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APOM-project: a study of pharmacy practice

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SOM theme A: Intra-firm coordination and change

Abstract

In 1994, a Ph.D-study started regarding pharmacy, organization and management (APOM) in the Netherlands. The APOM-project deals with the structuring and steering of pharmacy organization. This article describes the summary of the empirical results of a survey in a relatively large sample (n=169). Generalization to the population of pharmacies in the Netherlands was made. The results for thought, the perceived importance of activities, comprised a total number of seven clusters of priorities of pharmacy mixes. Most pharmacy managers perceived the product (pharmaceutical) activities and the customer activities as the most important. The results for action, the actual performance of activities, comprised a total number of five clusters of activities of pharmacy mixes. Most pharmacy managers performed the product activities and the process (financial-economic) activities most frequently. The results showed that the traditional conception of the work in the community pharmacy is still vividly present.

Keywords
Community pharmacy
Management
Organization structure
Organization change
Pharmacy Organization
Strategy
Working organization

Introduction

Within phase 2 of this survey, three data-collection methods were used. The methods were selected in a pilot study [1]. In addition, the results of the pilot study were used to accentuate the theoretical description of the three pharmacy mixes described before [2]. The survey was held at 183 community pharmacies in the Netherlands. A random sample was made to test and enrich the results of the pilot. In addition, the results of the survey were used as input in the next phase of the APOM-project, the organizational change to the customer mix. The survey comprised *profile*, *thought* and *action*. Profile was used to describe the shape of the sample. Thought was used to describe perceived importance of the pharmacy-mix activities. Action was used to describe the actual use of pharmacy-mix activities. In addition, the correspondence of the results between thought and action was described.

Design and implementation of the survey

The patterns of actual steering measures are subject matter in phase 2 of the APOM-project. Roughly, the survey comprised three main goals. Firstly, an empirical description of the pattern of applied steering measures. What pharmacy mixes can be described? The data-collection method for thought of pharmacy managers was used to describe the perceived importance of steering measures related to the three pharmacy mixes. The data-collection method for action of pharmacy managers was used to describe the actual use of steering measures. Secondly, consistency in the perceived and applied steering measures was studied. What is the correspondence of the results between thought and action? Does a pharmacy manager who thinks he is in the customer mix actually stress steering measures related to customer? Thirdly, generilizability of the results to the population of Dutch community pharmacies was discussed. In addition, the results of the survey will be used as stimulus for the interviews in the next phase of the APOM-project, the 'travel' to the customer mix.

The design of the survey comprised a study with a relatively large sample to provide broad information on the subject and use this information to make a more detailed study of individual pharmacies. A total of 333 out of 1521 Dutch community pharmacy managers were invited to participate in the survey. The pharmacy manager was requested

to fill in the questionnaires. A file of the Royal Dutch Association for the Advancement of Pharmacy (KNMP) was used to select a random sample of 300 pharmacies. No overlap of the random sample and the selected pharmacies of the pilot was present, in order to prevent learning effects. The random sample group of community pharmacies was labelled with case numbers 1-300 (table 1). The remaining 33 community pharmacies were linked to stichting VNA and SAL Apotheken (VNA/SAL pharmacies)[1]. The selected sample group of VNA/SAL pharmacies was labelled with case numbers 1001-1033 (table 1).

sequence of sending	***case***
action before profile & thought	case 1-164
profile & thought before action	case 165-300, 1001-1033

Table 1. The sequence of sending to the selected pharmacy managers

The questionnaire comprised three studied items: profile, thought and action. The questionnaires for profile and thought were merged. The questionnaires for profile/thought versus action were send separately. The separation was made to minimize mutual influence of the questionnaires for thought and action. The second part of the questionnaire was send if the first part was received correctly. The sequence of sending comprised the questionnaire for action before the combined questionnaire for profile/thought for the first half of all pharmacy managers; vice versa for the second half of all pharmacy managers (**table 1**). The quarter group of the stichting VNA was added to the second half of all pharmacy managers.

On Thursday May 2, 1996, all questionnaires were sent to the selected pharmacy

[1] VNA/SAL pharmacies were approached to ensure sufficient supply for the quasi experiment in phase 3 of the APOM-project. Within the quasi experiment VNA/SAL pharmacies form a separate experimental group. Eight VNA pharmacies of a quarter group were added after two months of the start. A quarter group comprises pharmacy managers which discuss their intended activities and performed activities each quarter. Improved suitability of this group for the quasi experiment was the main argument for this delayed addition. However, three out of ten members of the quarter group did participate in the pilot study. Again these pharmacy managers filled in the questionnaires.

managers. An announcement and brief description of the APOM-project was made the same day in *Pharmaceutisch Weekblad*. After two weeks, in a phone call, all pharmacy managers not responding (74%) were requested to participate. After two months, the remaining pharmacy managers which promised to respond (34%) were called again with a similar request. After three months, a final request for participation was made at the remaining pharmacy managers not responding (1%). On receipt of the response, errors were discovered in some of the questionnaires for thought. These questionnaires were sent back with a request to correct the errors. An extra explanation was added in this letter. After four weeks an additional information paper was added for the remaining first issues of thought. Finally, 10% of the questionnaires for thought were returned due to errors of the pharmacy managers. Two pharmacy managers decided to reject correction and further participation; all remaining questionnaires were received correctly. A total of 14% of all pharmacy managers lost their questionnaire, but were still interested in participation during the telephone call. This group of pharmacy managers was sent an additional first questionnaire. Two other questionnaires were sent, but never arrived at the pharmacies. Both a questionnaire for thought and a questionnaire for action were involved in this postal problem. The two pharmacy managers gave up further participation. At September 11, well over four months after the first postal matter, the administrative settlement was closed. Finally, 183 pharmacy managers participated in the survey or a part of the survey, and 150 non respondents did not. The data were fed into the computer during the period of administrative settlement by two student assistants which checked each other. The statistical processing started at 16 September.

Methods

All statistical procedures were made in SPSS 6.01 for Windows in September 1996. Roughly three statistical methods were used: frequency distribution, Friedman test and cluster analysis for *profile*, *thought* and *action* respectively. The statistical methods used for *profile*, *thought* and *action* will be discussed below; the qualities are presented in table 2.

method / **quality**	**profile**	**thought**	**action**

form	survey	survey	survey
question	1 out of k[2]	rank 3 out of 3	p[3] out of k
scale	nominal	ordinal	nominal→ratio

Table 2. The qualities of the applied methods in the survey

Profile methods

The data-collection method used to study the ***profile*** of pharmacy organization was a description of frequency distribution. Similar to the pilot study subjects were analyzed with respect to general features of the pharmacy manager and of the pharmacy organization. Features of the pharmacy manager were seniority, sex, (in)dependence and division of time. Features of the pharmacy organization were organizational form, cooperation, location, part-time and full-time personnel, FTE pharmacists, FTE other personnel, flow of prescriptions, flow of patients, turnover and net profit. Within this method a nominal scale was used (**table 2**).[4]

[2] k relates to the number of possible options.

[3] p relates to the number of selected options.

[4] These features were used for a general picture of the participating pharmacies. In addition, the sample features of the response and the non response were compared with the available population features of Dutch pharmacies. Some statistical calculations were made to check if the sample was a good representation of the population with the use of a hypergeometric distribution. If a deviation was determined for a certain variable, for example, male pharmacy managers were overrepresented in the sample, an additional MANOVA was made. In other words: `Was it a problem to have an overrepresentation of male pharmacy managers in the sample?'. In the MANOVA the differences were analyzed, for example, did female pharmacy managers have other scores than male pharmacy managers with respect to *thought* and *action*?

Thought methods

In the data-collection method used to study ***thought*** of the pharmacy manager, 26 questions[5] comprised three sub-questions with respect to the three pharmacy mixes. Similar to the pilot study the sub-questions were ranked on a scale from 1 to 3, representing *important -less* important *-even less* important issues. The method comprised identical subjects used in the pilot study: Information, Administration, Automation, External Contacts, Facilities, Analysis, Organization of Labour, Personnel, Competence, Organization Standards and Productivity. Within the method for *thought* an ordinal scale was used (**table 2**). Within the ordinal scale the distance between 1, 2 and 3 has no meaning. As was mentioned in the pilot study, a controversy exists with respect to treating ordinal scales as interval scales and, for example, calculating a mean. Within this recent study both the conservative view and the liberal view were applied to calculate a rank; a Friedman test was applied and some ordinary means were calculated. In addition, reliability of the results was tested with a calculation of Cronbach's alpha. It was tested if the study would produce the same results if it was repeated.

Firstly, similar to the pilot study the Friedman test was applied to calculate a mean rank and an according p-value. The applied level of significance was α<.05 The Friedman test takes dependence ***within*** *each case between 1, 2 and 3 into account with the calculation of the mean ranking. However,* ***in****dependence* ***between*** *cases is required. As was mentioned in* ***an earlier study [1]****, within this study a mean rank was required* ***per case*** *for all questions; cases were used as questions. In the pilot study* ***in****dependence between questions was proofed for all cases. In the survey no learning effect was expected based on the results of the pilot. In relation with these results the* ***in****dependence within one case was presupposed in the survey*[6]*. Secondly, reliability was tested with Cronbach's alpha similar to the pilot study. The alpha was used to provide an*

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[5] The pilot study showed that 4 out of 28 questions were not used, because of their low score of Cronbach's alpha. However, two of these questions, the only questions related to the subject information, were used in the survey despite ot their low performance with respect to reliability. It was decided to leave the subjects intact. Consequently, 26 questions for *thought* were used in the survey.

[6] Similar to the pilot study, a test was made with respect to the outcome of the ordinal scale in a Friedman test and was compared with calculating the mean of the values used in the Friedman test, and calculating the mean of other values. If the same data matrix was used the result of calculating the mean was exactly in correspondence with the result of the Friedman test. In addition, the distance between 1, 2 and 3 does not have a meaning in an ordinal scale. This was tested to be true by
calculating the mean for some other values. The values 1, 2 and 3 were transformed into 1, 1.25 and 1.5; 1, 1.5 and 2; 1, 3 and 5 and 1, 5 and 9 respectively.

impression of the correctness of the item selection for the pharmacy mixes. Cronbach's alpha is based on the internal consistency of the test. Since alpha can be interpreted as the squared correlation coefficient, it ranges in value from 0 to 1. The value expresses the reliability of item selection for product, process and customer. Thirdly, similar to the methods used for ***profile, mentioned in 3.1.,*** *the hypergeometric distribution [3] was used to estimate results for the population.*

Action methods

In the data-collection method used to study ***action*** of the pharmacy manager, 209 out of 384 questions related to the three pharmacy mixes. The remaining 175 questions related to general issues. Similar to the pilot study all questionnaires consisted of binary questions (true/false) related to the activities at the pharmacy organization. The method comprised identical subjects used in the pilot study: Information, Administration, Automation, External Contacts, Facilities, Analysis, Organization of Labour, Personnel, Competence, Organization Standards and Productivity. Within this method a nominal scale was used, and, in addition, the questions were rescaled via a count variable to ratio scale (**table 2**). The data were processed with cluster analysis. Similar to the pilot study an agglomerative hierarchical cluster analysis was used in the survey.

Firstly, similar to the pilot study the agglomerative hierarchical clustering was selected. Within this cluster analysis entities which are most alike are pulled together [4]. Within this study cluster analysis was used as a tool to find similar cases, with respect to pharmacy-mix-related activities. The count variable for the cluster analysis was the number of scores 'yes' on the selected items for product, process, and customer. The form of the pharmacy-mix scores was of main importance in the clustering; the applied clustering method was average linkage within groups in combination with the similarity measure Pearson correlation. The decision of the number of clusters will be described in the results. Secondly, similar to the pilot study reliability was tested with Cronbach's alpha. Like in the method for ***thought*** *alpha was used to provide an impression of the correctness of the item selection. The reliability test was made with all questions related to a certain pharmacy mix. Since alpha can be interpreted as the squared correlation coefficient, it ranges in value from 0 to 1. The value expresses the reliability of item selection for product, process and customer. Thirdly, the results of* ***thought****,* ***action*** *and a combination of* ***thought*** *and* ***action*** *were used to estimate results for the population. Similar to the methods used for* ***profile, mentioned in 3.1.,*** *the hypergeometric distribution [3] was used to estimate results for the population.*

Results

The results presented are related to *profile*, *thought* and *action*. The results for profile describe frequency distributions and, in addition, representativeness is described. The

results for thought describe a ranking of perceived importance of the objectives per pharmacy mix. The results for action describe a ranking of actual used objectives per pharmacy mix. For both thought and action the results of the reliability analysis will be described. The results for *profile*, *thought* and *action* will be described below.

Profile results

Profile results comprise a presentation of the response and the non response, a presentation of the relation of sample and population, and a statistical comparison between sample and population with the use of the hypergeometric confidence bounds. All percentages described in the text were rounded up; the exact scores were presented in the tables. If the population results were not within the confidence bounds a probable explanation was described and a MANOVA was made to analyze possible differences between groups. The complete results of the random sample are described below.

The response comprised the random sample and the selected sample of VNA/SAL pharmacies. The response of the random sample of 300 pharmacy managers was 47% (absolute: 142). Only one questionnaire was sent by 4% (12) of the pharmacy managers. The response of the 33 VNA/SAL pharmacies was 82% (27). Only one questionnaire was sent by 6% (2) of the VNA/SAL pharmacy managers. The response of all 333 pharmacy managers was 51% (169). Only one questionnaire was sent by 4% (14) of all pharmacy managers.

The profile results of the response are presented in table 3-19 below. In table 3-7 data from the population were used. The issues described within this section were sex, age, location, (in)dependence and formulas. In table 8-12 data from a large sample (N=700) were used[7]. The issues described within this section were FTE assistants and other, FTE pharmacists, total WTG and not-WTG prescriptions, total patient population and total turnover. The hypergeometric distribution was applied for table 3-12. For some results no data of the population were available (table 13-19). The issues described within this section were seniority, cooperation, total personnel in part time, total personnel in fulltime, net profit, time for direct tasks and time for *in*direct tasks.

data of the population (N=1521);

The sample of pharmacy managers comprised 73% (compare table 3 for exact score: 73.3%) (rounded up population frequency (KNMP): 65%) male and 27% (35%) female.

source	**random sample**		**KNMP[8] N=1521**
sex	**n=146**	**%**	**%**
male	107	73.3%	65.4%
female	38	26.7%	34.6%

Table 3. Sex

[7] Although these data were not representing the complete population, it was assumed that the frequencies of these sample features were similar to the population.

[8] From the data of the Royal Dutch Association for the Advancement of Pharmacy (KNMP) of july 1996.

The age of 35 to 50 year was most frequently observed: 62% (52%) In addition. 25% (31%) was aged younger than 35, 13% (16%) was 50 up to and including 65 years old and 0% (1%) was older than 65.

source	random sample		KNMP[9] N=1521
age	**n=145**	**%**	**%**
< 35 year	36	24.8%	31.3%
35-50 year	90	62.1%	52.1%
50-65 year	19	13.1%	15.5%
> 65 year			1.1%

Table 4. Age

The location of 62% (57%) of the pharmacies was in the suburban area of a city and in the city centre. 38% (43%) of the pharmacies were located in rural areas and other[9].

source	random sample		KNMP N=1521
location[9]	**n=140**	**%**	**%**
city	87	62.1%	56.5%
rural area/other	53	37.9%	43.4%

Table 5. Location

[9] Within the questionnaire the distinction city centre, suburb and rural area was made. The distinction within the population data was city and rural area/commute area. The data of the KNMP of july 1996 showed that 56,5% of the pharmacies were in a city, and 43,4% of the pharmacies was in a rural area/commute area. It was assumed that city centre/suburb in the questionnaire corresponded with city of the population data, and that rural area corresponded with rural area/commute area.

Within the random sample 72% (69%) of the pharmacy organizations were managed by an independent pharmacy manager. The pharmacy managers in employment were 26% (27%), in addition, 2% (4%) of pharmacy managers in employment were employed and payed off their debts in order to become independent.

source	**random sample**		**KNMP/VNA N=1521**[10]
employment	**n=145**	**%**	**%**
independent entrepreneur	104	71.7%	68.9%
in employment	38	26.2%	27%
in employment and becoming independent	3	2.1%	4.1%

Table 6. (in)dependence

[10] Data of the KNMP related to independent entrepreneurship, and data of the stichting VNA about pharmacy managers in employment working for independence were used. The data of the KNMP of july 1996 showed that 60% of all pharmacy managers are pharmacy owners and 68,9% established owner. Within this study it was assumed that an independent pharmacy manager was an established owner. The data of the stichting VNA of september 1996 show that 63 pharmacists were 'in employment and becoming independent'. The percentage was calculated by dividing this number of pharmacy managers by the total number of pharmacies in accordance with the data of the KNMP of may 1996 (1521). The percentage of the category 'in employment' was calculated as a 'remaining'percentage. The percentages from the other categories were substracted from 100%

The pharmacies not participating in a pharmacy concept were 83% (81%). In addition, 17% (19%) was related to a formula like Kringapotheek, Meditheek, Extra Apotheek, Baliemodelapotheek or the Service Apotheek. In formulas pharmacies pay membership and cooperate with respect to information policy, interior design, education, customer studies et cetera.

source	**random sample**		**formula-organizations[11] N=283**
pharmacy formula	**n=142**	**%**	**%**
formula	24	16.9%	18.5%
no formula yet	118	83.1%	81.4%

Table 7. Formulas

[11] The information used for the data was provided by the organizations for pharmacy formulas. A total number of 238 pharmacies was connected with a formula in september 1996. Per formula the numbers are Kringapotheek (66), Meditheek (76), Extra Apotheek (60), Baliemodel Apotheek (6), Service Apotheek (75), all in september 1996. De category *no formule (yet)* was calculated by substracting the number of formula pharmacies of the total number of pharmacies in accordance with the data of the KNMP from may 1996 (1521). The observed pharmacy formulas in the sample were Kringapotheek (7), Meditheek (3), Extra Apotheek (5), Baliemodel Apotheek (1), Service Apotheek (8).

data of a large sample (n=700);

The completement in Full-Time Equivalence (FTE) for other personnel comprised 4 to 7 FTE for 42% (50%) of the pharmacies. In addition, 25% (14%) used less than 4 FTE for other personnel, 23% (23%) used 7 to 9 FTE and 10% (13%) used 9 FTE or more.

source	**random sample**		**SFK[12] N=700**
assistants and other	**n=140**	**%**	**%**
<4 FTE	35	25.0%	14.2%
4 tot 7 FTE	59	42.1%	50.1%
7 tot 9 FTE	32	22.9%	23.2%
9 FTE	14	10.0%	12.6%

Table 8. FTE assistants and other

The FTE comprised pharmacists and other personnel. The FTE for pharmacists comprised less than 1.5 FTE for 74% (66%) of the pharmacies. In addition, 26% (33%) used 1.5 to 3 FTE for pharmacists, 0% (0.7%) used 3 to 4,5 FTE and 0% (0%) used 4,5 FTE or more.

source	**random sample**		**SFK[8] N=700**
pharmacists	**n=142**	**%**	**%**
1.5 FTE	105	73.9%	66.2%
1.5 tot 3 FTE	37	26.1%	33.1%
3 tot 4.5 FTE			0.7%
4.5 FTE			0%

Table 9. FTE pharmacists

[12] From the data of the Stichting Farmaceutische Kengetallen (SFK) of july 1996 of all 700 participants of the SFK.

The total number of prescriptions (including not Wet Tarieven Geneesmiddelen [WTG]) comprised 50,000 to 70,000 prescriptions per year for 36% (32%) of the pharmacies in 1994. In addition, 25% (17%) of the pharmacies processed less than 50,000 prescriptions, 21% (28%) processed 70,000 up to and including 90,000 prescriptions and 18% (23%) processed more than 90,000 prescriptions.

source / **prescriptions**	**random sample**		**SFK[13] N=700**
	n=131	**%**	**%**
< 50,000	33	25.2%	16.7%
50-70,000	47	35.9%	32.4%
70-90,000	27	20.6%	27.6%
> 90,000	24	18.3%	23.3%

Table 10. Total WTG and not-WTG prescriptions 1994

The total number of patients comprised 8,000 to 11,000 patients for 39% (36%) of the pharmacies in 1996. In addition, 33% (29%) of the pharmacies served less than 8,000 patients, 22% (21%) served 11,000 up to and including 14,000 patients, and 6% (13%) served less than 14,000 patients.

source / **patients**	**random sample**		**SFK[9] N=700**
	n=141	**%**	**%**
< 8,000	46	32.6%	29.5%
8-11,000	55	39.0%	35.9%
11-14,000	31	22.0%	21.5%
> 14,000	9	6.4%	13.1%

Table 11. Total patient population 1996

[13] From the data of the Stichting Farmaceutische Kengetallen (SFK) of July 1996 of all 700 participants of the SFK.

The total turnover comprised from 2.5 to 3.5 million Dutch guilders for 34% (34%) of the pharmacies in 1994. In addition, 29% (16%) of the pharmacies had a turnover of less than 2.5 million, 23% (27%) had a turnover 3.5 up to and including 4.5 million, and 14% (23%) had a turnover of more than 4.5 million.

source	**random sample**		**SFK[9] N=700**
total turnover	**n=128**	**%**	**%**
< hfl. 2,500,000	37	28.9%	15.8%
hfl 2,5-3,500,000	43	33.6%	34.2%
hfl 3,5-4,500,000	30	23.4%	27.1%
> 4,500,000	18	14.1%	22.9%

Table 12. Total turnover 1994

no usable data of the population available;

Seniority was for 39% of the pharmacy managers 6 up to and including 15 years. In addition, 10% had a seniority of less than 2 years, 21% had a seniority of 2 to 6 years and 30% longer than 15 years.

source	**random sample**	
seniority	**n=145**	**%**
< 2 year	15	10.3%
2-6 year	30	20.7%
6-15 year	56	38.6%
> 15 year	44	30.3%

Table 13. Seniority

The independence of the pharmacy was 60% The remaining pharmacies of 4% had a cooperation with a health-care centre, 1% in a chain of pharmacies[14], 16% ownership of several pharmacies, 17% part of a cooperation of some kind and 2,1% participated in a transfer formula[15].

source	random sample	
organizational form	**n=141**	**%**
independent pharmacy	84	59.6%
health-care centre	6	4.3%
chain pharmacy	2	1.4%
management of several pharmacies	22	15.6%
part of a cooperation	24	17.0%
transfer formula	3	2.1%

Table 14. Cooperation

[14] A pharmacy chain is a intensive cooperation between pharmacies. Pharmacy managers are in the pay of the chain. For example, the Boots chain which recently started in the Netherlands.

[15] A transfer formula is a financial construction for pharmacy managers to become independent incrementally. For example, the construction of stichting VNA in the Netherlands.

The total personnel completement comprised parttime and fulltime personnel. Fulltime personnel was employed for 38 hours per week or more, parttime personnel for less than 38 hours. In the sample, 43% of the pharmacies employed 5 to 10 parttime members of staff. In addition, 8% employed 2 or less parttime members of staff, 39% employed 3 to 5 members of staff and 10% employed 10 or more members of staff.

source	random sample	
personnel in parttime	n=145	%
2	12	8.3%
3 tot 5	57	39.3%
5 tot 10	62	42.8%
10	14	9.7%

Table 15. Total personnel in parttime

In the sample, 50% of the pharmacies employed 3 to 5 fulltime members of staff. In addition, 22% employed 2 or less fulltime members of staff, 27% employed 5 to 10 members of staff and 1% employed 10 or more members of staff.

source	random sample	
personnel in fulltime	n=145	%
2	32	22.1%
3 tot 5	72	49.7%
5 tot 10	39	26.9%
10	2	1.4%

Table 16. Total personnel in fulltime

The net profit, after purchase, costs and before taxes, comprised 100,000 to 250,000 Dutch guilders for 42% of the pharmacies in 1994. In addition, for 21% of the pharmacies the net profit was less than 100,000, 23% had a net profit of 250,000 up to and including 400,000, and 14% a net profit of more than 400,000.

source	random sample	
net profit	**n=117**	**%**
< hfl. 100,000	25	21.4%
hfl 100-250,000	49	41.9%
hfl 250-400,000	27	23.1%
> 400,000	16	13.7%

Table 17. Net profit 1994

The time for direct pharmacy tasks, for example, pharmaceutical tasks, managerial tasks, Farmacotherapeutic Consultation (FTO) and check of the prescriptions, was more than 40 hours per week for 62% of the pharmacies. Less than 20 hours were used by 1% of the pharmacists, 20 to 30 hours were used by 8% and 30 to 40 hours were used by 29%

source	random sample	
hours per week	**n=146**	**%**
< 20 hour	1	0.7%
20-30 hour	12	8.2%
30-40 hour	42	28.8%
> 40 hour	91	62.3%

Table 18. Time for direct tasks per week

The time for *in*direct pharmacy tasks, for example, (committee) tasks related to the pharmaceutical profession in general, conferences and courses, was less than 10 hours per week for 70% of the pharmacists. Indirect tasks were performed from 10 to 15 hours per week for 20% of the pharmacists, 15 to 20 hours for 6% and more than 20 hours for 4%

source	**random sample**	
hours per week	**n=146**	**%**
< 10 hour	102	69.9%
10-15 hour	29	19.9%
15-20 hour	9	6.2%
> 20 hour	6	4.1%

Table 19. Time for *in*direct tasks per week

In table 3-12 the results of the sample and the data of the population were presented. Roughly, the correspondence seems reasonable. However, in some tables differences between sample and population were observed. Were these differences alarming?[16] It was assumed that, although a poor correspondence of sample and population was observed for some of the questions, the random sample was a relatively good representation of the population. The hypothesis of no difference in the means for the different groups for *thought* and *action* was accepted. In addition, the observed differences between sample and population were accepted to have little importance on the pharmacy-mix scores. Consequently, the results for *thought* and *action* were generalized to all pharmacies in the Netherlands.

[16] To give a more exact answer to possible noncorrespondence between sample and population, a statistical comparison was made using the hypergeometric distribution. In addition, if noncorrespondence was observed for a certain variable, for example too many female pharmacy managers, an additional MANOVA was made. In the MANOVA it was checked if the scores of this variable for *thought* and *action* varied from other variables. In other words: did female pharmacy managers have other scores than male pharmacy managers?

The non response was for the random sample 49% (146), for the VNA/SAL pharmacies 12% (4), and for the total sample 45% (150). All non respondents were called. A reason for no participation and questions about the *profile* were asked. Roughly the categories of pharmacy managers refusing to participate in the survey comprised lack of time, no interest, absence and other. Lack of time was 51% of all non response. Other issues named in combination with lack of time were: holiday (11%), too many surveys (7%), questions violating privacy (4%), no interest (4%). Consequently, the categories lack of time and related issues were 77% of all non response. Other categories named were no interest (3%), constant absence (5%), other (15%). The reasons for non response appeared to have little relation with the variables we were interested in, e.g. reasons like `I cannot participate because I am to busy with the implementation of customer activities' were not observed. Consequently, it was assumed that the non response did not influence the results for *thought* and *action*.

Thought results

The results for *thought* comprise, similar to the pilot study, calculating some mean ranks per pharmacy manager and a test for the reliability of the questionnaire. Within the method for *thought* many questions were answered by the same pharmacy manager. As was mentioned before, in accordance with the results of the pilot study *in*dependence within one case was presupposed in order to be able to use the Friedman test. As a result, identical to the pilot study the Friedman test was applied. The results of the Friedman test for *thought* comprised the random sample and the selected sample of VNA/SAL pharmacies. Both samples are presented separately. Within the presentation of the results the three pharmacies are described: the product mix for pharmaceutical activities, the process mix for financial-economic activities and the customer mix for customer activities. A total number of seven clusters of priorities of pharmacy mixes were found. For 13 out of 175 cases (9%), two of the three pharmacy mixes were equal. These cases were classified in the nearest cluster described in table 23. For 2 cases (2%), case 241 and case 254, all three pharmacy mixes were equal.

Table 23 shows that case 22 (second column, cell upper left) is classified in the cluster product-process-customer. Within this cluster the score product-related activities was highest. The second highest score were process-related activities and than customer-related activities. These results show that the pharmacy manager of case 22 perceived pharmaceutical activities (product) as the most important, followed by financial-economic activities (process) and customer activities (customer). The results of the random sample for *thought* in **table 23** show that most pharmacy managers perceived pharmaceutical activities or customer activities as the most important activities. A total of 61% (13+76) perceived pharmaceutical activities as the most important. A total of 36% (46+6) perceived customer activities as the most important. Only 2% (1+2) of the pharmacy managers perceived process activities as the most important issues. A total of 84% (76+46) of the observations had a combination of product activities and customer activities in the first two positions of a rank.

group	**rank**	**case** (random sample n=146)	**case** (selected sample n=29)
1.	***product-process-customer***	case 22, 28, 49, 62, 64, 74, 104, 192, 204, 259, 265, 283, 299 **13**	case 1012 **1**
2.	***product-customer-process***	case 3, 5, 7, 8, 11, 21, 30, 36, 41, 48, 50, 52, 54, 57, 60, 61, 68, 71, 73, 78, 79, 80, 82, 87, 91, 96, 99, 105, 106, 118, 122, 125, 126, 129, 138, 139, 143, 159, 160, 162, 163, 164, 166, 167, 171, 173, 176, 177, 184, 185, 187, 189, 190, 194, 196, 197, 201, 207, 210, 214, 215, 218, 221, 224, 226, 230, 231, 239, 242, 256, 260, 273, 278, 280, 282, 294 **76**	case 1003, 1005, 1009, 1017, 1030, 1031 **6**
3.	***process-product-customer***	case 90 **1**	case 1014, 1026 **2**
4.	***process-customer-product***	case 157, 276 **2**	case 1019 **1**
5.	***customer-product-process***	case 1, 9, 19, 33, 43, 44, 45, 51, 69, 76, 77, 97, 101, 109, 111, 115, 116, 130, 133, 147, 148, 165, 179, 186, 188, 191, 205, 213, 223, 228, 234, 236, 246, 249, 251, 263, 271, 272, 275, 284, 287, 290, 291, 293, 295, 296 **46**	case 1001, 1002, 1004, 1006, 1007, 1010, 1015, 1016, 1022, 1024, 1029, 1032, 1033 **13**
6.	***customer-process-product***	case 27, 55, 89, 123, 220, 297 **6**	case 1008, 1021, 1023, 1025, 1027, 1028 **6**
7.	***product=process=customer***	case 241, 254 **2**	
	total cases thought	**146**	**29**

Table 23. Rank clustering of pharmacy mixes for the method for ***thought*** in the random sample and the selected sample.

The stability of the ranking of the Friedman test in table 23 was tested in the APOM-project with a comparison of the levels of significance and a qualitative perspective.

The Friedman test calculates a p-value for all individual questionnaires. The applied level of significance was α<.05. Nearly half of the questionnaires had a p-value <.05 (49% of all questionnaires), some of which had a significance of more than .99 (38%). However, for 51% of all questionnaires the p-value ≥.05. Principally, the Friedman test did not produce a significant ranking for these questionnaires. What were the reasons for this relatively low significance? Could these results still be trusted? To answer these questions the function of the significance within the Friedman test must be discussed. The Friedman test calculates a mean rank. Within the APOM-project, a rank of three scores was produced. The calculated p-value is related to the differences between scores in the rank. The larger the difference between these scores of the rank, the lower the p-value. In addition, small differences produce a high p-value. An extreme example: two pharmacy managers (case 241 and 254) had three identical scores. The corresponding p-value was 1. However, does this mean that the results, equal importance of the three pharmacy mixes, can not be trusted?

Firstly, equality in perceived importance, and therefore a low level of significance, does not necessarily lead to results to be questioned. In the extreme example mentioned before, three identical scores were observed and the calculated p-value was 1. However, the interview of extreme case 254, in accordance with the results of a follow-up study, showed that the results, although equal scores for all pharmacy mixes, were recognized and accepted by the pharmacy manager. Equal scores could be meaningful. Actually, pharmacy managers can perceive the pharmacy mixes of equal importance. The Friedman test does not provide a significant ranking in these situations. All of the questionnaires with a p-value ≥.05 had two or three scores which were very similar or equal. The higher the p-value the smaller the differences between the ranking of the Friedman test. In addition, stronger differences between the pharmacy-mix scores of the lower p-values were observed.

Secondly, the three pharmacy mixes of the APOM-project were closely related. It could be expected that pharmacy managers perceive the mixes of equal importance. The additional written comment of pharmacy managers given in the survey showed that 15 pharmacy managers experienced problems in making choices between the three pharmacy mixes in the method for thought. However, the interviews of the follow-up study showed some remarkable results related to the comment. In the quasi-experiment, 5 out of the 15 pharmacy managers, describing comment in the survey, were interviewed. All 5 pharmacy managers, describing problems in making choices, recognized and accepted the produced mean rank for thought. In addition, the interviews in the quasi-experiment showed that 81% (26) of the participating pharmacy managers agreed with the mean rank. Some other 16% (5) of the pharmacy managers agreed with the result, but described difficulties in making choices between the pharmacy mixes. Only 3% (1) of the pharmacy managers disagreed and expected the process mix to be in the third position of the rank, in stead of the second position.

Although 51% of calculated rankings was not significant within the Friedman test, the results were accepted

*as the rankings for **thought**[17]. Reasons described were: equality in ranking was showed to be possible in the interviews and the comment of survey. In addition, the ranking was stable in using alternative values for 1, 2, and 3.*

It can be concluded that the pharmacy mixes were closely related and sometimes pharmacy managers experienced problems with the equal importance of pharmacy mixes *during* the survey. However, most pharmacy managers, agreed with the rank of pharmacy mixes *after* the survey in an interview. In addition, a high p-value does not necessarily lead to results to be questioned. The results of the interviews showed that pharmacy mixes can be perceived of equal importance. All of the questionnaires with a p-value .05 had two or three similar scores or even equal scores. Finally, other applied values to calculate a mean rank resulted in exactly the same ranking for all cases. Despite of some high p-values, all results of the Friedman test were used to produce a ranking for *thought*.

In addition, a rough sketch of generilizability was made. With a level of confidence of 95% the number of cases per ranked group in the population was estimated with hypergeometric confidence bounds [3] based on the observed number of cases per cluster in the random sample.

Firstly, the number of pharmacies in the observed rank product-process-customer with 13 cases in the sample was estimated for the population. The estimation of the number of pharma-

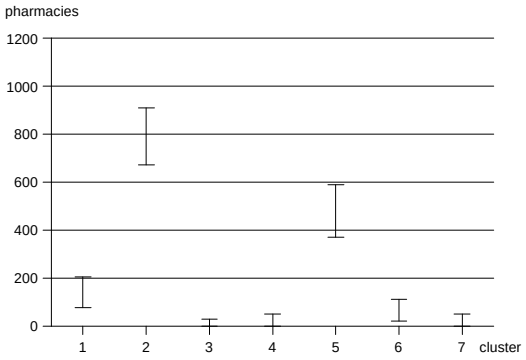

Figure 1. The estimated confidence bounds per cluster for *thinking* in the population.

[17] In addition, and similar to the pilot study, a test was made with respect to the outcome of the ordinal scale in a Friedman test and was compared with calculating the mean of the values used in the Friedman test, and calculating the mean of other values. If the same data matrix was used the result of calculating the mean was exactly in correspondence with the result of the Friedman test. In addition, the distance between 1, 2 and 3 does not have a meaning in an ordinal scale. This was tested to be true by calculating the mean for some other values. The values 1, 2 and 3 were transformed into 1, 1.25 and 1.5; 1, 1.5 and 2; 1, 3 and 5 and 1, 5 and 9 respectively. This resulted in exactly the same ranking for all cases. Consequently, the ranking of the Friedman test was accepted to be quite stable.

cies in the population of Dutch pharmacies was between 76 (5%) and 205 (14%) pharmacies (**cluster 1, figure 1.**). Secondly, the number of pharmacies in the observed rank product-customer-process with 76 cases in the sample was estimated. The estimation of the number of pharmacies in the population of Dutch pharmacies was between 673 (44%) and 911 (60%) pharmacies in cluster 2. Thirdly, the number of pharmacies in the observed rank process-product-customer with 1 case in the sample was estimated. The estimation of the number of pharmacies in the population of Dutch pharmacies was between 0 (0%) and 30 (2%) pharmacies in cluster 3. Fourthly, the number of pharmacies in the observed rank process-customer-product with 2 cases in the sample was estimated. The estimation of the number of pharmacies in the population of Dutch pharmacies was between 0 (0%) and 51 (1%) pharmacies in cluster 4. Fifthly, the number of pharmacies in the observed rank customer-product-process with 46 cases in the sample was estimated. The estimation of the number of pharmacies in the population of Dutch pharmacies was between 370 (24%) and 589 (39%) pharmacies in cluster 5. Sixthly, the number of pharmacies in the observed rank customer-process-product with 6 cases in the sample was estimated. The estimation of the number of pharmacies in the population of Dutch pharmacies was between 22 (2%) and 112 (7%) pharmacies in cluster 6. Seventhly, the number of pharmacies in the observed rank product=process=customer with 2 cases in the sample was estimated. The estimation of the number of pharmacies in the population of Dutch pharmacies was between 1 (0%) and 51 (3%) pharmacies in cluster 7.

The results of the random sample for *thought* in **table 23** showed that most pharmacy managers perceived product activities or customer activities as the most important activities. The estimation of the number of pharmacies with a first rank for the product mix, in the population of Dutch pharmacies, was between 808 (53%) and 1037 (68%) pharmacies (**first rank: product, figure 2.**). The estimation of the num-

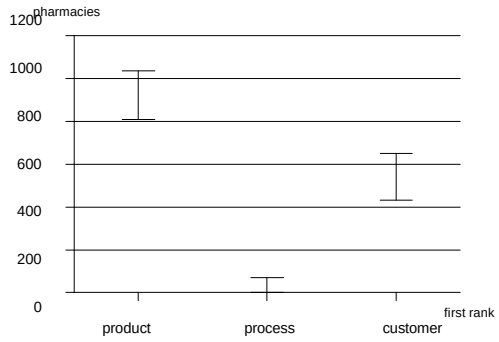

Figure 2. The estimated confidence bounds per rank for *thinking* in the population.

ber of pharmacies with a first rank for the customer mix was between 432 (28%) and 651 (43%) pharmacies (first rank: customer). The estimation of the number of pharmacies with a first rank for the process mix was between 0 (0%) and 71 (5%) pharmacies (first rank: process). The estimation of the number of pharmacies with product or customer in the first two ranks was between 1182 (78%) and 1351 (89%) pharmacies.

Finally, to be sure that the study, when repeated, should produce the same results, reliability was tested with Cronbach's alpha similar to the pilot study. The test was applied to *thought* of pharmacy managers.

The reliability test of Cronbach's alpha is based on the internal consistency of the test. Within this method the reliability is based on the average correlation of items within a test. Since alpha can be interpreted as a squared correlation coefficient, it ranges in value from 0 to 1. All items related to a certain pharmacy mix were tested separately. As a result the alpha for the product mix, the process mix and the customer mix was .78, .79 and .72 respectively. The alpha value of the process mix was highest, indicating that the applied scale was used in the most consistent way, and, therefore relatively reliable.

The presented results showed that the applied method for *thought* seemed to be reasonable with respect to reliability.

Action results

The results for *action* comprise, similar to the pilot study, calculating some ratios variables per pharmacy manager and a test for the reliability of the questionnaire. Within this study cluster analysis was used as a tool to find similar cases. The calculated ratios related to the product mix, process mix, customer mix, remaining questions and all questions. The agglomerative hierarchical clustering method was applied to three pharmacy-mix-related ratios: product, process, and customer. The applied similarity measure was the Pearson correlation coefficient in combination with the clustering method average linkage *within* groups. The results of the agglomerative hierarchical clustering for *action* comprise the random sample and the selected sample of VNA/SAL pharmacies. Both samples are presented separately. Within the presentation of the results the three pharmacy mixes are described: the product mix for pharmaceutical activities, the process mix for financial-economic activities and the customer mix for customer activities. Below decisions related to the cluster analysis are described.

*A total number of sixteen basic clusters of activities of pharmacy mixes the result of the agglomerative hierarchical clustering (**table 24**). This first step in the clustering was compared with the actual ratio scores, which were used for the clustering. The results showed that each basic cluster related to the rank of scores on the pharmacy-mix-related questions. In a cluster with product-process-customer, product questions scored highest, then process questions and finally customer questions. For example, case 19 (third column, second cell) in **table 24** was classified in the cluster product>process>customer. Within this cluster the pharmacy-mix-related ratio score of product-related activities was highest. The second highest score were process-related activities and then customer-related activities. These results show that the pharmacy manager of case 19 performed most pharmaceutical activities (product ratio score of .77 meaning that 77% of all product questions were answered with 'yes'), followed by financial-economic activities (process ratio score of .67) and customer activities (customer ratio score of .51). Comparison of the clustering and the ratio scores showed that 7 cases were in the `wrong' cluster. However, the clustering made by the cluster analysis was used as a starting point in the quest for an explanation. It was presupposed that no clusters should be added to the 16 basic clusters calculated by the agglomerative hierarchical cluster analysis, presented in table 24. An explanation for the 'wrong' positions was found.*

*The 7 individual cases (**bold** and <u>underlined</u> in figure 6.) were analyzed again. A total of 5 cases were positioned in another cluster with similar scores of two of the pharmacy mixes. Since the applied cluster analysis clusters cases based on the form of the score, some of the differences were minimal. Cluster analysis clustered both clusters together, based on the similarities between the scores of two variables. For example, case 76, 1014 and 1032 were positioned in basic cluster 3, in which the product scores and the process scores were similar. However, for these cases the scores of process were highest. Cluster 9 seemed to be a good alternative for these cases, having exactly the right shape of (process≈product)>customer. Case 76, 1014 and 1032 were replaced to cluster 9. In addition, case 48 and 122 were positioned in basic cluster 5 in which the product scores and the process scores were similar. Cluster 2 seemed to be a good alternative for these cases, having the right shape of product>process≥customer, in which the process score was higher than the customer score. Case 48 and 122 were replaced to cluster 2. Finally, case 79 and 115 were positioned in basic cluster 10 in which the product scores and the customer scores were similar. However, no cluster seemed to be a good alternative for these cases, having the right shape of process>(customer≈product), in which the customer score was higher than the product score. It was presupposed that no basic clusters should be added. Case 79 and 115 remained in cluster 10. As a result of the clustering, 5 out of 7 cases were corrected. A total of 3% (5) of all clustered cases was replaced. In addition, 2 cases remained in their original position since no alternative cluster could be found.*

basic cluster[18]	**rank**[19]	**case** (random sample n=150)	**case** (selected sample n=27)

[18] The separate clusters are the first clusters produced with the agglomerative hierarchical clustering using the cluster method average linkage within groups and using the similarity measure Pearson correlation.

[19] Mainly, the first pharmacy mix mentioned had the highest score. The applied symbols are: > and < for larger and smaller than, and for larger and almost equal to and smaller and almost equal to, (mix1 mix2) two mix scores being almost equal.

1.	***product>process>customer***	case 19, 21, 27, 64, 68, 77, 90, 95, 97, 106, 125, 129, 138, 157, 166, 171, 173, 205, 220, 224, 242, 249, 259, 282, 287, 290, 293, 299	case 1016, 1019, 1025, 1028
2.	***product>process≥customer***	case 33, 52, 73, 82, 101, 102, 118, 123, 160, 162, 177, 185, 201, 215, 296	case 1005, 1015, 1023, 1030
3.	***(product≈process)>customer***	case 1, 7, 28, 43, 49, 67, 71, **76**, 78, 105, 107, 126, 194, 214, 221, 226, 271	case 1001, **1014**, 1022, **1032**
4.	***product>customer>process***	case 8, 51, 61, 69, 99, 116, 143, 165, 167, 189, 196, 218, 223, 228, 246, 260, 291	
5.	***product>customer≥process***	case 30, **48**, 62, 80, 91, 104, **122**, 130, 164, 184, 187, 191, 263, 265, 278, 295	case 1002
6.	***(product≈customer)>process***	case 57, 96, 176	
7.	***(customer≈product)>process***	case 45, 74, 163	
8.	***process>product>customer***	case 11, 22, 44, 54, 55, 109, 111, 148, 159, 192, 230, 234, 236, 254, 273, 275, 280, 284	case 1003, 1004, 1008, 1010, 1024, 1029
9.	***(process≈product)>customer***	case 5, 42, 53, 60, 89, 110, 114, 133, 147, 210, 239, 256, 283	case 1007, 1021, 1026, 1033
10.	***process>(product≈customer)***	case 3, 41, **79**, **115**, 179, 188, 241, 294	case 1006, 1027
11.	***process≈product≈customer***	case 87, 213, 297	case 1012
12.	***customer≥(product=process)***	case 9, 36, 50, 207	
13.	***customer>(product≈process)***	case 139, 231	
14.	***customer>(process≈product)***	case 251	
15.	***customer≈process≈product***	case 186	case 1031
16.	***customer>process>product***	case 276	
	total cases *action*	**150 cases**	**27 cases**

Table 24. Basic clustering of pharmacy mix ratio scores for ***action*** in the random sample and the selected sample

The next step the was to refine the corrected clustering of the sixteen basic clusters into five clusters; the data reduction to five clusters showed a clear description of the ranking in the pharmacy-mix-related scores. ***Figure 25.*** *shows the five clusters product-process-customer (cluster 1-3), product-customer-process (cluster 4-7), process-product-customer (cluster 8-11), customer-product-process (cluster 12-14) and customer-process-product (cluster 15-16).*

cluster	**rank**	**case** (random sample n=150)	**case** (selected sample n=27)
1.	***product-process-customer***	case 1, 7, 19, 21, 27, 28, 33, 43, 48, 49, 52, 64, 67, 68, 71, 73, 77, 78, 82, 90, 95, 97, 101, 102, 105, 106, 107, 118, 122, 123, 125, 126, 129, 138, 157, 160, 162, 166, 171, 173, 177, 185, 194, 201, 205, 214, 215, 220, 221, 224, 226, 242, 249, 259, 271, 282, 287, 290, 293, 296, 299 **61**	case 1001, 1005, 1015, 1016, 1019, 1022, 1023, 1025, 1028, 1030 **10**
2.	***product-customer-process***	case 8, 30, 51, 57, 61, 62, 69, 80, 91, 96, 99, 104, 116, 130, 143, 164, 165, 167, 176, 184, 187, 189, 191, 196, 218, 223, 228, 246, 260, 263, 265, 278, 291, 295 **34**	case 1002 **1**
3.	***process-product-customer***	case 3, 5, 11, 22, 41, 42, 44, 53, 54, 55, 60, 76, 79, 87, 89, 109, 110, 111, 114, 115, 133, 147, 148, 159, 179, 188, 192, 210, 213, 230, 234, 236, 239, 241, 254, 256, 273, 275, 280, 283, 284, 294, 297 **43**	case 1003, 1004, 1006, 1007, 1008, 1010, 1012, 1014, 1021, 1024, 1026, 1027, 1029, 1032, 1033 **15**
4.	***customer-product-process***	case 9, 36, 45, 50, 74, 139, 163, 207, 231 **9**	
5.	***customer-process-product***	case 186, 251, 276 **3**	case 1031 **1**
	cases *action*	**150 cases**	**27 cases**

Table 25. Refined clustering of pharmacy mix ratio scores for ***action*** in the random sample and the selected sample

For the clustering the form of the scores on the three mixes was essential (**figure 3.**). The results of the random sample for *action* in table 25 show that most pharmacy managers had the highest score on product activities or process activities. A total of 63% (161+34) show that most pharmacy managers had the highest score on product activities in cluster 1 and 2. A total of 29% (43) show that most pharmacy managers had the highest score on process

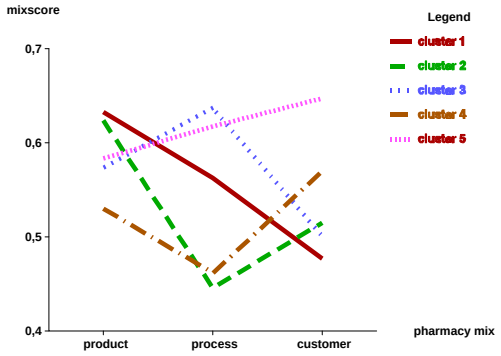

Figure 3. The mean score per pharmacy-mix ratio per cluster.

activities in cluster 3. A total of 8% (9+3) show that most pharmacy managers had the highest score on customer activities in cluster 4 and 5. Most scores (69%) were a combination of product activities and process activities in the first two scores in cluster 1 and 3.

In addition, a rough sketch of generizability was made. With a level of confidence of 95% the number of cases per cluster in the population was estimated with hypergeometric confidence bounds, similar to the method for thought, based on the observed number of cases per cluster in the random sample.

Firstly, the number of pharmacies in the observed rank product-process-customer with 61 cases in the sample was estimated for the population. The estimation of the number of pharmacies in the population of Dutch pharmacies was between 513 (34%) and 736 (48%) pharmacies (**cluster 1, figure 4.**). Secondly, the number of pharmacies in the observed rank product-customer-process with 34 cases in the sample was estimated.

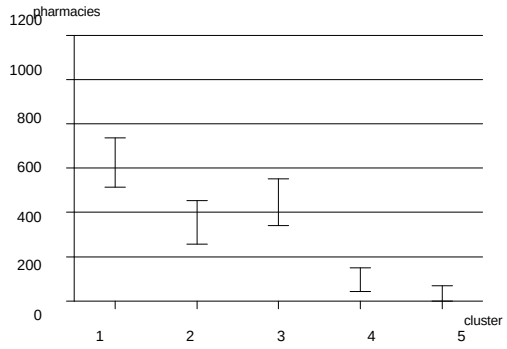

Figure 4. The estimated confidence bounds per cluster for *acting* in the population.

The estimation of the number of pharmacies in the population of Dutch pharmacies was between 258 (17%) and 452 (30%) pharmacies in cluster 2. Thirdly, the number of pharmacies in the observed rank process-product-customer with 43 cases in the sample was estimated. The estimation of the number of pharmacies in the population of Dutch pharmacies was between 340 (22%) and 553 (36%) pharmacies in cluster 3. Fourthly, the number of pharmacies in the observed rank customer-product-process with 9 cases in the sample was estimated. The estimation of the number of pharmacies in the population of Dutch pharmacies was between 43 (3%) and 149 (10%) pharmacies in cluster 4. Fifthly, the number of pharmacies in the observed rank customer-process-product with 3 cases in the sample was estimated. The estimation of the number of pharmacies in the population of Dutch pharmacies was between 1 (0%) and 69 (5%)

pharmacies in cluster 5.

The results of the random sample for *action* in table 7 showed that most pharmacy managers performed product activities or process activities. The estimation of the number of pharmacies with a first rank for the product mix, in the population of Dutch pharmacies, was between 849 (56%) and 1077 (71%) pharmacies (**first rank: product, figure 5**). The estimation of the number of pharmacies with a first rank for the process mix was between 340 (22%) and 553 (36%) pharmacies (first rank: process). The estimation of the number of pharmacies with a first rank for the customer mix was between 63 (4%) and 195 (13%) pharmacies (first rank: customer). The estimation of the number of pharmacies with product or process in the first two ranks was between 950 (63%) and 1163 (77%) pharmacies.

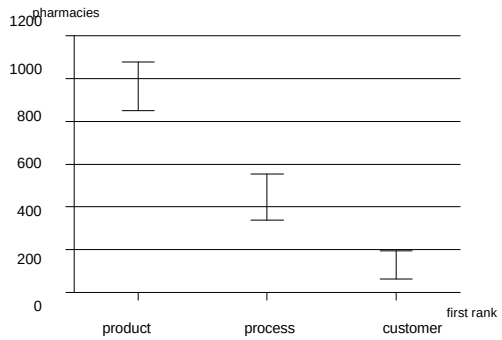

Figure 5. The estimated confidence bounds per rank for *acting* in the population.

Finally, reliability was tested with Cronbach's alpha similar to the pilot study. The test was applied to *action* of pharmacy managers.

The reliability test of Cronbach's alpha can be interpreted as a squared correlation coefficient, it ranges in value from 0 to 1. All items related to a certain pharmacy mix were tested separately. The pilot study described that large reliability coefficients could be produced, even when the average inter-item correlation was small, if the number of items on the scale is large enough. Within this study the total number of items was large. As a result the alpha for the product mix, the process mix, the customer mix and the remaining questions was .83, .90, .88 and .92 respectively. The alpha value of the remaining questions was highest, indicating that the applied scale was used in the most consistent way, and, therefore relatively reliable.

The presented results showed that the applied method for **action** seemed to be good with respect to reliability.

Correspondence of the results

In what way do the results of *thought* and *action* correspond? The estimation of the number of pharmacies with a complete correspondence between *thought* and *action*, in the population of Dutch pharmacies, was between 167 (11%) and 329 (22%) pharmacies (**rank correspondence: complete, figure 6.**). The estimation of the number of pharmacies with a correspondence in the first rank was between 275 (18%) and 464 (31%) pharmacies (rank correspondence: first rank). The estimation of the number of pharmacies with a correspondence in the second rank was between 184 (12%) and 349 (23%) pharmacies (rank correspondence: second rank). The estimation of the number of pharmacies with a correspondence in the third rank was between 158 (10%) and 312 (21%) pharmacies (rank correspondence: third rank). The estimation of the number of pharmacies with a *no* correspondence in any rank was between 331 (22%) and 529 (35%) pharmacies (rank correspondence: no). In addition, the results of *thought* and *action* showed some remarkable differences. Within the complete rank (for example case 28 in the rank product-process-customer, second column table 26) the results of *thought* and *action* corresponded for 16% (28) of the pharmacy managers. The rank of the first pharmacy mix (for example product for case 62, second column table 26) corresponded for 24% (40) of the pharmacy managers. The rank of the second pharmacy mix (for example product for case 44, sixth column for thought and fourth column for action in table 26) corresponded for 17% (29) of the pharmacy managers. The rank of the third pharmacy mix (for example customer for case 22, second column for thought and fourth column for action in table 26) corresponded for 15% (25) of the pharmacy managers.

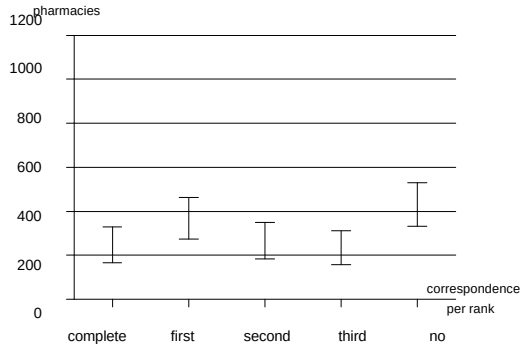

Figure 6. The estimated confidence bounds of correspondence between *thinking* and *acting* in the population.

rank[20] **method**	***product process customer***	***product customer process***	***process product customer***	***process customer product***	***customer product process***	***customer process product***	***product= process= customer***
thought	case 22, 28, 49, 62, 64, 74, 104, 192, 259, 265, 283, 299, 1012 **13**	case 3, 5, 7, 8, 11, 21, 30, 36, 41, 48, 50, 52, 54, 57, 60, 61, 68, 71, 73, 78, 79, 80, 82, 87, 91, 96, 99, 105, 106, 118, 122, 125, 126, 129, 138, 139, 143, 159, 160, 162, 163, 164, 166, 167, 171, 173, 176, 177, 184, 185, 187, 189, 194, 196, 201, 207, 210, 214, 215, 218, 221, 224, 226, 230, 231, 239, 242, 256, 260, 273, 278, 280, 282, 294, 1003, 1005, 1030, 1031 **78**	case 90, 1014, 1026 **3**	case 157, 276, 1019 **3**	case 1, 9, 19, 33, 43, 44, 45, 51, 69, 76, 77, 97, 101, 109, 111, 115, 116, 130, 133, 147, 148, 165, 179, 186, 188, 191, 205, 213, 223, 228, 234, 236, 246, 249, 251, 263, 271, 275, 284, 287, 290, 291, 293, 295, 296, 1001, 1002, 1004, 1006, 1007, 1010, 1015, 1016, 1022, 1024, 1029, 1032, 1033 **58**	case 27, 55, 89, 123, 220, 297, 1008, 1021, 1023, 1025, 1027, 1028 **12**	case 241, 254 **2**
action	case 1, 7, 19, 21, 27, 28, 33, 43, 48, 49, 52, 64, 68, 71, 73, 77, 78, 82, 90, 97, 101, 105, 106, 118, 122, 123, 125, 126, 129, 138, 157, 160, 162, 166, 171, 173, 177, 185, 194, 201, 205, 214, 215, 220, 221, 224, 226, 242, 249, 259, 271, 282, 287, 290, 293, 296, 299, 1001, 1005, 1015, 1016, 1019, 1022, 1023, 1025, 1028, 1030 **67**	case 8, 30, 51, 57, 61, 62, 69, 80, 91, 96, 99, 104, 116, 130, 143, 164, 165, 167, 176, 184, 187, 189, 191, 196, 218, 223, 228, 246, 260, 263, 265, 278, 291, 295, 1002 **35**	case 3, 5, 11, 22, 41, 44, 54, 55, 60, 76, 79, 87, 89, 109, 111, 115, 133, 147, 148, 159, 179, 188, 192, 210, 213, 230, 234, 236, 239, 241, 254, 256, 273, 275, 280, 283, 284, 294, 297, 1003, 1004, 1006, 1007, 1008, 1010, 1012, 1014, 1021, 1024, 1026, 1027, 1029, 1032, 1033 **54**		case 9, 36, 45, 50, 74, 139, 163, 207, 231 **9**	case 186, 251, 276, 1031 **4**	

Table 26. Table of correspondence for *thought* and *action*

[20] In table 26, 6 cases (case 190, 197, 204, 272, 1009 en 1017) with results for *action* only, and 8 cases (case 42, 53, 67, 95, 102, 107, 110 en 114) with results for *thought* only, were not included. An analysis of correspondence was not possible with the result of one method. As a result a total of 169 cases were used in the analysis for correspondence.

Some pharmacy managers are complete consistent. Table 26 shows complete correspondence if a case number is presented for *thought* and *action* in the same column; for example, case 64 in the second column, and case 8 in the third column. Out of 28 complete consistent pharmacy managers 86% (24) have product in the first rank. A combination of product and customer was observed for 75% (21) of all pharmacy managers with consistent positions. Pharmacy managers with consistency for the first mix (40) have product in the first rank for 95% (38) of all first-rank-only consistencies. A combination of product and customer was observed for 93% (37) of all pharmacy managers with first-rank-only consistency. Pharmacy managers with consistency for the second pharmacy mix (29) and third pharmacy mix (25), and, in addition with a complete *in*consistent position (47), have customer in the first rank for 65% (66) of all (partial) *in*consistent positions. A combination of customer and product was observed for 77% (78) of all pharmacy managers with first-rank-only consistency.

A first-rank-only analysis shows that product and customer were perceived as the most important pharmacy mixes in the method for *thought*. However, most activities were observed at product and process in the method for *action* (figure 7.). In addition, in the method for *thought* pharmaceutical tasks were perceived as the most important issues (table 27). The results of the method for *action* showed that pharmaceutical tasks were performed most frequently. Most pharmacy managers managing consistently, managed in the product mix mainly. Out of 28 consistent steering pharmacy managers, 24 managers had product in the first rank. Most pharmacy managers managing *in*consistently,

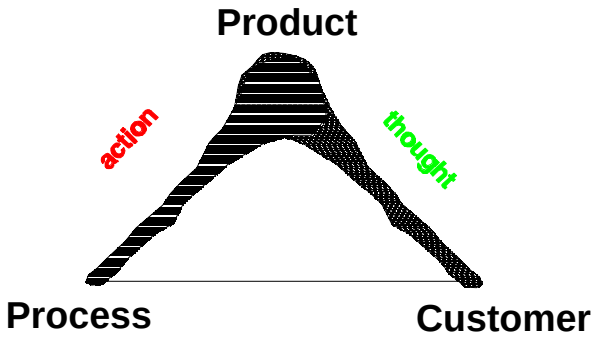

Figure 7. The triangle with the main result of the correspondence between *thinking* and *acting*.

managed in the customer mix mainly. Out of 47 complete *in*consistent steering pharmacy managers, 24 managers had customer in the first rank.

rank method	*product process customer*	*product customer process*	*process product customer*	*process customer product*	*customer product process*	*customer process product*	*product= process= customer*	total
thought	14 cases	82 cases	3 cases	3 cases	59 cases	12 cases	2 cases	175 cases
action	71 cases	35 cases	58 cases		9 cases	4 cases		177 cases

Table 27. Table with frequencies for *thought* and *action*

Conclusion and discussion

The response was reasonable for the random sample: 47% (142). The response for the selected sample of VNA/SAL pharmacies was good with 82% (27). The response for the random sample and the selected sample was reasonable: 51% (169 out of 333 invited pharmacies).

The results of *profile* in the random sample show that the results have a good correspondence with the distribution of the population. The applied questions in the random sample show that the random sample is a good representation of the population of Dutch pharmacy managers.

The results for *thought* show that most pharmacy managers perceived product and customer as the most important pharmacy mixes. For 47% (82) of the pharmacy managers the rank product-customer-process was observed. Additionally, for 34% (59) of the pharmacy managers the rank customer-product-process was observed. For the remaining 19% (34) another rank was observed. Of these other ranks, 15% (26) gave product or customer a first rank. It was concluded that most pharmacy managers (55%) selected the product mix as the most important pharmacy mix. In addition, a large number of pharmacy managers (41%) perceived customer as the most important pharmacy mix. Only 4% of the pharmacy managers perceived the process mix as the most important pharmacy mix. The results for *thought* show that product and customer were perceived as the most important activities.

The results for *action* show that most pharmacy managers performed product

activities and process activities. For 40% (71) of the pharmacy managers the rank product-process-customer was observed. Additionally, for 32% (56) of the pharmacy managers the rank process-product-customer was observed and for 20% (36) of the pharmacy managers the rank product-customer-process was observed. For the remaining 8% (14) another rank was observed. Of these other ranks, 5% (3) performed process activities mostly. It was concluded that most pharmacy managers (60%) performed activities related to the product mix. In addition, a large number of pharmacy managers (34%) performed activities related to the process mix mostly. Only 6% of the pharmacy managers performed activities related to the customer mix. The results for *action* show that most activities performed were related to product and process.

The complete rank of *thought* and *action* corresponded for 16% (28) of the pharmacy managers. The correspondence of the first rank only was observed for 24% (40) of the pharmacy managers. For the remaining 60% (101) the results did not correspond partially (54) or did not correspond completely (47). As a result, *thought* and *action* of most pharmacy managers do not correspond. Most pharmacy managers managing consistently (28), managed in the product mix mainly (24). Most pharmacy managers managing *in*consistently (47), managed in the customer mix mainly (24). However, could it be that questions related to the product mix were more reliable than questions related to the customer mix? It was accepted that the questions for both the product mix and the customer mix were reliable since the differences between Cronbach's were minimal (for product and customer .78 for .72 for *thought* and .83 and .88 for *acting* respectively).

As described earlier [1], Organization Theory showed that this result could be expected. Mintzberg [5 6] describes the difference between 'intended strategy' and 'realized strategy', within the APOM-project studied as *thought* and *action*. Another study [7] showed that people don't act in correspondence with their espoused theory. The actual behaviour is another theory, the theory in use. The theory in use must be traced back from behaviour. The theory in use does not correspond with the espoused theory. Argyris argued that people are not aware of this behaviour. It is assumed that even if people would be aware, the differences would be present still.

Within this study, *non* correspondence of *thought* and *action* was observed. It seems acceptable to assume that the espoused theory and the theory in use were visualized within the APOM-project. Contrasty, it can also be argued that social desirability was of importance in the results. Social desirability means that the answers of respondents are also determined by what they think the researcher will value as a good answer [8], or the other way around, that there are certain facts or events that respondents rather would not report accurately (...).

The community pharmacy branch suggests that pharmacy managers change from the product mix and concentrate more on (positive) customer activities. Contrasty, the negative publicity in the media and statements of the government suggest that pharmacy managers concentrate on (negative) process activities. Within this argumentation a 'good' answer would be the customer mix and a 'bad' answer would be process mix. Some measures were made to avoid a penetration of this problem in the survey. Firstly, a privacy regulation was sent with the survey to secure confidentiality and anonymity. Secondly, careful attention was given to minimize a sense of judgement; consistency was the main issue studied. A leaflet was added to the survey to describe the background of the study and explain why all three pharmacy mixes were legitimate positions to 'produce' good quality. Did pharmacy managers, in spite of this effort to avoid social desirability, prefer the customer mix and avoid the process mix in the survey?

The results of *thought* showed that 71 pharmacy managers had the 'positive' customer mix in the first rank, and 6 pharmacy managers had the 'negative' process mix in the first rank. Per question a link to the pharmacy mix was explicitly described in the relatively short questionnaire (26 questions); a sense of judgement was possible. However, with the covering letter a description was made that *thought* and *action* were sent separately and that differences in outcome would be of main interest. It is expected that pharmacy managers knew that answers of *thought*, so also social desirable answers, would be proofed in *action*. In this construction less incentives, to give social desirable answers, were expected to be present. In addition, as mentioned before, the interviews in the quasi-experiment showed that 81% (26) of the participating pharmacy managers agreed with the mean rank. Some other 16% (5) of the pharmacy managers agreed with the result,

but described difficulties in making choices between the pharmacy mixes. Only 3% (1) of the pharmacy managers disagreed and expected the process mix to be in the third position of the rank, in stead of the second position. Finally, if the customer mix was perceived as positive, most pharmacy managers were expected to be in the customer mix. The results show that still 57% (96) of the pharmacy managers were observed in the product mix.

The results of *action* showed that 13 pharmacy managers had the 'positive' customer mix in the first rank, and 58 pharmacy managers had the 'negative' process mix in the first rank. Per question the link to the pharmacy mix was not described but hidden in the long questionnaire (386 questions); a sense of judgement was hardly possible. However, if the questions related to the process mix would have been discovered and valued negatively, the number of pharmacy managers with a first rank for the process mix would expectedly be lower. Consequently, the number of pharmacy managers with a first rank for the customer mix should be higher.

The results of *thought* and *action* showed that *non* correspondence was observed. Social desirability was not expected to be present in the overall result since the result would be very negative if the pharmacy mixes were linked to the discussion of the 'good' customer answers and 'bad' process answers. It is assumed that the results of *thought* have visualized intensions, the intended strategy of Mintzberg [5 6]. The pharmacy manager has not yet 'arrived' in the *action* of the customer mix, the realized strategy. In addition, in relation with the espoused theory and theory in use, it is assumed that the espoused theory (*thought*) and the theory in use (*action*) were visualized within the APOM-project. The pharmacy manager is probably unaware of the differences between *thought* and *action*. It is assumed that even if people would be aware, the differences would be present still. However, related to the issue of espoused theory and theory in use a question rises. Why was this study made if the result, *non* correspondence between *thought* and *action* of pharmacy managers, could be expected? Explanations point in the direction of the next phase of the study, the follow-up study, and the special features of pharmacy organization as compared with other organizations.

The travel to the customer mix is subject matter of the next phase of the study. Both results of *thought* and *action* are required to make intensions and actions explicit before a travel to the customer mix. Before a travel is made information about the recent location and destination are required. In an earlier study [2] a destination, the customer mix, was described. However, where is the pharmacy manager at the moment? Information with respect to importance (*thought*) and performance (*action*) of activities is required. A major managerial task is to create commitment within the organization for the travel. Within this context, the results of *thought*, the perceived importance of activities in the mind of the manager, are not sufficient. It is a start for a travel to the customer mix. The personnel needs to get involved also. Additionally, the results of *action* show in what position the pharmacy manager is at the moment.

Within the field of Management and Organization the subject of the study, the community pharmacy in the Netherlands, is special. In the APOM-project, the applied organizational model was used to find answers to questions, within the specific setting of the Dutch community pharmacies. Differences between *thought* and *action* are predictable within Organization Theory and Business, but are special when applied to the Dutch Community pharmacy sector [1 2]. In relation with the description of the three pharmacy mixes and the organizational change to the customer mix mentioned in an earlier study [2], it was assumed that similar issues will be present in other branches also. The described customer and process activities are closely related within Organization Theory and Business. However, within the APOM-project a contrast between customer and process activities was observed. That is special and was studied here. The Dutch pharmacy manager works in a politicized line of business. The relation customer and process is problematic [9]. Normally, within the field of Management and Organization a customer orientation is expected to lead to an improved financial position. For example, in a supermarket customer activities are perceived as important in order

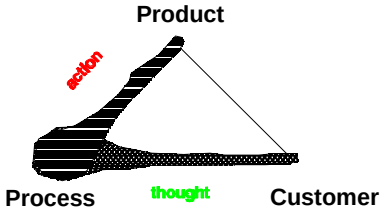

Figure 8. An example of a triangle for a supermarket manager in the correspondence between *thinking* and *acting*.

to achieve profit and to gain continuation of the organization. In this situation, one would expect major importance given to financial activities in close relation with customer activities like in figure 8. The results of the APOM-project showed other perceptions of importance. Customer and process were not related in perceived importance. A relation between product and customer was found. The professional quality of the pharmacy manager was perceived as the most important issue here, and not profit. Some questions rise. Why is professional quality of major importance? and Why is there missing link between customer and process?

The study showed that most consistent positions were found within the product mix. A possible explanation for the importance of the product mix is that, the pharmaceutical activities in both *thought* and *action* relate to the product-oriented tradition of the profession. The product mix relates to the field in which pharmacy managers are well educated and trained. It is their main purpose. The historic conception of pharmaceutical tasks of the community pharmacist is still of great importance in education, work and mind of pharmacy managers. In addition, customers, physicians and government require a maximum of high professional quality. The pharmaceutical expertise is conditional for process and customer. Consequently, organizational change to the customer mix in the next phase of the study is expected to be a difficult matter since the product mix is still the pivot of pharmacy organization.

It was described that the missing link between customer and process is a special feature in comparison with other organizations. An explanation for the missing link is given below. A possible explanation is that making profit by selling medicine to ill people is perceived to be not very ethical. Consequently, the public debate related to financial issues for pharmacies is mostly negative. It seems plausible that pharmacy managers secure their market share by stressing the customer mix and avoiding related financial issues. In addition, the power of pharmaceutical tasks controls the second and third position of priority. Given the negative associations with financial activities, the customer mix seems to be a better second option than process mix. In relation with the negative publicity in the media and statements of the government, mentioned before, it is suggested that pharmacy managers concentrate on (negative) process activities. In contrast, the community pharmacy

branch suggests that pharmacy managers concentrate on (positive) customer activities. The study showed a difference in nuance for both positions. Remarkable is that most *in*consistent positions were found within the process mix and the customer mix. It is expected that the specificity of this observed *in*consistency in the community pharmacy will make a qualification of the travel to the customer mix hard. These results show that pharmacy managers are neither strong organized with respect to process and customer. Consequently, statements of the government ánd statements of the community pharmacy branch, mentioned above, seem to have little proof.

The missing link between customer and process showed that the pharmacy organization has special features in comparison with other organizations. The traditional conception of the work in the community pharmacy is still vividly present. It can be concluded that pharmacy managers steer their organization well with respect to *thought* and *action* with the product-related issues, but have a lot to learn with respect to process-related issues with respect to thought and customer-related issues with respect to action. The organization of the customer mix within the Dutch community pharmacy sector is a difficult matter. Problems in 'making' pharmacy managers more customer oriented is well known. It is expected that the strong consistency in the product mix and the *in*consistency in the customer mix will handicap the travel to the customer mix.

In a smaller group of pharmacies (n=64) the travel of pharmacy managers to the customer mix will be studied in a quasi-experiment in the next phase of the APOM-project. The difficulty in travelling to the customer mix was stressed by the traditional importance of the pharmaceutical tasks, and the specificity of the observed *in*consistency. Within this quasi-experiment, four groups of 16 pharmacy managers will receive different stimuli. In this phase of the study a longitudinal approach will be applied.

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