

## E-COMMERCE

# Better Processes = Better E-Commerce

by **Hajo A. Reijers and Monique H. Jansen-Vullers**

**M**any companies have found out the hard way that successful e-commerce requires more than a flashy Web presence. Electronic customer and supplier interaction must be seamlessly integrated with existing business processes. Quality professionals will find they must redesign business processes with this aim, particularly in the service industry.

### In 50 Words Or Less

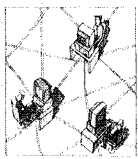
- **When you are improving services on the internet, traditional business process redesign (BPR) can come in handy.**
- **A local government evaluated its online building license application using 13 best practices for e-services BPR.**

There is a historic parallel for the current uphill battle of e-commerce. The first wide-scale introductions of IT in the business place focused on the improvement of isolated parts of operations, such as generating invoices. Productivity increased locally, but the overall effect was small. Only during the '80s and '90s did companies start to see the benefits of considering entire business processes when implementing information systems, and this is when they began to achieve huge gains.

### Current State of E-Commerce

Today, it seems companies are at the start of this same loop again with e-commerce. The focus is on creating "brochure-ware," pro forma, this-is-who-we-are websites.<sup>1</sup> As of 2002, 85 to 95% of corporate e-commerce websites were not even linked up with their back office processes.<sup>2</sup> Once again, the view on the entire process is missing, which prevents the new technology from becoming fully effective.

Emphasizing process in the context of e-commerce and using best practices to redesign business processes when e-technology is introduced in an organization enable total process improvement. Total quality



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management (TQM) and business process redesign (BPR) embrace the same ideas and goals for organizational improvement, both focusing on encouraging employee empowerment, teamwork, quality, change and customer focus. TQM aims at long-term continuous improvement, whereas BPR is the rapid and radical redesign of strategic processes.<sup>3</sup>

E-business is a broad field, and many definitions of it exist. In this article, we use the term e-commerce (EC) for activities related to marketing,

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buying and selling products and services on the internet,<sup>4</sup> and we focus explicitly on e-sales: selling via the internet either to consumers or other companies.<sup>5</sup>

EC initiatives are well known for delivering both physical goods and services. The service industry is traditionally underexposed in literature, but it offers much more potential for EC initiatives than does the manufacturing environment. After all, physical constraints are almost absent, transportation of information can take place instantaneously, and there are no real limitations with respect to the in-process inventory. This suits the properties of the internet perfectly.

Examples of e-services—services that are accessible through electronic means such as a Web interface<sup>6</sup>—include e-finance, e-healthcare and e-government.

### BPR for E-Services

In the early '90s, the first reports appeared on systematic approaches—in contrast to functional approaches—to generating performance improve-

ment of entire business processes. These were labeled with various terms, such as business process reengineering/redesign/transformation. The essence of these approaches is still best covered by one of the earliest definitions: “the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical measures of performance, such as cost, quality, service and speed.”<sup>7</sup> Applying IT and reordering the existing process structure are key elements of BPR.

EC enabled processes have evolved only recently, but it is clear the success factors for an EC enabled process are different from those for a conventional process. Consider the 24/7 availability that is almost a standard requirement for an EC process. Also, the speed of service delivery is more important, because clients generally are less loyal and more impulsive in looking for alternatives.

Many known BPR best practices may be used to make an EC process better aligned to such new constraints. Consciously using the best practices of BPR could make the difference between a process that merely allows EC and a process that excels in supporting EC.

### BPR Best Practices for E-Services

The following best practices have been derived from experience either within large companies or by consultancy firms with experience applying BPR.<sup>8,9</sup> A broad literature survey resulted in 30 generally applicable redesign rules.<sup>10</sup> To select the most potent rules in the context of e-services, we first identified the most relevant performance criteria within the context of EC and the special requirements of e-services and the service industry:<sup>11</sup>

- **Speed:** the period used to deliver the e-service.
- **Availability:** the percentage of time the e-service is available.
- **Transparency:** the insight a customer has into how his or her e-service is fulfilled.
- **Quality:** the quality of the e-service itself, as a result of the business process.
- **Cost:** the cost of the business process, reflected in the price of the e-service.
- **Time-to-market:** the period of time necessary to introduce new e-services in the market.

In regard to these characteristics, 13 best practices seem especially promising for EC (see sidebar on p. 60). For each of these best practices, we

show how they affect the EC process, explain how the process structure could be changed as a consequence of the redesign and identify which performance characteristics are affected. A complete and detailed overview is available for download at <http://tmitwww.tn.tue.nl/staff/mjansen.12>

### Case Study: BPR When Offering Services Through the Internet

We carried out a case study for a Dutch local government that is gradually making its processes available on the internet. The changes are still under way, and the municipality asked our advice on how to redesign the way it deals with citizens' applications for building licenses, one of the services it was offering online.

It is the municipality's most complex process, involving more than 50 steps and 14 different organizational roles. Despite the new possibility for citizens to apply for a building license on the internet, it is the single process generating the most complaints from citizens with respect to timeliness and quality of service.

After the entire application has been submitted and received, it is passed on to the inspection committee. This committee is in session once every two weeks and enforces the regulations regarding the external appearance of buildings. As part of the committee's evaluation, a number of checks are made: The application is checked against environmental planning regulations, technical regulations and, if applicable, the regulations for monuments.

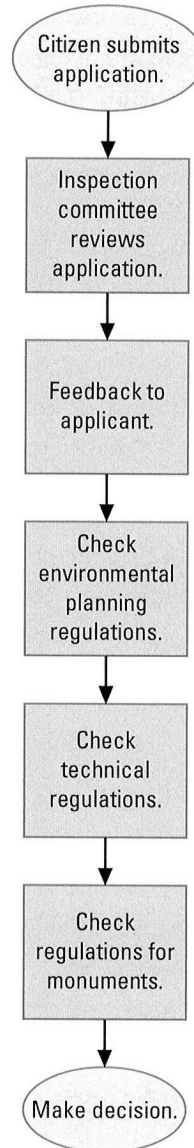
After these steps, the committee either accepts, holds or rejects the application. This portion of the larger process is shown in Figure 1.

We studied the process models, procedures and work instructions the municipality had established for the building license process and considered for each of the 13 best practices, one by one, whether and where in the process it would be applicable. In a workshop at the town hall we discussed our ideas and gathered feedback about the sensibleness of our proposed changes. Below are four of the best practices from two categories—task and routing.

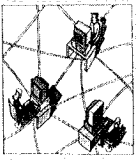
#### Task Best Practices: Task Elimination and Task Automation

Reducing unnecessary tasks or activities from a business process is a widely known BPR best prac-

**FIGURE 1** Application for a Building License



tice.<sup>13</sup> A common way of regarding a task as unnecessary is when it adds no value from the client's viewpoint. In an EC context, the advantage of omitting a task that requires a scarcely available resource is big. It can make the process execution faster and delivery dates more reliable. The advantages of omitting a task more easily outweigh the



# 13 Best Practices for E-Services

**Task best practices:** Task best practices focus on optimizing single tasks within a business process. Two of them are of special interest:

1. **Task elimination.** Delete tasks that do not add value from a client's viewpoint.
2. **Task automation.** Introduce technology if automated tasks can be executed faster, with less cost and with higher quality.

**Routing best practices:** Routing best practices try to improve upon the routing structure of the business process. The most effective of these in an e-commerce (EC) context are:

3. **Knockout.** Execute those checks first that have the best ratio of knockout probability to the expected effort to check the condition.
4. **Control relocation.** Relocate control steps in the process to others, such as the client or the supplier, to reduce disruptions in the process.
5. **Parallelism.** Introduce concurrency in a business process to reduce lead times.

**Allocation best practices:** Allocation best practices involve a particular allocation of resources to activities. One in particular is especially promising in EC:

6. **Case manager.** Make one person responsible for the handling of a specific case.

**Resource best practices:** Resource best practices focus on the types and availability of resources.

7. **Empower.** Give workers most of the decision making authority and reduce middle management.

**Best practices for external parties:** These best practices try to improve on the collaboration and communication with the client and third parties. The most promising are:

8. **Outsourcing.** To reduce costs, relocate work to a third party that is more efficient in doing the same work.
9. **Contact reduction.** Combine information exchanges to reduce waiting time and errors.
10. **Buffering.** Subscribe to updates instead of complete information exchange.
11. **Trusted party.** Replace a decision task by the decision of an external party.

**Integral process best practices:** This type of best practice applies to the business process as a whole. The following are especially important in EC:

12. **Case types.** Determine whether tasks are related to the same type of case and, if necessary, distinguish separate processes and case types.
13. **Case based work.** To speed up the handling of cases, get rid of constraints that introduce batch handling.

potential loss of quality—its traditional price—in EC than in conventional processes.

When considered the task elimination best practice in our case study, the feedback to the applicant after the inspection committee's session seemed easily eliminated. After all, the applicant is mainly interested in the final decision; communicating this intermediary result takes time from a scarce municipality resource and serves a purpose only if the total procedure takes a lot of time. If, in combination with other redesign principles, the lead time is considerably reduced, the intermediary step adds no value.

When we considered the task automation best practice, it also seemed possible to automate the feedback step. As a result, the task can be executed faster, for less cost and with higher quality. The decision of the inspection committee can be made available to the applicant on the Web, much in the same way it is made available to the municipality's internal employees. Furthermore, in addition to this explicit feedback moment, additional feedback moments can be introduced after the checks for environmental planning regulations, technical regulations and regulations for monuments. As workflow technology is introduced anyway, the applicant becomes more capable of tracking the status of his or her application.

In the application of the two best practices, from a service perspective it seems wise to automate and increase the feedback. From a cost perspective, reducing the feedback is the most sensible approach.

### Routing Best Practices: Knockouts and Parallelism

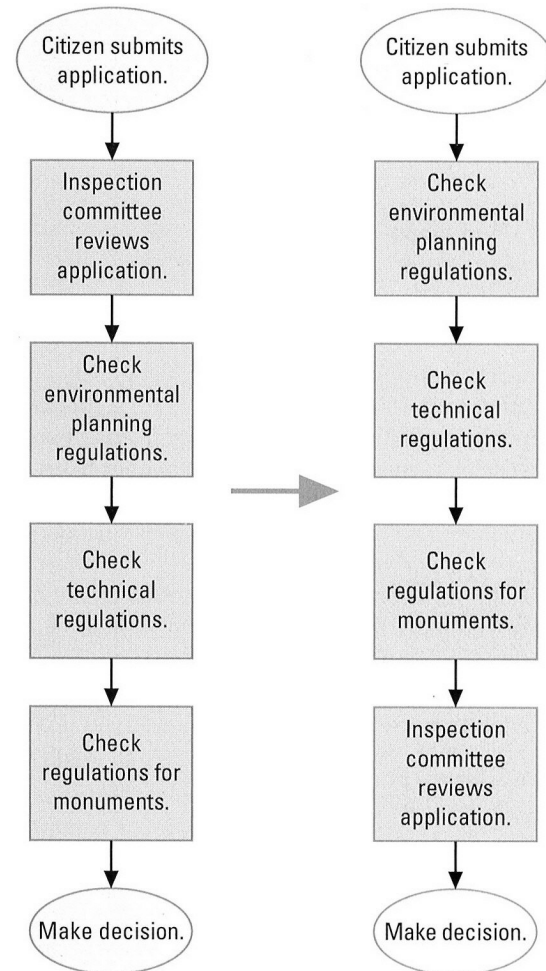
Many processes in the service industry involve various subsequent checks, or so-called knockouts. If a knockout is not satisfied, this puts a stop to the entire process.<sup>14</sup> We identified four knockouts:

1. The evaluation by the inspection committee.
2. The check against environmental planning regulations.
3. The check against technical regulations.
4. The check against regulations for monuments.

A negative result of one of these checks will result in a negative decision at the end and could therefore stop the process. This makes them all knockouts.

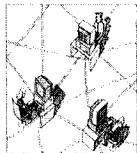
Knockouts should be ordered so the one that takes the least effort to perform is carried out first,

**FIGURE 2** Knockouts



followed by the knockouts that take more effort, followed by steps that are not knockouts. This best practice can result in much more efficient resource use, a reduction of the lead time or both. A different and viable ordering of the current checks on the basis of this best practice is depicted in Figure 2. The time consuming gathering of the inspection committee is now moved to the end.

However, we looked at the existing process more closely, it became clear all checks are performed anyway, regardless of the outcome (positive or negative) or the order in which they are performed. This is because Dutch law requires governmental



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agencies to support each of their rejections by all arguments, that is, by all outcomes of the checks. Thus, the knockout principle is not effective here because of a legal constraint. On the other hand, there is still opportunity for another best practice: parallelism, or concurrent execution of various steps.

The most important effect of parallelism is drastically reducing lead time, a major benefit in EC or any business setting. Clearly, only tasks that do not depend on each other are candidates to be put in parallel. Whereas the knockout rule focuses on re-

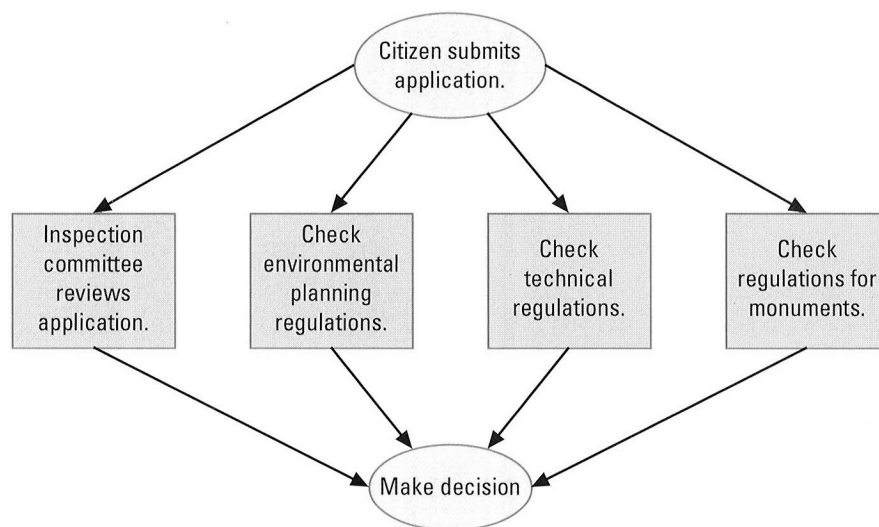
ducing resource use and lead time, parallelism focuses on reducing lead time and usually increases resource use.

In our case study, however, all checks are performed anyway, causing a fixed resource burden. So, to start, checks for environmental planning, technical and monumental regulations can be done in parallel. Also the check by the inspection committee can be put in parallel, implying the feedback to the applicant could disappear. This intermediary feedback is again no longer necessary because lead times are considerably reduced. The resulting process design is shown in Figure 3.

### BPR and EC: Success

The success of EC in the service industry can be positively affected by sensibly applying BPR principles. When the actual process is taken as a starting point, each of the best practices has to be considered for relevance. In general, this results in a number of alternative redesigns: Several best practices are applicable to the same part of the process with different results. Evaluating the implications of each scenario should result in an explicit and well-founded decision on the final form of the redesign.

**FIGURE 3** Parallelism



The municipality considered the approach a valuable way to generate alternative redesigns for its current process. One official remarked he was pleasantly surprised by the quality of the suggestions by relative outsiders, which illustrates the general applicability of the best practices.

A broader awareness is needed of the importance of the whole business process in the context of any EC effort. In the end, it is the performance of the entire process that will determine the effectiveness and success of EC, and neglecting the BPR knowledge accumulated over the past decade would really be a missed opportunity.

#### REFERENCES

1. James Champy, *X-Engineering the Corporation: Reinventing Your Business in the Digital Age*, Warner Books, 2002.
2. Ron Krzywonos, "What Happens After the 'BUY' Button Is Hit: Managing the Performance Integration of the E-Business," *Communication News*, July 2000, pp. 6-61.
3. Farzaneh Fazel, "TQM vs. BPR," *Quality Progress*, Oct. 2003, pp. 59-62.
4. Peter Gloor, *Making the E-Business Transformation*, Springer Verlag, 2000.
5. Jeff Hall, "Are Your Processes Fit for E-Commerce?" *Management Services*, April 2000, pp. 12-16.
6. Marlon Dumas, Justin O'Sullivan, Mitra Heravizadeh, David Edmond and Arthur ter Hofstede, "Towards a Semantic Framework for Service Description," *Proceedings of the Ninth International Conference on Database Semantics, Hong Kong*, Kluwer Academic Publishers, 2001, pp. 1-15.
7. Michael Hammer, "Reengineering Work: Don't Automate, Obliterate," *Harvard Business Review*, July-Aug. 1990, pp. 104-112.
8. Roger O. Rupp and James R. Russell, "The Golden Rules of Process Redesign," *Quality Progress*, Dec. 1994, pp. 85-90.
9. Kevin McCormack, "Business Process Orientation: Do You Have It?" *Quality Progress*, Jan. 2001, pp. 51-58.
10. Hajo A. Reijers, *Design and Control of Workflow Processes: Business Process Management for the Service Industry*, Springer Verlag, 2003.
11. Monique H. Jansen-Vullers and Hajo A. Reijers, "Business Process Redesign for Effective E-Commerce Processes in the Service Industry," *Technical Report #105 of the Beta Research School for Operations Management and Logistics, Eindhoven University of Technology*, 2003, pp. 1-42.
12. Ibid.
13. Joe Peppard and Philip Rowland, *The Essence of Business Process Reengineering*, Prentice Hall, 1995.
14. William M. P. van der Aalst, "Reengineering Knock-Out Processes," *Decision Support Systems*, Vol. 30, No. 4, 2000, pp. 451-468.

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