

A System for Selling and Planning Zoned Inserting

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Abstract: For most newspapers, advertising is and will continue to be the most important source of revenue. Advertisements are typically printed on the pages of the newspaper. Inserting and geographically-targeted inserting are other ways to advertise and are gradually being introduced in Europe. However, the offering of geographically-targeted inserting for small zones causes big changes in all the phases of the production chain. Specialised systems support is required to manage this.

VTT Information technology has developed a system prototype to support the selling and planning of zoned inserting. The following paper presents the complexity of this task and describes how the system handles it and supports users in making the right decisions. The system helps in the co-ordination of printing, inserting and distribution. It also makes it possible to store inserting-related production knowledge into the system for everybody to utilise. It is a web-based system with a browser interface to enable selling from remote locations. The advertising selling and booking processes are becoming electronic and this also has an effect on the system requirements. This aspect is also discussed in the paper.

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Introduction

Advertising is a significant source of revenue for newspapers. Advertisements are normally printed on the pages of a newspaper and delivered in an identical manner to all readers. Inserts are an alternative way of advertising. Inserts offer a wider variety of options than normal ads in terms of paper stock, colours, size and page count. In addition, it is not necessary to have the same inserts in all copies of an issue. Present inserting technology allows the creation of different insert combinations for different subscriber groups.

There is a strong trend towards personalised advertising. The electronic media, such as the internet and mobile phones, make it possible to create very personalised advertising, which is a challenge that newspapers have recognised. The offering of personalised advertising is, however, very different from the way newspapers are used to operating. Newspapers have been one of the main mass media and their advertisements are typically used to get the attention of large audiences. Therefore, it may be wise not to jump directly to the other extreme, but instead to explore options that utilise some of the existing process knowledge in newspapers.

Geographically-targeted advertising is an option that offers some of the benefits of personalised advertising, but which is not completely different from the way newspapers are used to operating. Although it does not make it possible to reach selected individuals who have certain interests or characteristics, it does obviate the requirement for newspapers to obtain detailed information on such individuals. It is important to remember that the most critical requirement for effective personalised marketing is the availability of reliable and detailed information on certain persons. Unfortunately, this kind of information is expensive and difficult to get, and even more so to keep up-to-date. There are also many restrictions on collecting and storing personal data, particularly in Europe. We must remember, too, that the newspaper is not so much a personal product as, for example, the mobile phone is. This also complicates the offering of personalised advertising in newspapers. However, geographically-targeted inserting is a way to allow advertisers to target audiences with more specific profiles, but without excessive requirements for the collecting of subscriber profile information.

Even though geographically-targeted inserting with modern mailroom equipment is a batch-type process similar to the normal production process, it puts new demands on sales and production co-ordination and management, particularly when the size of the zones decreases and the number of zones increases. [Anon, 1997][Falke, 2000]

This paper presents the requirements that geographically-targeted inserting puts on the sales and production planning processes, and presents the system prototype that was developed at VTT Information Technology to support these processes.

Prerequisites for geographically-targeted inserting and requirements for system development

Information

To be able to choose the target zones in a meaningful way, the advertiser and the sales rep need demographic information on the subscribers in different zones. It is possible to buy reliable information on people's characteristics, such as age and income level. However, this information can be obtained only for groups of people, rather than for individuals. Zip codes are the most typical grouping criteria. Newspapers have often acquired demographic information on their readers. Usually the following data is available:

- gender,
- age,
- education and
- household income

This data is supplied by indicating the percentage or number of households or readers in these different categories.

For geographically-targeted inserting, information must be available on the zones offered for selective inserting. This is obtainable, but requires investment.

Another issue to decide is whether demographic information should also be obtained on non-subscribing households. Since inserts can be delivered relatively easily to non-subscribing households, information on them might be useful. The higher the newspaper's coverage is, the less interesting the non-subscribers become, since many advertisers regard them as poor prospects. But as the coverage of newspapers is slowly but steadily declining, this is forcing newspapers to find ways to reach the non-subscribers, too.

We will assume that demographic information is available for the smallest zone level offered to advertisers and that it concerns the number of households or persons in the different categories. The information may be available for both subscribers and non-subscribers.

Technology

Geographically-targeted inserting can be done either in the mailroom by precisely controllable inserting machines, or manually by carriers. In the latter case, it is not necessary to actually insert the inserts into the newspapers. Instead, they can be delivered along with the newspaper.

The main components of a mailroom system for geographically-targeted inserting are:

- a buffer storage between the printing presses and inserters, to eliminate disturbances on either side
- automatic insert storage
- inserters with several infeed stations and a sophisticated control system to allow precise control of which newspapers should have inserts and which should not
- a control system to package the newspapers precisely according to particular delivery routes.

The number of insert infeed stations decisively affects the inserting options the newspaper can offer. If the number of infeed stations is small, only a small number of different inserts and zones can be offered. The number of different inserts during one production run can be increased, if these inserts are fed consecutively from the same infeed station. This is only possible with a pre-defined production order in which there is no requirement to change the inserts back and forth. However, newspaper production people are not eager to accept any new restrictions on production. This is because many disturbances may arise during production runs, and it is important to have as many options as possible to minimise the damage caused by them.

As most printing presses run at higher speeds than the inserter, there are often two or three inserters per press. This increases the number of available insert infeed stations, if production can be organised so that one insert reserves as few infeed stations (and inserters) as possible.

For automatic storage, there are two main alternatives - movable and immovable storage units. With movable units, an outside printer may directly store the inserts into an automatic unit, even though the inserts may be transferred into larger units before the actual inserting process begins. If small insert batches are inserted, it is not practical for more than one inserting machine to be reserved for that insert. Therefore it should be possible to organise production so that certain routes are produced on one predefined inserting machine only. The inserters may have infeed units that are suitable only for automatic infeed or only for manual infeed, or there may also be units that can be used either way. Therefore, it is not

enough only to control the number of different inserts, but also the type of the required infeed station.

In many cases, pre-inserting is done to increase inserting capacity. For geographically-targeted inserting this is not a very practical solution, because it requires detailed control of which inserts each pre-inserted newspaper copy has.

Using carriers to deliver inserts without inserting them into the newspaper copies in the mailroom is an option in three main cases:

- the insert cannot be inserted mechanically because of its size (extreme formats and page counts)
- the insert batch is so small that it is not economical to reserve an infeed station for the batch
- delivery to non-subscribers is required, which reduces the benefit gained from delivering the inserts inside the newspapers. This applies particularly to areas where the subscriber coverage is low.

We assume in the system development that the newspaper is able to offer both mailroom inserting and carrier inserting. We also assume that the newspaper publisher may want to set some limits as to the minimum size of acceptable batches. The limit may be a copy count or a fixed starting price which make extremely small batches very expensive. The inserter is assumed to be able to selectively insert batches, but not single copies.

Distribution

To fully utilise the potential of zoned inserting, the newspaper should have direct control over the distribution system. In this way it is possible to offer all inserting options, including manual delivery by carriers and distribution to non-subscribing households. Finnish newspapers are delivered early to subscribers, usually by 6 a.m. Co-distribution systems are used, which means that only one organisation operates in each area and delivers all the newspapers that want to buy this service.

The keeping of deadlines is emphasised in Finnish newspapers, because reliable delivery is very important in building subscriber loyalty. Therefore, the distribution capacity should also be taken into consideration when accepting insert orders. If inserts are inserted into the newspapers, they usually have only a small effect on the delivery time, unless the newspapers are very heavy or thick, or the inserts have a tendency to fall out. When inserts are delivered as separate units, extra time may be needed. When estimating the available distribution capacity, all those newspapers participating in the early distribution should be taken into consideration. As some newspapers are not published every day, the available capacity will vary from day to day.

To be able to offer attractive zones for insert advertisers, carrier and truck routes should be planned so that the demographic characteristics of the areas are taken into consideration. This may be difficult and, as there are many demographic features, only some of them may be considered. In practice, operating costs and service level must be considered and may even take precedence. The advertising customer will wish to be free to choose any zones that fulfil his or her criteria. In practice, it is difficult to avoid certain cost steps from emerging. For example, if different editions are made of the newspaper either by changing plates during the print run or by printing with two or more presses, a selection that includes zones from all editions will usually cost more to produce than an equal number of zones from one edition.

In system development, one carrier route is considered the smallest selectable zone. In Finnish circumstances, this means 100 to 400 copies (in some areas the routes are small and one carrier takes care of several routes, whereas in other areas one carrier is responsible for only one route). We assume that the adequacy of carrier capacity may be estimated either by estimating the time needed to complete the route or by estimating the total load weights.

Insert sales

During our project, some newspaper publishers were interviewed to see how insert sales and production are managed today, and where the problems are. The main finding was that insert sales often involve many different people and departments - the printer for insert printing, the mailroom for insert storage and inserting, and finally transport and delivery. As the selling of these services is often done by different people, the result may be that no-one has direct responsibility for the order as a whole. [Lymysalo, 1999]

Therefore, we suggest that companies planning to introduce geographically-targeted inserting organise their sales process so that one media salesperson can handle most of the insert reservation steps and that there is a process owner who makes sure that all the different parts of completing the order are carried out as planned. This is where a system tool is helpful. The system used by these people should have all the static and dynamic information that needs to be taken into account when planning and producing an insert.

The buying of advertising space, including inserts, should be made easy for customers. Therefore, newspapers must balance the benefits of offering many options and of making the selection easy and efficient. Zone selection can be made easier by pre-defining the zones on a geographical or demographic basis. To make it possible to transfer order booking data between different systems, XML vocabularies are being developed [Lucenius & al, 2001]. Vocabularies are needed to describe the order as well as the job to be produced [Anon, 2001]. The

offering of geographically-targeted inserts should be designed so that it can be integrated with these intra-company processes. Then large customers could also use their own advertising booking systems for making insert requests. In these cases, the insert order request would be an XML message which is created in the customer's system and then transferred into the insert planning system, and processed there to check if the order can be accepted [Antikainen & Bäck, 2001]. Advertising booking vocabularies are being developed and, hopefully, there will also be suitable vocabularies for newspaper inserts.

Data flows and dependencies

Managing geographically-targeted inserting requires the sharing of information with many systems. Figure 1 lists one possible flow of events when booking inserts and the required data flows.

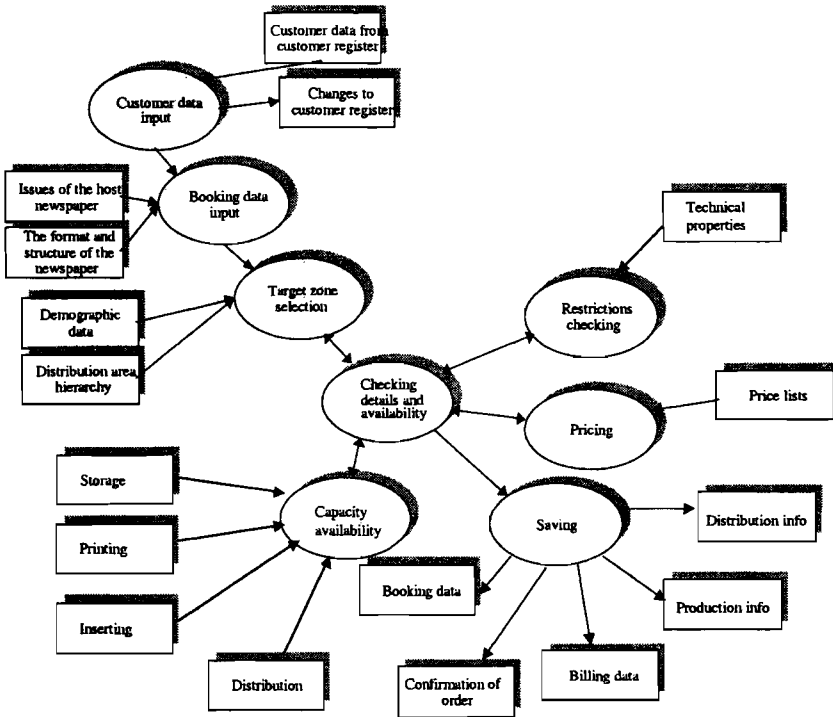


Figure 1. The main tasks and data flows in booking geographically-targeted inserts.

Input data flows

Customer information. The company should have one customer database for its advertising customers, and no separate customer database should be set up for inserting customers.

Subscriber information. The following information is needed for zone selection:

1. the number of subscribers/non-subscribers in each carrier route, and
2. the number of subscribers/non-subscribers with different demographic features in each carrier route.

Newspaper schedules and page counts. To estimate in advance what the total page count of the newspaper and its inserts will be, the system must have information on the planned page counts. Information on the publication dates will also be needed.

Technical production requirements. When the system is initialised, it must be supplied with information on the requirements and restrictions set by the production machinery, and on how the production will be set up (for example, how the presses are reserved for different editions).

Capacity reservations. The system should be built to estimate and store information on how much insert-production-related capacity is reserved for any period. The system must be able to access the necessary capacity reservation information, if this information is not stored in its own database.

Distribution system information. To produce production management information and to manage any production restrictions relating to the production order, the system should have up-to-date information on:

1. the production order of the editions
2. which transport route serves each carrier.

To make sure that carrier capacity is not exceeded - or that necessary corrective measures are taken in advance - information is needed on each route concerning how many and what kind of newspaper copies and inserts are to be delivered, and how much time the carrier has to complete his or her job on time. A formula is needed to make an estimate of the required delivery time. There may also be a technical requirement (for example, the maximum thickness of the copy).

Production feedback. The system should also get feedback on how successfully the insert orders were carried out. This information is needed to inform

customers of problems, if there have been some, and to collect information on product features that should be avoided.

Output data flows

Order confirmation. If the customer requires an order confirmation, it must be sent. The confirmation may also include necessary information on how the insert should be produced. It may also be necessary to transfer information to an outside printer, if one is used for printing the inserts, to give information on the production and delivery requirements.

The information on the insert reservations must be forwarded to *print and mailroom production and distribution management* for two purposes. Since the system is not a complete production planning system, the order information must be reviewed by the production management, particularly when the system indicates that system capacity is close to its maximum. Production personnel can then make detailed scheduling and suggest changes in insert production details, if necessary. The exact zone selection information is needed to produce the production control programs for the mailroom.

Distribution planning personnel should have access to the order information to check the insert load for each day, and to plan corrective actions when there is a risk of running late. Insert information should be transferred into the carrier salary accounting system.

Transport and distribution information. Specific information is needed on inserts in separate distribution, to inform the personnel both in advance and during the actual production night.

Billing. The company should have one billing system for its advertising customers, and no separate billing system should be set up for the inserting customers.

The IZAP system

Our system prototype, the IZAP system, has been built using the so-called three-tier architecture. The main building blocks are the browser (the user interface), the Java servlets (the middle tier) and an SQL database. In the prototype we have collected all the necessary information into our database, but in a real application the connections to existing databases should be established. When the user has the required access rights, it is possible to use the system from any location with Internet access.

IZAP - Selling and planning zoned inserts																			
Reservation																			
Year	2000																		
Month	April																		
	Tue			Wed			Thu			Fri			Sat						
Date	04.04			05.04			06.04			07.04			08.04						
New	<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>						
Edition	itä			itä			itä			itä			itä						
Insert info	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P		
Delivery-itä	Delivery			Delivery			Delivery			Delivery			Delivery						
* itä etelä	■	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0
* itä pohjoinen	■	■	■	0	■	■	1	■	■	0	■	■	0	■	■	0	■	■	0
* itä länsi	■	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0
* itä itä	■	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0
Edition	länsi			länsi			länsi			länsi			länsi						
Insert info	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
Delivery-länsi	Delivery			Delivery			Delivery			Delivery			Delivery						
* länsi etelä	■	■	■	0	■	■	3	■	■	0	■	■	0	■	■	0	■	■	0
* länsi pohjoinen	■	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0
* länsi länsi	■	■	■	0	■	■	2	■	■	0	■	■	0	■	■	0	■	■	0
* länsi itä	■	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0
Edition	pohjoinen			pohjoinen			pohjoinen			pohjoinen			pohjoinen						
Insert info	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
Delivery-pohjoinen	Delivery			Delivery			Delivery			Delivery			Delivery						
* pohjoinen etelä	■	■	■	0	■	■	1	■	■	0	■	■	0	■	■	0	■	■	0
* pohjoinen pohjoinen	■	■	■	0	■	■	2	■	■	0	■	■	0	■	■	0	■	■	0
* pohjoinen länsi	■	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0
* pohjoinen itä	■	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0	■	■	0
Previous												Next							


Figure 2. A 'calendar view' of the booking status. Starting with this view the user may proceed to making a new reservation, modifying existing reservations or viewing the inserts orders for separate delivery.

Figure 2 shows one of the key user interfaces of the system. This view summarises the insert booking status to help users see where there is free capacity and where new orders could be booked. Users have direct access to the insert details, from where they may proceed to modifying them or viewing the delivery status. This view can therefore also be used by delivery supervisors.

When new orders are booked, the main technical characteristics of the inserts must be given. Production restrictions and recommendations may be stored in the system and a check will be made during the booking process to see if the

planned insert meets these requirements. Figure 3 shows the main part of the technical specification page.

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Insert data 

Insert type
 Pre-printed insert
 Also printing required

Insert name

Insert format

Other format (mm) width height

Insert content type
 advertisements
 editorial

Inserting mode

Insert page count

Insert weight g

Paper type

Other type

Paper weight g/m²

Paper grade newsprint magazine paper

Insert finishing

Insert back thickness mm

Incoming inserts ¹

reels from the supplier
reel type
other reel type

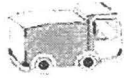
reels from the inserting plant
reel type

pallet

Figure 3. The input form for technical insert details.

IZAP - Selling and planning zoned inserts

Distribution



Inserting and distribution

Inserting and delivery to non-subscribers ▾

Maximum number of available inserts / day

Zone selection

Whole issue

Partial issue

Edition selection

itä ▾

Premade areas:

itä

itä_etela
itä_pohjoinen
itä_lansi
itä_ita

länsi

länsi_etela
länsi_pohjoinen
länsi_lansi
länsi_ita

pohjoinen

pohjoinen_etela
pohjoinen_pohjoinen
pohjoinen_lansi
pohjoinen_ita

Free zone selection

Map

Demographic selection

Demographic data

Figure 4. The selection of the inserting target areas.

Many ways can be used in choosing target areas for the inserts. Our prototype supports the choice of predefined areas at different levels and selections that utilise demographic data. For demographic selections the user may specify which criteria the target group should have and the system lists the zones in their order of superiority. The user may then pick any zones that are regarded as interesting enough.

A map interface would also be helpful in selecting the zones. When the location of a shop is taken as the selection criterion, for example, the map alone can be used to select the zones. But when demographic information is also taken into account, the map combined with searches of demographic data is the preferred combination. A map interface would also be beneficial to distribution planning personnel, helping them to visualise the distribution capacity status and to plan corrective actions.

IZAP - Selling and planning zoned inserts

Results from the inserting request - availability and restrictions

Inserting dates and insert quantities:

Inserting date: 2000-04-04

Area	Inserting quantity	Separate distribution quantity	Total quantity	Quantity to be printed
itá	3016	394	3410	3580
Total:	3016	394	3410	3580

Price:

No room at the inserting machine for area: itá [Redefine date](#)

For this format and pagecount, the paperweight must be between 60-90g/m² This restriction is valid for pagecounts between 4-6 [Redefine the insert](#)

Figure 5. Results of an insert booking request. There are conflicts in both a technical and a capacity matter.

When all the data has been keyed in and the zones have been selected, the system checks if the order can be accepted. Both the technical restrictions as well as the capacity are checked. In the example presented in Figure 5, two problems have been detected (a capacity problem and a technical problem). The user may try to solve the problem by changing the order specification, if possible.

The technical restrictions are easy to handle in a system like this, because numerical limit values can be set. In addition to the absolute requirements that the insert must meet, there may also be some not so precise requirements.

Storage and delivery capacities are such issues, because the capacity may be adjusted or some jobs rescheduled to solve capacity bottlenecks. For example, if there seems to be a problem with the storage capacity, it may be possible to adjust schedules and insert handling methods so that all the required inserts can be processed, even though the rough estimate suggests that there are too few reels. The sales rep needs some guidelines as to whether he/she can accept the order, and, if accepted, the production personnel must be notified of the fact that corrective measures must be planned and taken.

In order to have reliable information on the storage situation, information must be stored on when the inserts have actually arrived in the storage area from an outside printer or from the press. Exact information is also needed on the insert weight, which could be measured and entered in the system at the same time as inserts come into the storage area.

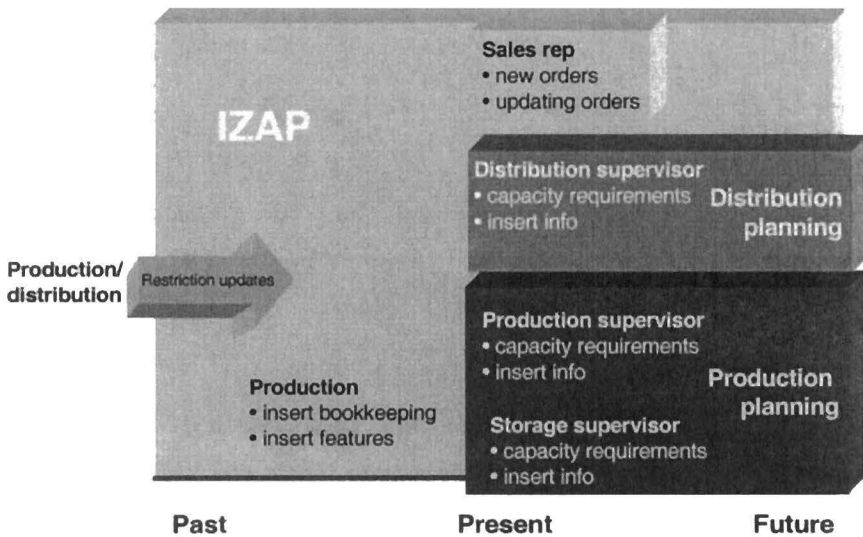


Figure 6. The IZAP system is intended to be the primary tool for sales personnel. The system also supplies production and distribution personnel with information on orders, detailed production plans should be created using other systems.

To summarise, the IZAP system contains functions and information that can be used by the following user groups:

- sales reps who negotiate with customers and make and update customer orders

- big customers who have been authorised to make their reservations directly in the system and to view them there
- production personnel in the printing plant (production planner, storage supervisor)
- distribution personnel (supervisors, carrier salary system).

The system has either the role of the main tool or the role of the source of information that is further processed in other systems (Figure 6). The IZAP system is meant to be the primary tool for the sales people. Using the system, sales reps may book insert orders and modify existing orders. The system helps them by making sure that the inserts can be run successfully from the technical and capacity points of view.

Conclusions and discussion

The idea of geographically-targeted inserting is not new, having been discussed as early as ten years ago. However, there are very few cases where it has been applied in practice, particularly in Europe. To the best of our knowledge, the main reason has been the notion that it is difficult to justify on business terms. Small batches require as much work as large batches at many phases in the sales and production process, and thus the total revenue remains low. The process should be very efficient to handle these small lots in an efficient way. However, changes in the advertising and communications world are forcing newspapers to look for new services for their customers. Geographically-targeted inserting could be a new way for advertisers to reach their best customer prospects.

Increasing the number of inserts is also one way of improving the economy of early distribution. The percentage of fixed costs is very high in early distribution, and therefore by increasing the distribution volume, unit costs may be decreased. This is important for newspapers, allowing them to run early distribution services at a reasonable cost level.

The prototype created in our project is a tool that can be used to ensure that the process requirements are met, to help co-ordinate the insert-related production and to share insert order information. The system estimates the capacity utilisation level and warns when capacity is exceeded. Setting the system up in practice requires close integration with the systems that are already in place and contain some of the information required by the IZAP system. Additionally, a model of how the production is run and the capacity is reserved needs to be built into the system according to the specific production system of each newspaper.

Another important challenge in further developing the system is to facilitate the resolving of conflicts. The system and other tools that can be combined with it

should allow users to easily modify production plans, in order to utilise the available capacity as efficiently as possible.

Newspaper production processes are very complicated, because deadlines are tight and the product is created out of new pieces each night. A lot of information must be exchanged both internally, within the organisation, and externally, to and from the different subcontractors. Therefore good tools are needed not only to collect and share information on the processes and their performance during production planning and production, but also to analyse and improve them. This tool is an option allowing the management of the insert-related aspects of the newspaper production process.

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