Chapter 5
Use and Profit Impact of Revenue Management in the Process Industry

## 5.1 Background of the Third Empirical Study

The positive profit impact of RM has contributed to its widespread adoption by many service industries, such as the travel industry, retail and utilities (Talluri and van Ryzin 2004). Differentiated pricing, capable of exploiting the willingness-to-pay of different customers or customer segments, is a key driver of the successful RM application.

In some RM approaches, the different willingness-to-pay is utilized by offering various product variants, tailored to different client segments, such as different fare classes offered by airlines. Other approaches focus on a single product variant but dynamically adapt the price over time: Low-cost airlines or fashion retailers during end-of-season clearance sales follow this approach (Fleischmann et al. 2004; Quante et al. 2009).

This third line of research builds upon the studies of Kolisch and Zatta (2009, 2012). Kolisch and Zatta (2009) analyze the current status and perspectives of RM in the PI in Germany, as one of Europe's key markets. The study involves 124 companies interviewed between June 2004 and February 2005. The main finding of the study is that the interviewees regard the overall importance of RM within the PI as high. Furthermore, the perceived importance positively correlates with company size, time since introduction and IT implementation. The type of RM system employed depends on the duration of its use: RM systems shift from capacity or price control to price and capacity control over time. Barriers to introduction of RM consist of the absence of a clearly defined pricing strategy, lack of experience and lack of adequate approaches.

In Kolisch and Zatta (2012), the application of RM was assessed for Europe and North America, comparing its use across countries. Interviews with 479 companies were carried out between May 2008 and July 2009. Comparisons between North America and Europe indicated differences in the application of RM: In North

Fig. 5.1 The structure of this study. Note: *Arrows* represent relations that have been investigated in detail
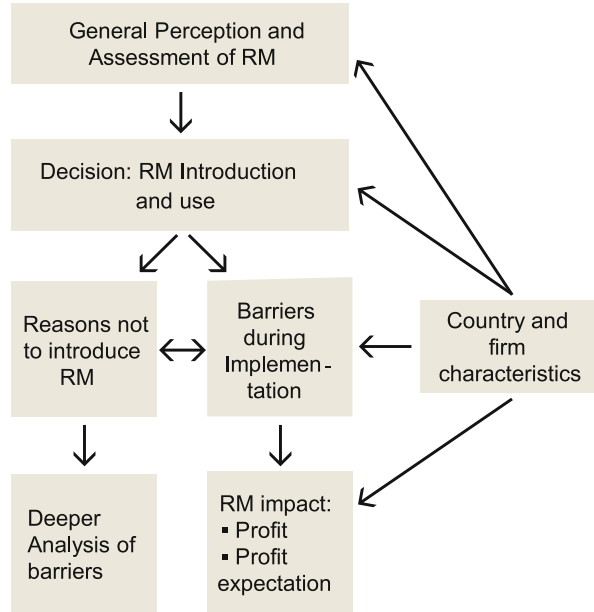
America, RM is considered more important, was introduced earlier and is more price based.

As in Kolisch and Zatta (2009, 2012), for this study, the PI is examined. The overall objective of this study is to assess the profit impact of RM in the PI. More specifically, we investigate the following issues (see Fig. 5.1):

- What is the general perception and assessment of RM?
- How high is the profit expectation linked to RM before its introduction?
- How strong is the profit impact after implementation?
- What has hindered the introduction of RM either for the companies that have not introduced it or for firms that have implemented it?

This Section proceeds as follows: First, the exploratory research is presented and then the quantitative study described. The results are reported next and finally the findings are summarized and an outlook offers inputs for further research.

5.2   Exploratory Research

In a first step, we undertook an exploratory study with 38 interviews of experts from the PI in the oil (8), metal (7), chemical (6), pharmaceutical (6), paper (6) and glass industries (5). Half of these companies use or have recently introduced RM, whereas the other half do not employ RM. We use the findings of this explorative study in order to derive a number of positions on RM.

When we consider companies that employ RM, it becomes evident that the relevance of RM is considered high by all interviewees, whether they have used RM for more than a year or they have only recently started applying RM. In addition, the companies of the exploratory study indicate that they introduced RM to improve profitability through optimized prices or better use of idle capacities.

The Sales Director of a North American pharmaceutical company reported: 'The main reason for the introduction of RM is to generate a positive EBIT impact. Each investment made by our company needs to be approved on the basis of a business case. When considering RM the return indicated in the business case is caused by an optimized price and capacity management'. The financial trigger as a prerequisite to an investment in RM was emphasized in several statements such as the following: 'An RM project is a journey that is a long term commitment which requires a significant upfront effort, but we expect an overall positive ROI once it is fully operative. This is the reason why we decided to move ahead on this journey. I am confident that through RM we will increase the use of idle capacities and also serve new customers' (CEO, a European paper company).

The introduction of RM positively impacts firm profitability, according to the companies using it, as in the case of a US-based oil company: 'After implementation, the impact of RM on the return on sales was in the range of 3–5 percentage points, which equals a three-digit million US dollar amount. RM is clearly having a positive impact on our financial results. We will extend its use also to our subsidiaries in the other geographic regions where we are operating' (Sales Vice President, a US-based oil company).

The same applies to the metal industry: 'The landscape of our industry is quite differentiated. In some sub-sectors of the metal industry there are overcapacities, for example in the extrusion sub-sector in Southern Europe, while in other sub-sectors demand peaks are registered. This is the reason why RM is of great value when your company serves different sub-sectors of the metal industry. Since the introduction of RM, our company has increased the EBIT in a range of 3–5 percentage points which has had a significant impact on overall profitability' (CEO, a European metal company).

If we then review the feedback provided by companies that do not apply RM, two elements, both linked to insufficient experience with RM, emerge. First, lack of awareness is responsible for not applying RM: 'I have heard about this concept but I have never seen a standard RM solution or software for the glass industry—or at least I am not aware of it. If RM really helps increase profits there would be some success stories around it that for the moment I cannot think of. Before taking into consideration an implementation of RM, I would like to see some proven case studies in our industry' (General Manager, a European glass company).

Second, lack of management attention prevents RM introduction: 'RM and pricing has not reached the agenda of the CEO yet: I seriously believe that our company should invest in this area, however the top management is currently dealing on the one hand with supply chain optimization and purchase of raw materials, whose price increases are eroding our margins, and, on the other hand, with an internal reorganization. I believe that once the restructuring project has

been completed, RM will be the next topic on the agenda' (Global Marketing Director, a North American chemical company).

Low management attention to RM can be found in companies where other projects or activities have higher priority. Rather than failing to recognize the benefits or potential of RM in such cases, RM is put on hold due to other projects and thus awareness throughout the company is low: 'I recognize the value and potential of RM. However, we are currently rolling out a new global ERP-system. Once this is up and running, we will have a solid IT infrastructure that will represent a good basis also for a future RM introduction' (Vice President Transformation and Strategy, a US-based pharmaceutical company).

The CFO of a European chemicals company responded in this respect: 'The reason that no RM system is currently in place is not due to the fact that our company does not recognize the benefits of it: We have just taken over a smaller company and we are busy integrating it. After the post-merger reorganization we are going to review in detail the potential margin improvement that we could realize through RM and decide how to move ahead'.

5.3   Quantitative Study: Data Collection

Based on the exploratory research, we developed a semi-structured questionnaire (see Appendix A). The study was conducted through personal interviews. Six hundred companies in the PI were contacted in North America and 600 in Europe. The companies were randomly selected using the Dun & Bradstreet database (Dun & Bradstreet Sales & Marketing Database 2012).

The data collection, which involved 603 participating companies, was completed between July 2012 and May 2013. Of the participating companies, 259 of 2 countries were located in the regional cluster North America (Canada and USA), whereas 344 companies of 14 countries were located in the regional cluster Europe (Austria, Denmark, France, Germany, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and the UK).

Figures 5.2, 5.3, and 5.4 show the distribution of the respondents across countries,[1] turnover and industries. Respondents were managers responsible for the activities linked to RM. Personal interviews were conducted by means of the questionnaire (see Appendix A.3).

At the beginning of each interview, we provided the definition of RM given by Phillips (2005): 'Revenue Management refers to the strategy and tactics used by a number of industries . . . to manage the allocation of their capacity to different fare classes over time in order to maximize revenue'. By doing this, we ensured that there was a clear and consistent understanding of RM among the respondents.

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[1] "Others" in Fig. 5.2 refers to Austria (with 12 respondents), Denmark (8), Poland (4) and Portugal (3).

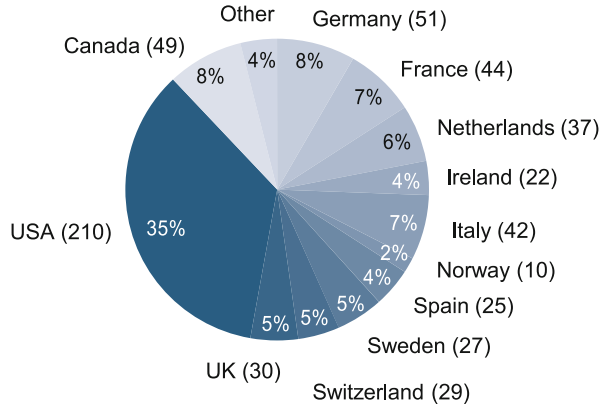**Fig. 5.2** Distribution of interview partners per country

Other
Germany (51)
Canada (49)
4% 8%
France (44)
8%
7%
Netherlands (37)
6%
Ireland (22)
4%
USA (210) 35%
7%
Italy (42)
2%
Norway (10)
4%
Spain (25)
5% 5% 5%
Sweden (27)
UK (30)
Switzerland (29)

Fig. 5.3 Distribution of interview partners per turnover

Below 50 m Euro
Over 1 bn Euro
Between 50 and 100 m Euro
7% 2%
10%
Between 1 and 10 bn Euro
25% 20%
Between 100 and 500 m Euro
36%
Between 0.5 and 1bn Euro
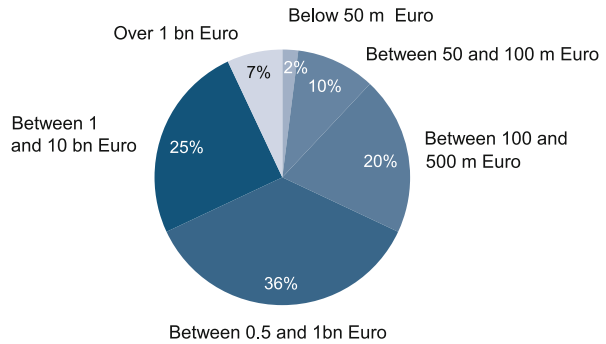
Fig. 5.4 Distribution of interview partners per industry

Glass: 73 (12%)
Metal: 117(19%)
73 117
Oil: 111 (18%)
111
99
Pharmaceuticals: 99 (16%)
82
Paper: 82 (14%)
121
Chemicals: 121 (20%)
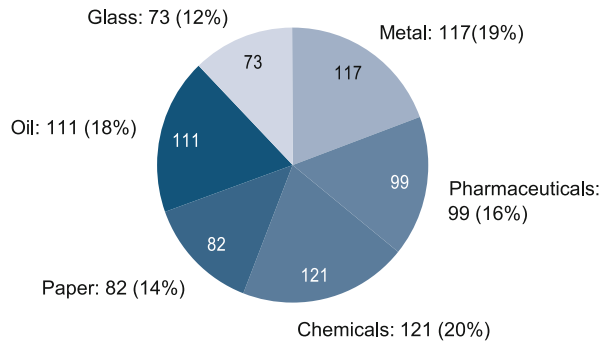
When discussing the profit generated by or expected from the introduction of RM, respondents were asked for *a priori* and *a posteriori* profit impacts. For confidentiality reasons the companies questioned did not share detailed data or balance sheets with the interviewer. Therefore, answers related to profit impact are based on the assessment of respondents.

To assess the validity of the results, it is relevant to verify that managers decided to participate in the study independently at their opinion on the importance of RM (Wolfe 2003). Therefore, to tackle this issue, all targeted interviewees were first asked to report the importance they attributed to RM within their company. Two per cent of the nonparticipating target interviewees and 1 % of the participating interviewees attributed a low importance to RM. This shows that there was no non-response bias.

5.4   Results: RM in Practice

5.4.1   RM Profit Impact Evaluation and RM Years of Utilization

A key aspect of the study is to assess the impact of RM on the profitability of companies. Respondents were therefore asked to evaluate how appropriate RM is to increase revenues on a Likert scale from 1 (not important) to 7 (very important). Although the overall score was high, there is a significant difference between Europe and North America. North America shows a higher overall assessment of the impact RM has on profit than does Europe. A two-tailed t-test reveals that the difference between the average (AV) in Europe (5.6) and North America (6.2) is highly significant ($P = 0.000$, $t = -6.733$, $DF = 509$). In our view this difference is due to a more intense and longer RM utilization in North America than in Europe.

Firms participating in this study and located in North America, on average, have been using RM for a longer time than firms based in Europe. This fact confirms the results of Kolisch and Zatta (2012) that North American manufacturing companies introduced RM on average earlier than their European peers, as in the case of service companies, such as airlines, where the early adopters were located in North America. This earlier introduction helped companies to recognize sooner the benefits of RM and re-enforce its application (see Smith et al. 1992). Another interesting aspect linked to early adoption is that several software companies started developing specific RM solutions (see Quante et al. 2009), most of them operating in North America.

Figure 5.5 reports the number of years of RM use and the evaluation of RM ability to increase profit in North America and in Europe. The average years of RM utilization is still low (4.2). A two-tailed t-test shows that the difference between the AV in Europe (3.6) compared to North America (4.9) is highly significant ($P = 0.000$, $t = -6.733$, $DF = 509$). This can be interpreted as a positive fact for RM, as it means that RM has significant potential not yet realized due to its limited application both in North America and Europe.

With the increasing availability of data, technology and software solution advances in RM, we expect that its utilization across the manufacturing industry will grow more rapidly in the near future than in the last few years.
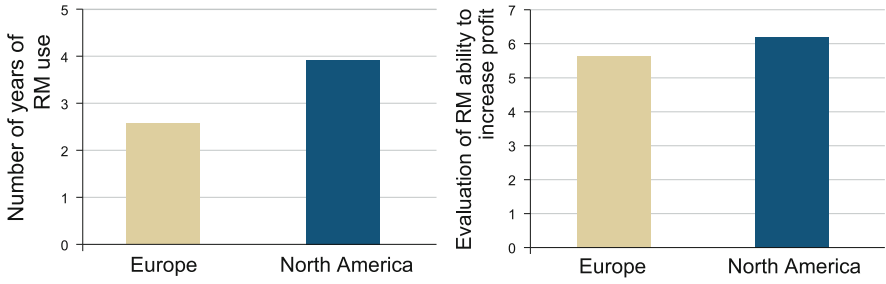
Fig. 5.5 Number of years of RM use and evaluation of RM ability to increase profit in North America and Europe

5.4.2   RM Introduction and Use

The majority (511 out of 603) of the firms that participated in this survey employ RM, which means that almost 85 % of the companies in the sample make use of RM. Companies with a higher level of internationalization, in terms of number of markets where they are active and with a higher turnover, are more likely to introduce RM.

The positive correlation between RM introduction and the number of markets ($R_{Spearman} = 0.227$, P = 0.000, two-tailed) indicates that companies operating in several markets are more likely to introduce and use RM. This can be explained by the fact that RM helps manage complexity, which is greater when customers from multiple markets with different willingnesses-to-pay for capacity and if the company is responding with capacity buckets spread out over multiple plants in different countries. The greater the complexity, the more beneficial RM is, as it helps match supply and demand in order to maximize revenues.

We also find a positive and significant correlation between RM introduction and firm revenue ($R_{Spearman} = 0.522$, P = 0.000, two-tailed).[2] This result is in line with previous findings (see Kolisch and Zatta 2012) which show that the importance of RM increases with turnover. Therefore, large firms are more willing to introduce RM because they often have an adequate pricing strategy and organization to support RM introduction and implementation.

In addition, higher turnover is typically linked with a broader international presence (Simon 2009). Figure 5.6 shows the distribution of revenues for companies that introduced RM (left) versus companies which have not (right). It is interesting to note that all 40 companies with a turnover of over 10 billion euros

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[2] The Spearman correlation is used because the variable revenue has an ordinal level (revenue is clustered in ordinal categories). In the following analysis, we use the Spearman correlation when at least one of the variables is an ordinal variable. As we realized during the preparation of the survey, for several reasons (for example, privacy concerns) our participants preferred to give their answers in terms of categories rather than to reveal the numerical values.
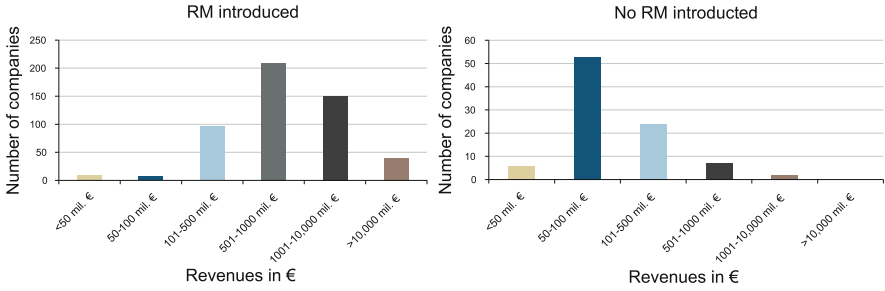
Fig. 5.6 Distribution of revenue for companies that introduced RM (*left*) versus companies that did not (*right*)
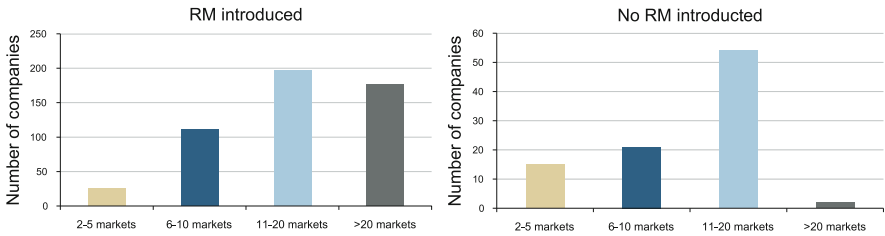

Fig. 5.7 Distribution of the number of markets for companies that introduced RM (*left*) versus companies that did not (*right*)

have introduced RM, whereas the large majority (53 out of 60) of the companies with a turnover between 50 and 100 million euros have not introduced RM.

Figure 5.7 shows the number of markets a company operates in for companies that introduced RM (left) versus companies that did not (right). It becomes evident that nearly all firms active in more than 20 markets (177 out of 179 companies) have introduced RM.

5.4.3 Impact of RM Utilisation on Profits

Respondents were asked to indicate how successful their companies have been in increasing profits through RM (Likert scale from 1—very unsuccessful, to 7—very successful). The average score was high (5.7), showing that the introduction of RM is perceived as leading to profit improvement.

A two-tailed t-test shows that the difference between the AV in Europe (5.4) compared to North America (6.0) is highly significant ($P = 0.000$, $t = -6.966$, $DF = 509$). North America shows greater success with respect to RM in terms of profits than Europe, and the explanation could be that North America introduced RM earlier than did Europe. The average number of years since RM introduction is
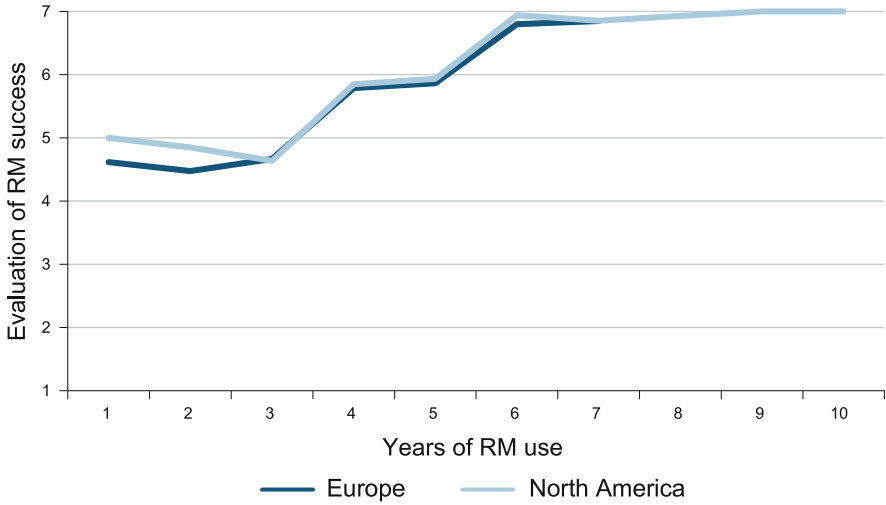
Fig. 5.8 RM success in increasing profit with respect to duration of use in North America and Europe

3.6 in Europe, while it is 4.9 in North America. Truly, a learning curve effect for the use of RM can be observed.

We further investigated the impact of the period of RM use on the success in increasing profits. We found a positive and highly significant correlation between period of use and success ($R_{Spearman}$ =0.069, P = 0.000, two-tailed). Hence, more experience with RM improves its success in terms of profitability (see Fig. 5.8). Moreover, there is a positive correlation between revenue and average yearly EBIT (Earning before Interest & Taxes) impact of RM ($R_{Spearman}$ =0.087, P = 0.048, two-tailed).

Therefore, larger firms are more likely to achieve a profit increase due to the introduction of RM. The explanation for this could be that large firms are more capable of identifying the appropriate RM approach and better exploiting RM, since they are more likely to have a coherent pricing strategy and adequate capabilities and resources. We also observed that larger firms in terms of turnover typically tend to have better organizational support for RM and place more importance on the lack of management support for RM as a barrier that hinders RM implementation ($R_{Spearman}$ = 0.337, P = 0.000, two-tailed). Better organization support for RM often means that there are dedicated RM resources, for example an RM function typically led by an RM Director who manages RM analysts. Additionally, the senior management of larger firms tends to attribute greater importance to RM ($R_{Spearman}$ = 0.814, P = 0.000, two-tailed).

5.4.4   A Priori and a Posteriori Estimation of Profit Improvement Due to RM

Based on the survey results, both the *a priori* assessment of expected profit improvement, due to RM before its introduction, and the profit increase 1 year after RM introduction, are assessed by the respondents as positive. The participants expect to achieve positive and high profit improvement due to the introduction of RM (average 5.6 %) and also report an increased profit due to RM 1 year after its introduction (average 3 %).

However, the expected profit improvement is higher than that observed after 1 year. There is a positive and highly significant correlation between expected profit improvement due to RM introduction and the period of RM use ($R_{Spearman}$ =0.634, P = 0.000, two tailed) and a highly significant and positive correlation between the observed profit after 1 year and the period of use ($R_{Spearman}$ = 0.929, P = 0.000, two-tailed). This indicates that the longer RM is in use, the more effectively it is applied within a company and therefore the stronger the beneficial impact it has on profit improvement.

A two-tailed t-test shows that the difference in profit expectation in Europe (AV = 5.1 %) compared to North America (AV = 6.3 %) is highly significant (P = 0.000, t = −9.430, DF = 509). We find evidence of a significant difference between North America and Europe also with respect to observed profit improvement 1 year after RM introduction (Fig. 5.9). In this case, a two-tailed test shows that the difference in observed profit between Europe (AV = 2.5 %) and North America (AV = 3.6 %) again is highly significant (P = 0.000, t = −9.821, DF = 509).
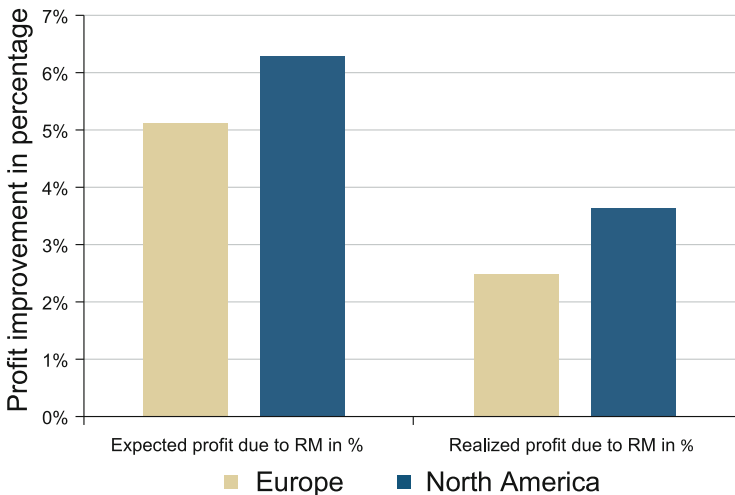

Fig. 5.9 A priori estimation of profit improvement due to RM and a posteriori realized profit improvement due to RM in North America and Europe

An explanation of this difference may be that RM in North America is more price-based and therefore the profit impact is stronger than in the case of a capacity-based approach, which is more widespread in Europe (see Kolisch and Zatta 2012). Moreover, previous literature (Kolisch and Zatta 2012) provides a further interpretation for these findings. RM is more system based in North America, whereas it is more manual based in Europe, which can lead to a profit impact that is realized earlier and turns out to be higher in North America than in Europe.

5.4.5   Barriers that Hinder RM Implementation

The respondents using RM mentioned a number of barriers that hinder the implementation of RM (Likert scale from 1—very weakly, to 7—very strongly). In decreasing order of importance, these are (see Fig. 5.10): (1) Lack of experience with RM, (2) no appropriate RM approach identified, (3) no clearly defined price strategy, (4) lack of management attention/support, (5) danger of a price-level decrease, (6) lack of customer acceptance, (7) lack of appropriate IT system, (8) lack of data availability, (9) no corporate culture, (10) fear of negative RM experience, and (11) fear of negative customer feedback.

These results are in line with previous findings of Kolisch and Zatta (2012). The two studies differ only slightly with respect to some factors. In Kolisch and Zatta (2012), the barrier 'danger of a price decrease' was in the third instead of the fifth position. A reason for this could be the fact that our study was conducted during a time when the global economy, compared to the time when the study of Kolisch and Zatta (2012) was undertaken, was suffering from a downturn. Therefore, prices had already decreased to a certain extent and this factor was therefore not perceived as a
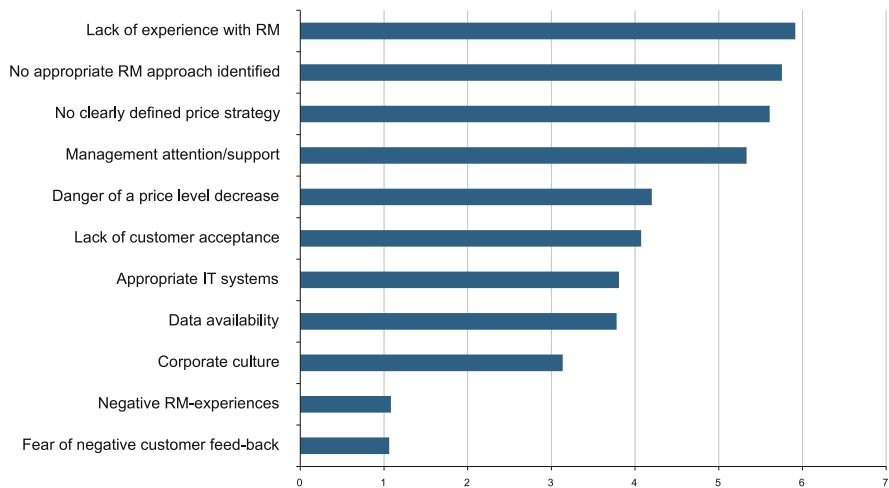

Fig. 5.10 Average importance of barriers to the introduction of RM

top barrier. Data availability is not considered a top barrier in our study, though it was a more relevant barrier in Kolisch and Zatta (2012). A possible reason for this difference might be due to technological advances in Supply Chain Planning and Revenue Management software solutions and accordingly greater data availability.

The main reasons for not implementing RM are lack of experience, lack of approach identification, unclear price strategy definition and lack of management attention.

Inappropriate IT systems on the customer side, the lack of an RM culture within the company or inappropriate supporting processes and data are not considered critical barriers to the use of RM. Interviewees do not fear negative customer feedback or experiences. There is, however, a negative and significant correlation between the average score of the barrier 'danger of a price level decrease' and firm revenue ($R_{Spearman} = -0.106$, $P = 0.016$, two-tailed). Therefore, larger firms in terms of turnover are less worried about a price reduction due to RM. One explanation for this observation may be the fact that larger companies tend to have more developed pricing strategies in place than do smaller companies, which implies that they segment the market more precisely. A segment-specific pricing strategy prevents an undifferentiated price reduction.

On the other hand, bigger firms in terms of revenue are more worried about lack of management attention/support as a barrier to RM introduction ($R_{Spearman} = 0.337$, $P = 0.000$, two-tailed). This could be explained by the fact that in these larger firms the senior management changes more often than in mid-sized and smaller companies. Such changes can lead to disruptions in management direction and sponsored projects by senior managers, which in turn leads to vanishing management attention and support for RM projects.

North America and Europe differ significantly in the importance assigned to some critical barriers. In particular, the score on the barrier 'lack of a clearly defined price strategy' differs significantly between Europe ($AV = 5.98$) and North America ($AV = 5.13$) using a two-tailed t-test analysis ($P = 0.000$, $t = 10.740$, $DF = 509$). This reflects the fact that Northern American companies are typically ahead, compared to European companies, in the definition of a price strategy and therefore the lack of a price strategy is seen more often as a barrier in Europe. Furthermore, a two-tailed t-test ($P = 0.000$, $t = 10.740$, $DF = 509$) shows that management attention/support is a more important barrier to RM introduction in North America ($AV = 5.87$) than in Europe ($AV = 4.92$).

The above results are not driven by a difference in firm revenue between North America and Europe, since a t-test rejects the hypothesis that a significant difference in revenue exists between the two regions. Therefore, the greater importance attributed to management attention/support by companies in North America is not due to a difference in the size of the firms measured in revenue but correlates with the geographical location of the firms. The same is true for the lower importance attributed to the lack of a clearly defined price strategy by North American companies.

Another interesting issue is whether RM introduction has an impact on the evaluation of RM barriers. We compare similar questions that ask for an evaluation

of the importance of the barriers that hinder RM introduction for both RM users and non-users (Likert scale from 1 to 7 as described above). ANOVA and t-test show significant differences between RM users and non-users with respect to barrier assessment.

RM users do not fear negative customer feedback when deciding whether to introduce RM (AV = 1.06), whereas non-users assign medium importance to this barrier (AV = 4.23). A two-tailed t-test analysis finds that the difference between users and non-users is highly significant (P = 0.000, t = −31.805, DF = 601). This result indicates that once in use, RM is accepted by customers, who do not complain and do not provide significant negative feedback to the companies applying it. A two-tailed t-test shows that the difference in the average evaluation of corporate culture as a barrier for RM users (3.14) compared to nonusers of RM (4.32) is also highly significant (P = 0.000, t = −6.461, DF = 601).

RM users assign more importance to the lack of experience in hindering RM introduction (AV = 5.91) than non-users (AV = 5.42): A two-tailed t-test shows that the difference in the average score is statistically significant (P = 0.000, t = 3.786, DF = 601). Moreover, a two-tailed t-test shows that the difference in the average evaluation of unclearly defined price strategy as a barrier for users (AV = 5.61) compared to non-users (4.49) is also highly significant (P = 0.000, t = 8.241, DF = 601).

These findings shed light on the different perception of barrier importance prior to and after RM introduction. Firms hesitating to introduce RM could therefore evaluate, in light of the assessment of firms that have already experienced RM, whether the barriers they fear are realistic or if they are given undue weight.

5.4.6 Reasons for Not Implementing RM

Interviewees of companies that do not use RM reported a number of reasons for the lack of RM introduction (Likert scale from 1—no importance, to 7—strong importance). In decreasing order of importance, the relevant ones are (Fig. 5.11): (1) Waiting for more implementations in the industry, (2) other issues have higher priority, (3) no appropriate RM approach identified, (4) lack of management attention/support, (5) lack of experience with RM, (6) limited visibility by top management, and (7) no clearly defined price strategy.

Therefore, if companies decide not to introduce RM, this is typically due to the fact that there are other projects or activities with higher priority rather than a failure to recognize the benefits or potential of RM. Interviewees do not fear negative RM experiences or price-level decreases.

Furthermore, we investigate the impact of the barriers that led to the decision not to introduce RM. We run a logistic regression, where the dependent variable indicates RM introduction (RM introduction = 1, RM no introduction = 0). As independent variables we use the evaluations of the barriers that may hinder RM implementation (see Appendix B). The results show that three barriers have a
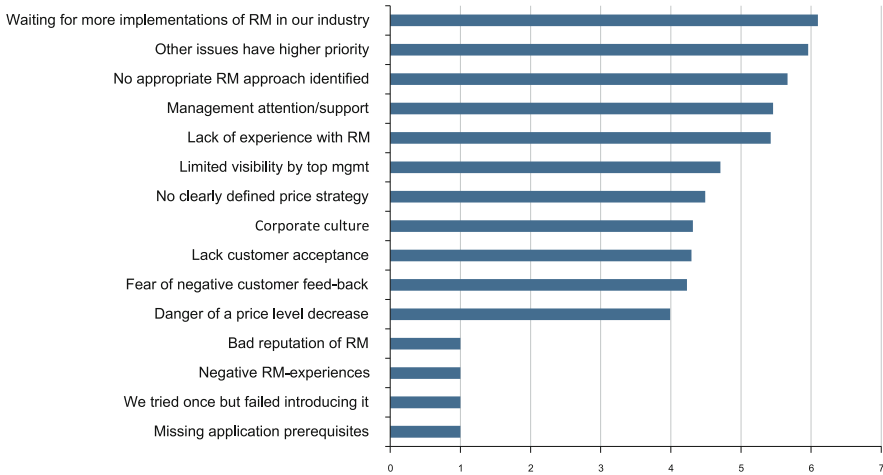
Fig. 5.11 Average importance of reasons for not introducing RM

significant impact on RM introduction. First, higher importance is attributed to an unclearly defined price strategy that leads to a higher probability of RM introduction. Second, the more important the barrier 'fear of negative customer feedback' is, the more likely it is that RM will not be introduced. Finally, the more important the barrier 'corporate culture' is, the more likely it is that RM will not be introduced. If a company intends to introduce RM, it should invest time in assessing these specific barriers to increase its chance of success.

5.5   Conclusions

To the best of our knowledge, this exploratory research based on interviews with 603 companies in North America and Europe comprises the first study that provides comparative insights into the profit impact of RM in the PI and also draws comparisons between these two regional clusters. The main results, limitations and outlook can be summarized as follows.

5.5.1   Results

This article contains the first study based on interviews with firms in Europe and North America that provides insight into the profit impact of RM in the PI.

In general, RM is regarded as contributing to profit. However, the results of this study show that the impact differs between North America and Europe with respect to both the period of time RM has been in use and the evaluation of RM. The impact

of RM in terms of profit increases with firm revenue and period of use, and differs between North America and Europe. The findings show that both the *a priori* estimation of profit improvement due to RM before its introduction and the *a posteriori* realized profit improvement due to RM are positive. The profit improvement due to RM increases with the period of use and differs between Europe and North America, being higher in the latter region.

The main barriers to RM implementation are the lack of RM experience and of approach identification, an unclear price strategy definition and the lack of management attention. North America and Europe assess the importance of some barriers differently. If companies decide not to introduce RM, this is typically due to the fact that companies are waiting for more RM implementations or that there are other projects or activities with higher priority rather than explicitly not recognizing the benefits or potential of RM.

We expect to see an increasing spread of RM in the PI, similar to its diffusion in the service industry, in the years to come, with its positive profit impact being the main driver of this development.

5.5.2 Limitations and Outlook

Our research involved 603 firms located in North America and Europe belonging to 6 industries, and therefore it is a cross-country analysis. However, this work does not take into account the dynamics over time. Therefore, to overcome this issue, a longitudinal research could be undertaken, which would also make causal relations possible (Rindfleisch et al. 2008).

Emerging regions such as Asia-Pacific or Latin America have not yet been explored but might be interesting to assess, following, for example, the hypothesis that RM introduction in these countries would be quicker compared with, for example, that observed in Northern America, for example, as available RM solutions and tested approaches would speed up the process. We would also expect differences in estimated profit impact and perceived barriers, as manufacturing companies in these regions would introduce RM at a more mature life cycle stage of RM, with a greater availability of RM tools, software solutions and case studies.

In addition, some countries had a limited number of respondents and therefore it was not possible to assess further differences and peculiarities across the countries in terms of RM use and the general perception of RM. Future studies may include more interviewees for each of the countries in scope.