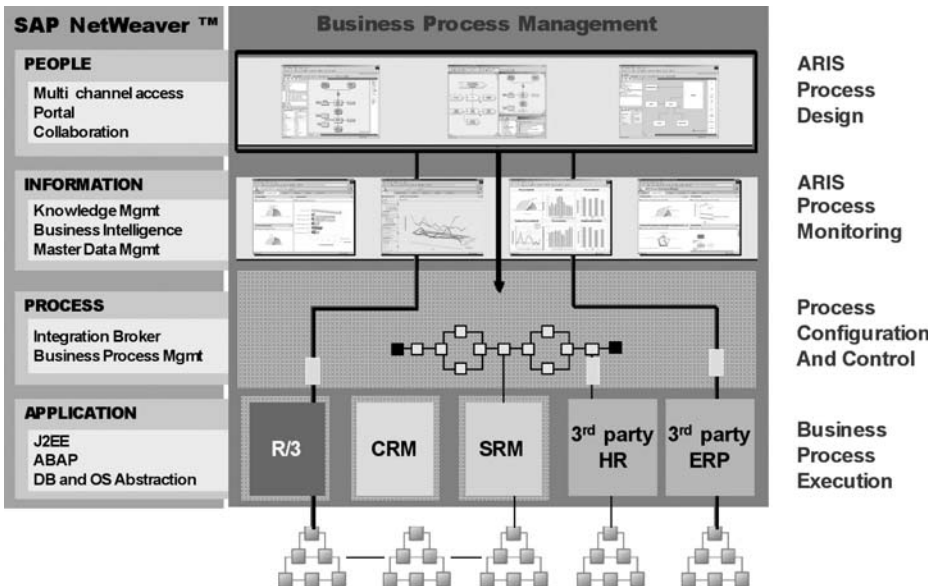


Figure 7. SAP NetWeaver and ARIS Process Platform—Example for Next Generation Process Automation

## Composite applications

This new generation of process automation allows, as explained, the combining of existing applications with new applications seamlessly, avoiding integration challenges experienced with traditional application environments. This allows the integration of best and next practices in an agile environment.

However, in order to automate next practice business processes you may not even need new, not existing application functionality. It may be sufficient to use existing application functionality in a new process logic. Next generation process automation environments allow the rapid development of such *composite applications*. They deliver a process definition, an appropriately configured workflow and data integration, and use one or several existing software modules. Composite applications support a specific *new* business process, which has not been supported by the existing software solution. They represent business content of next generation process automation systems.

These composite applications may be built based on already implemented standard software packages like ERP, SCM, or CRM systems (Woods, Packaged Composite Applications, 2003), allowing an enterprise to use those systems in a new way. These composite applications may also add the functionality of available, specialized third party software in order to support the defined business process.

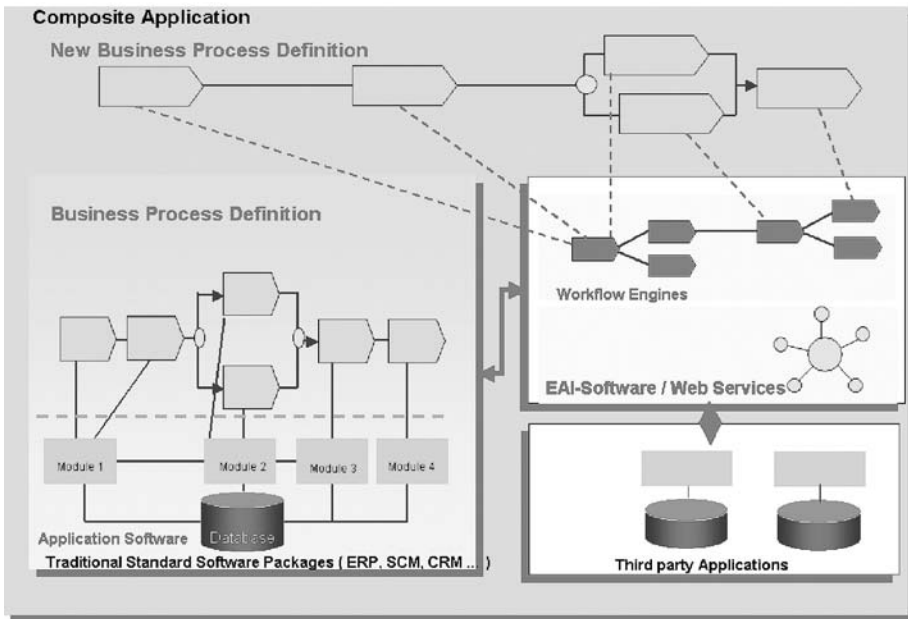


Figure 8. Composite applications: New processes based on existing applications.

The idea of those composite applications is visualized in Figure 8.

These composite applications built on existing standard software, can be offered as packaged solutions on the market, a way of distributing next business practices (Woods, PCA, 2003). Software or consulting companies, or even end-use companies, may develop such composite applications and offer them as *next practices*. These next practices are likely to eventually become best practices.

Examples for packaged composite applications are SAP xApps (Stolz, 2003) that are offered by SAP and its partners, providing new processes solutions based on existing SAP applications.

## THE BUSINESS PROCESS FACTORY— A CRITICAL LINK

Key for the efficient and effective use of those next generation process automation solutions in an agile environment is the structured and reusable definition of the business processes to be supported. Those business processes reflect the combination of best and next practices. These processes are defined in process models on the specification layer of the ARIS House of Business Process

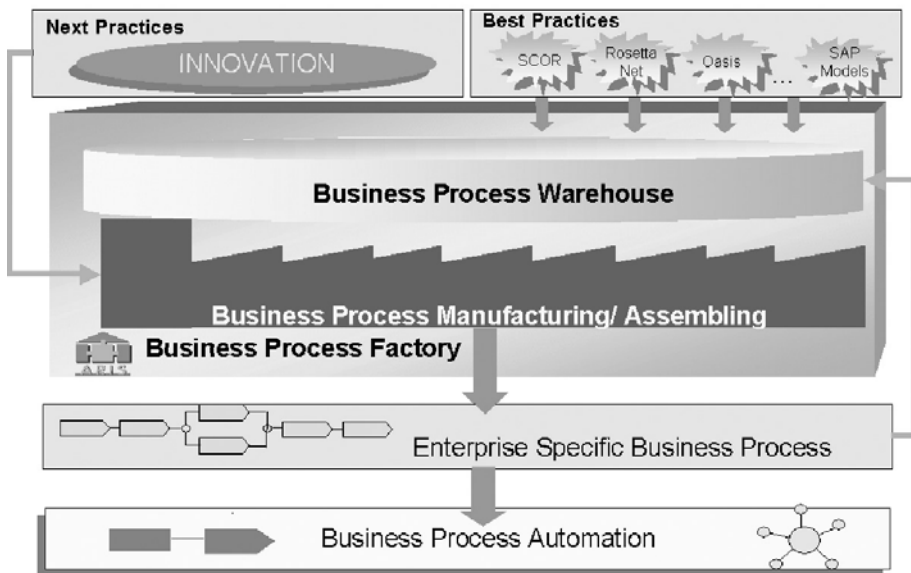


Figure 9. Business process factory—efficient and effective

Excellence, described above (Scheer, 1998). They are the key enabler for the agile organization.

As explained above, those models are the basis for the successful use of next generation process automation environments. They have to be developed and modified frequently in order to support a continuous innovation and improvement reflected in concepts like the adaptive enterprise or the real time enterprise. The business process factory is the environment that enables productivity and performance through the management of business process models (Kirchmer, Brown, and Heinzl, 2002). It's the critical link between the strategic decision to innovate and improve and the operative realization and execution of those decisions. That means the process factory is a core application environment for the agile organization. The concept of the process factory is shown in Figure 9.

Best practices are available on the market in the form of process reference models. They are delivered by industry organizations such as the Supply Chain Council, RosettaNet, BPMI, or Oasis, and by consulting companies or by software companies (Kirchmer, Business Process Oriented Implementation, 1999). Those models are stored in a database, called the *business process warehouse*. They can be used as *best practice process components* for the specification of enterprise specific business processes.

In the *process manufacturing and assembling* unit of the business process factory, enterprise specific business process models are either *assembled* using those

available process components or new processes are manufactured based on the planned innovations of an enterprise. The result is the desired combination of best and next practices, reflected in the enterprise specific process models.

Those enterprise specific models have to be consistent and reflect exactly the desired future business processes. Every mistake in the process models leads to a mistake in the following execution. Therefore the simulation of processes, the development and comparison of various scenarios, and a thorough cost and time analysis of the designed processes is extremely important and a core component of the process assembling and manufacturing.

Those process models are forwarded to the next generation process automation environment where they drive the configuration of the workflow and integration solution. This ensures a process execution according to the developed process design.

The process models are also stored in the process warehouse. This allows their later reuse for a roll out to other locations, outsourcing or other partners, new holdings realized through mergers & acquisitions, or just a further improvement of the process.

The physical realization of this process factory can be done using the ARIS Business Process Platform (The ARIS Process Platform), as part of the overall process lifecycle management, explained above. The integration of the ARIS solutions into process automation environments, like for example SAP's NetWeaver or solutions from vendors like WebV2, Intalio, Savvion or Vitiria, allows the seamless hand over of the process models and their reuse in the automation environments to drive the configuration.

The business process factory enables the business driven efficient use of next generation process automation environments to achieve competitive advantages. Technology enablers are environments like the ARIS business process platform. Best and next business practices can be implemented based on the concept of the business process factory (Elzina, Gullede, and Lee, 1999) (Scheer et. All, 2002). By being prepared to implement and dynamically manage the lifecycles of best and next business practices, an enterprise can be transformed to an agile organization that is better prepared for long-term success.

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