Improving Communication in Real Estate Project Initiation:
An Explorative Case Study Using a Mashup

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ABSTRACT

In this paper we propose a strategy to improve the current business process for financers and those requesting financing in the real estate development sector. Our goal is to improve communication between both parties, making the process of project initiation faster and more accurate. We introduce a mashup for improving the communication: it is developed for a specific real estate developer and their potential financers. We tested the mashup in five different scenarios within the real estate development company; the mashup proved to be useful in three of the five scenarios. Recommendations are made for further research on improving this mashup and making it applicable more generally. As the paper identifies an approach for defining a mashup it implies a potential generic method for designing mashups.

INTRODUCTION

Business processes are "a sequence of activities aimed at producing something of value for the business" (Morgan, 2002). In some instances, companies still perform old-fashioned processes, which do not leverage new technology that could improve them. Hammer (1990) comments that companies should "use the power of modern information technology to radically redesign their business processes in order to achieve dramatic improvements in their performance." Broadbent et al. (1999) also argue that information technology is an important enabler of business process redesign. In our opinion these are still a valid statement. In this paper we investigate the use of specifically mashups.

Mashups are, in their broadest sense, a combination of multiple existing sources into one application or overview. Deemer and Gregg (2009), describe them as applications that are "designed to synthesize knowledge by semantically connecting disjoint information and knowledge sources". Another description, given by Fichter and Wisniewski (2009) is that "mashups combine information from two or more sources to create something not previously imagined."

An example of a mashup is the application that is used by the website Funda.nl. This is a website on which people can register their house when it is for sale. Funda combines the information about the house with Google Maps, so people can see what the neighborhood looks like. This is also combined with numbers of the Dutch Central Bureau of Statistics (www.CBS.nl) in the Netherlands (Funda.nl, 2009). Another example of implementation of a mashup is the Crime Map, which shows what crimes are committed in which areas. This mashup also combines Google Maps with another source, in this

case information about crimes in the Netherlands, which everyone can enter into the map (Misdaadkaart.nl, 2009).

The mashups mentioned are both directed towards consumers, but mashups can also be applied in business-to- business. An example of a mashup that saved a lot of time for a company, was a mashup created by Audi, the car company. They built a mashup tool that extracted corporate data from twenty websites. This tool replaced a time-consuming data gathering process (Fichter, & Wisniewskim, 2009). Another example by Fichter and Wisniewskim (2009) is a mashup created by The University of Pittsburgh. They created a data mashup that combines and intelligently filters feeds of new publications by Pitt faculty members, pulled from the two major citation databases. They use two sources to be as comprehensive as possible. This new master feed is then displayed in a scrolling marquee on the library homepage. Fichter and Wisniewskim (2009) also point to the Gartners Groups' predictions for business intelligence for 2009-2013. They mention "one-third of analytic applications applied to business processes will be delivered through coarse-grained application mashups."

In this paper we describe how mashups can benefit the communication process between organizations. Communication with external parties, such as customers or wholesalers, is an important business process (e.g. Shelby, 1993). Specifically, when it comes to communication between financers and real estate developers, during project initiation much communication has to take place in order to establish and maintain cooperation. The type of communication often exists of numerous meetings and swapping facts, figures and numbers in the form of feasibility reports. This process takes up a lot of time from all involved parties (Vlek et al., 2009) and makes it very suitable for us to identify improvements using mashups. Consequently we have defined the following research question within the context of project initiation in the real estate development sector:
"How can IT (i.c. mashups) improve communication between real estate development and financers, such that the business process becomes faster and more accurate?"

We approach this research question by first interviewing a domain expert on real estate development. When we have a detailed understanding of the project initiation phase in real estate development, we will identify the possibilities of process improvement in a specific real estate development company, using Hammer's (1990) seven listed 'principles of reengineering'. Subsequently, we define mashup opportunities that operationalize the identified business process improvements within a real estate development company. Additionally, we create and test a prototype of the mashup at the real estate development company.

PROCESS DESCRIPTION AND PROCESS IMPROVEMENT

At Bluestone Real Estate GmbH we performed an explorative open interview to understand the overall real estate development process, and specifically the project initiation phase and to identify areas of improvement with requirements. Bluestone was founded in 2001, is located in Aachen and operates on the Dutch and German real estate market. The company consists of a small team of experts in the domain of real estate development. In order to describe the process that we want to improve with the use of a mashup, we first elaborate on the general business process of Bluestone, which we consider as an appropriate instantiation of the real estate development industry.

Current Process
Figure 1 pictures the overall real estate development process as identified during the interviews at Bluestone.

Figure 1: The real estate development process according to Bluestone

The process step 'Preparation' represents the project initiation phase, during which much communication is needed, and which is the focus of our research. As for the financial aspects this business (sub-)process involves both the real estate development company and the financer. The process is initiated by the real estate development company. Before the company starts developing a project, it makes a feasibility analysis. This analysis is presented to all potential financing parties. The financers will analyze the project as well, to make sure it is feasible from their point of view too. If needed, they request more data or information about the project. If, according to their judgment, the project is feasible they will most likely decide to give financing to the project. However, if they decide the project is not feasible from their perspective, they will reject the financing request. This rejection can be final, but there is also a possibility that the project could turn out feasible with some adjustments. In the latter case, the real estate development company will make some adjustments to the project plan and submit the feasibility analysis to the financer again. If the rejection is final, from all financers, the company will most likely drop the project and start a new project (see figure 2).
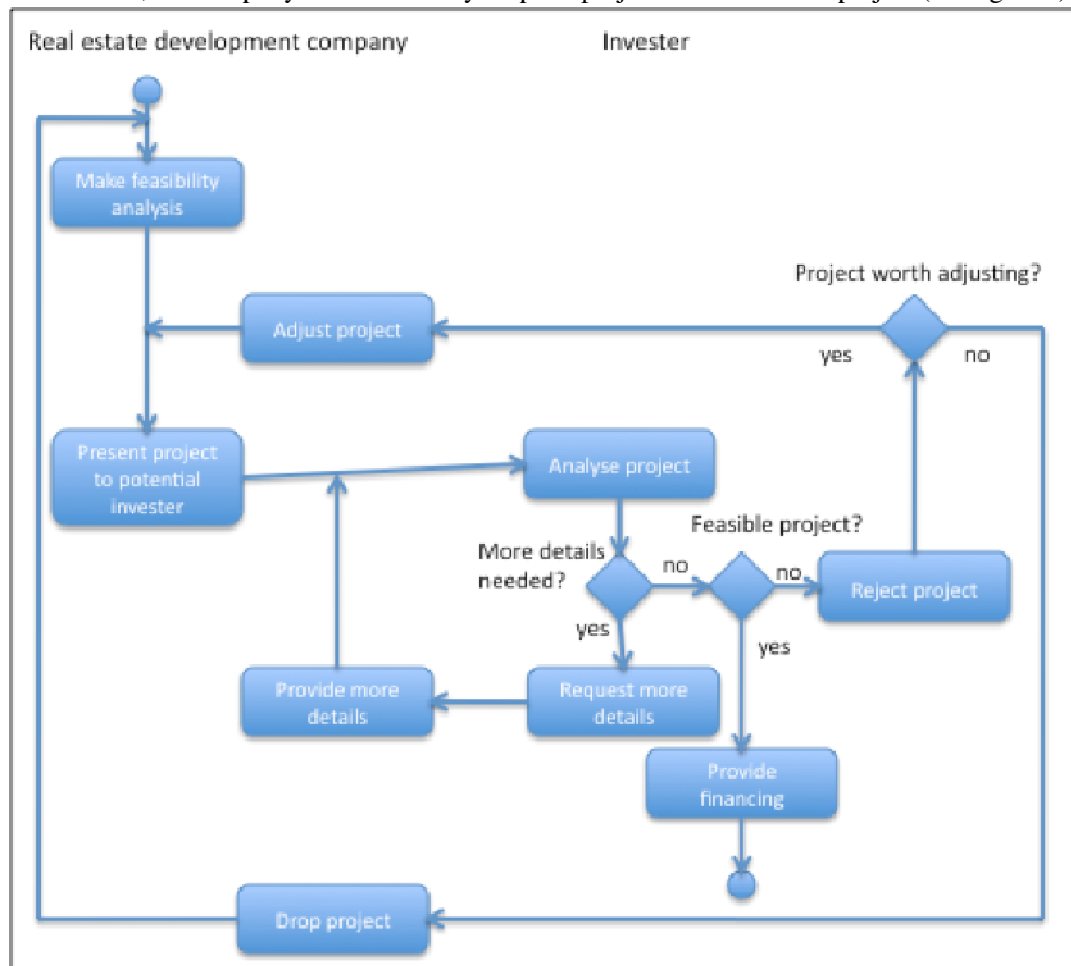

Figure 2: The current business process for financial preparation in real estate development

Process Improvement
We used Hammer's (1990) seven reengineering principles for identifying process improvements. Specifically the principle "capture information once and at the source" triggered the first two improvement suggestions: 1) the step where the financer asks for more specific details of the project. The activities concerning this step can be repeated multiple times. For real estate development companies it is often not quite clear what kind of information is expected from them. Additionally, this can be different for each financing party. It would be an improvement when financing parties communicated the demands in information beforehand. 2) A related improvement would be communication of the demands a financer has towards feasibility. If a real estate development

company already has an indication of the criteria on which a project will be rejected or accepted, the activity of adjusting the project will less likely need to be carried out. Instead, more projects will be accepted and financed. Hammer's principle "have those who use the output of the process perform the process" triggered a third improvement part of the process: 3) to completely eliminate the possibility of having to adjust the project plan multiple times, an improvement would be to get direct feedback on the project plan at hand. This way, the real estate development company will know exactly what to adjust. In this direct feedback the financer could also include an estimation of how much of the total amount of money needed they would be willing to finance and to what interest rate they would provide the financing.

The above described improvements will not only be useful for the real estate development company, but also for the financer. When they receive information in exactly the right format and detail specification, it saves them time in analyzing and communicating.

The improved business process is depicted in figure 3. The three improvements described above are incorporated in the process, with information needs. This means that in an improved situation the real estate development company would deliver exactly the right amount and format of information. Since this is quite difficult to achieve, there should be an activity where the financer gives direct feedback on the project plan. This way the real estate development company will know exactly what to adjust, and the activity of adjusting the project plan will only take place once. What is not shown in the diagram, is that less projects would be rejected, since real estate development companies will have an indication beforehand of when a project would be feasible for the financer.
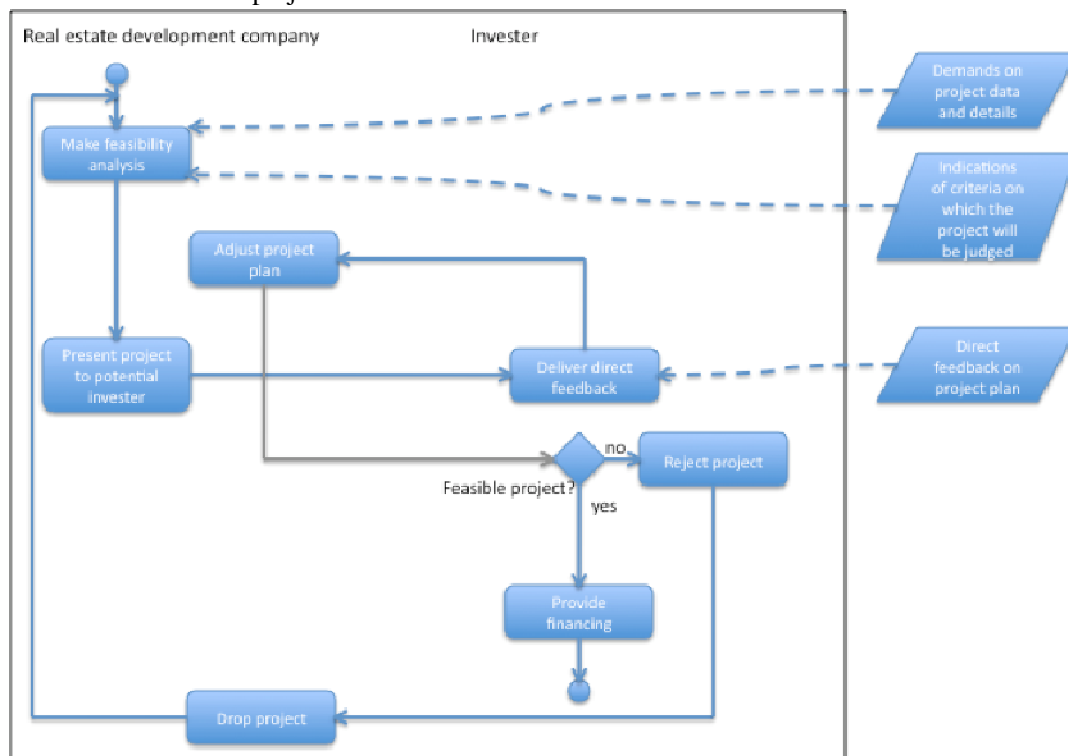

Figure 3: The improved business process for financial preparation in real estate development with information needs

Input from requester / output to invester		Input from invester / output to requester
		Criteria on which projects are judged
		Demands on project and details
Feasibility analysis results		
Project data and details		
	<- MASHUP ->	Direct feedback on project plan
		Project rating
		Expected interest per project
List of project in need of financing		

Figure 4: Input and output needed for the mashup

Mashup Requirements and Context

The improved process cancels two loops. In order to realize this improved process, we define a mashup that is both available for the development company and the financer. With a mashup for this process we combine data from different sources into one application. In our case these sources are data from a real estate development company (the finance requesting party) on one side, and data from a financer on the other side. We propose that the mashup should at least offer the possibility to communicate the three elements of information we identified earlier, since these elements would lead to the improved business process. The three elements of information can be split up in two types of elements. The two first elements only require input from the financer. The last element however, requires first input from the finance requester and secondly input from the financer in the form of feedback. It would be ideal if the financer would give feedback in the form of 'rating' the project, in order for the requesting party to see to what level they will have to improve the project to receive financing.

The real estate development company should have the ability to communicate with several potential financing parties through the mashup. This way, they will be able to see which financer offers them the best deal concerning for example interest rates.

To apply the communication of the three elements of information that need to be added to the process, we found several functional requirements. We identified these requirements based on the explorative interview with Bluestone's domain expert.

1. Demands on project data and details: a) Ability to select relevant financers, b) Ability to view desired input from various relevant financing parties, c) Ability to upload the project details in the desired format;
2. Indications on criteria on which the project will be judged: a) Ability to select relevant financers, b) Ability to view criteria on which the project will be judged per financer;
3. Direct feedback on realized project plan: a) Ability to upload feasibility analysis to relevant financers, b) Ability to receive feedback (in the form of a rating)

Based on these requirements we designed the following input/output functions, between which the mashup acts as the central enabling function (see figure 4). Note that figure 3 depicts the information

needs, which has now been defined as mashup input. In the following we discuss the different inputs and outputs from figure 4.

Criteria on which projects are judged and *Demands on project and details*
The data that would be pulled from the financing party should consist mainly of the criteria on which the projects will be judged and how the data about a project should be delivered to them. Depending on the financing party, they can make as much information about their own business process visible as they choose to. This data needs to be entered manually.

Feasibility analysis results and *Project data and details*
The input from the real estate development company consists of the results from the feasibility analysis results of a project. An optional input would be a description of the project at hand. The latter depends on what the financing party wishes to receive on project data and details. This data also needs to be entered manually.

Direct feedback on project plan
In the improved process, the financer gives direct feedback on the project plan. The feedback could also be generated automatically by the mashup. If the data consists of numbers, the mashup would be able to verify whether these numbers match the criteria of the financer. This way, the mashup can automatically provide the real estate development company with feedback.

Project rating
Important output to the finance requester consists of the rating that is given to the project; it gives them a prediction of whether the project seems feasible to the financer. This rating is calculated by the mashup, based on the criteria which the financer has delivered as input. Additionally to the rating for the overall project, an overview of ratings for each separate part of the project should be available. With this information the company will be able to see on which parts the project needs to be improved before it is considered for financing.

Expected interest per project
Another important output for the real estate development company is the interest that they would have to pay for the loan at each different financer. This is one of the outputs that can easily be generated automatically by the mashup, since it is completely dependable on numbers.

List of projects in need of financing
An important output for the financer consists of a list of projects with the calculated rating. Of course, the rating given by the application is just an advice to the financer. An actual financial consultant will have to judge whether the application made the right calculation and gave the proper rating. However, the financer will be kept updated of which projects are currently requesting financing. Thanks to the application they will be able to quickly inform themselves about the projects that have a high rating.

MASHUP TESTING

In order to test whether the mashup indeed improves the business process, we have created a paper prototype (mockup screens) of the mashup in order to simulate the process. The mockup is based on the identified requirements. We used the mockup screens for five fictive yet realistic scenarios: 1) Developing student housing, 2) Developing a health care centre, 3) Rebuilding a castle into apartments, 4) Expanding a high school building, and 5) Developing 'assisted living' housing. The scenarios were tested at Bluestone using the so called usability walkthrough technique (Nielsen, 1993) with domain experts of Bluestone. With the domain experts the paper screens were shown, following the scenario. During and at the end of the testing the domain experts provided feedback on the accurateness and fastness of the mashup-supported process. Figure 5 shows one of the mockup screens developed. Figure 6 shows the description of the first scenario. Figure 7 shows the overall results of the five scenario walkthroughs.
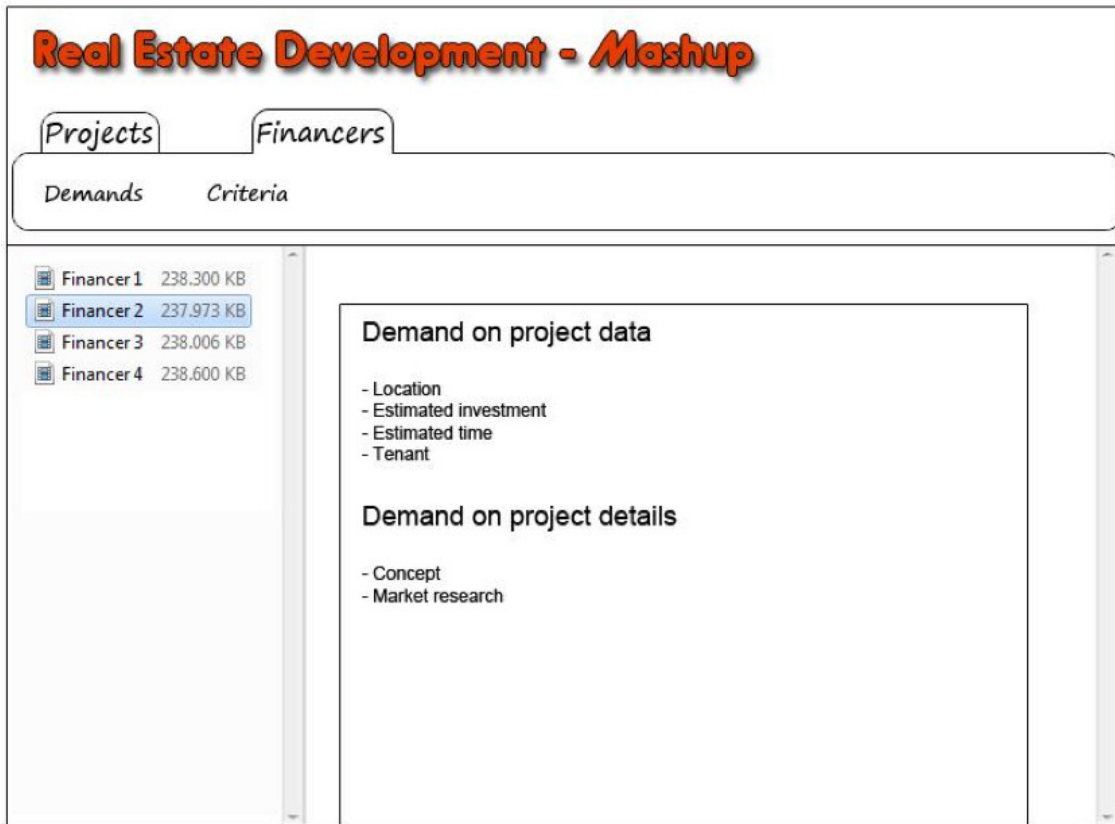
Figure 5: Mockup screen of the mashup with project data and details information

Project Name	Student housing	
Property	Location	Northern area of Maastricht
	Ground size	1200 m^2
Planning	Estimated time until building	12 months
	Estimated investment	10 - 13 mil. €
Market research	The demand for student housing is high. The area is well located and connected to public transport.	
Tenant	Potential tenant #1	Studentenhuisvesting Maastricht
	Potential tenant #2	Direct letting to students
Contract management	Potential financer #1	Financing party A
	Potential financer #2	Financing party B
	Potential financer #3	Financing party C
Feasibility	…	
Concept	Private studio's (ca. 25 m^2) for students in the Maastricht area.	

Figure 6: Student housing scenario

Case	Does the mashup provide sufficient information?	Able to follow improved process?	Mashup improves process ?	Comment
1	Yes	Yes	Yes	
2	No	No	No	In case of a health care centre many complications arise because of governmental interference.
3	Yes	Yes	Yes	
4	No	Yes	No	This project can be executed according to the improved process thanks to its simple nature, not thanks to the mashup.
5	Yes	Yes	Yes	

Figure 7: Overall results of the mashup testing

The results show that in three of the five scenarios the mashup lead to a perceived improved process. In scenario 1, 3 and 5 the mashup provided sufficient information to carry out the improved process. In scenario 2 and 4 however, the mashup did not provide sufficient information, for the reasons mentioned in the 'Comment'-column.

CONCLUSIONS AND FUTURE RESEARCH

In this paper we introduced a way to improve a current business process for financers and those requesting financing in the real estate development sector. The main question we asked was: "How can IT (mashups) improve communication between real estate development and a financer, such that the business process becomes faster and more accurate?" To answer this question we proposed a mashup. We tested this mashup in a case study at a real estate company and proved that it improves the current process in some business cases. As can be concluded from the case study, a mashup can improve communication between the two business partners described in this paper: we pointed out that a mashup can be a valuable asset in the process of requesting financing.

Another interesting side-effect of this research is the way of working we performed in identifying the interorganizational mashup requirements and making the design. Implicitly a method for mashup design is proposed in our paper:
1. Indicating the (interorganizational) process of interest;
2. Describing the existing process;
3. Identifying improvements in the business process, taking into account Hammer's (1990) seven principles and possibility of mashup enabling;
4. Describing the improved process, with mashup information flows;
5. Testing the mashup using usability walkthrough techniques and paper prototypes.

It needs to be further elaborated whether this method holds for other processes, industries, etc.

Currently, the case study has only been tested using a paper prototype. It is essential that before further research is done, testing is done with an actual system. That way, the results will be more accurate and it can be tested if the mashup will indeed improve the process, as is shown using a paper prototype. Additionally, an actual prototype requires access to the data from the APIs of the financer and the real estate development company, in order to be certain that the results are valid. If the mashup indeed proves successful as a real system, the success rate of this mashup needs to be elaborated in future research. Currently it is only tested at Bluestone, but in order to be certain the mashup can be applied in more real estate development companies, it needs to have a bigger test group which represents the

industry. If in that research the mashup still proves to be effective, it could be worth implementing it at all real estate developers.

The current mashup is applied at the real estate development field, but it is envisioned that it can also be applied in any other financing field. It needs to be researched whether this can be done, and what changes need to be made to the current design in order to achieve this.

Other facets that need to be looked at are the processes which include government interference. As shown in the case study, these processes are not improved when the mashup is used. It needs to be looked at why this happens and how these problems can be handled.

REFERENCES

Broadbent, M., Weill, P., and St. Clair, D. (1999) "The Implicationso f InformationT echnology Infrastructure or Business Process Redesign," MIS Quarterly(23:2), pp. 159-182.

Deemer, B., & Gregg, D. (2009). Mashups: A Literature Review and Classification Framework. Future Internet, 59-78.

Fichter, D., & Wisniewskim, J. (2009). They Grow Up So Fast: Mashups in the Enterprise. Online Magazine, 54-58.

Funda (2009) http://www.funda.nl. Retrieved from the web on March 15, 2010.

Hammer, M. (1990). Re-engineering Work: Don't Automate, Obliterate. Harvard Business Review, July-August, 104-112.

Misdaadkaart (2009). http://www.misdaadkaart.nl. Retrieved from the web on March 15, 2010.

Morgan, T. (2002). Business rules and information systems: aligning IT with business goals. London: Addison-Wesley.

Nielsen, J. (1993). Usability Engineering. Academic Press, Boston, MA.

Shelby, N. (1993). Organizational, Business, Management, and Corporate Communication: An Analysis of Boundaries and Relationships. Journal of Business Communication, 30 (3), 241-267.

Vlek, P., Oosterhout, A., Rust, W., Van den Berg, S. and Chaulet, T. (2009). Investing in capital goods and areas (In Dutch). Vlaardingen: Management Producties.

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