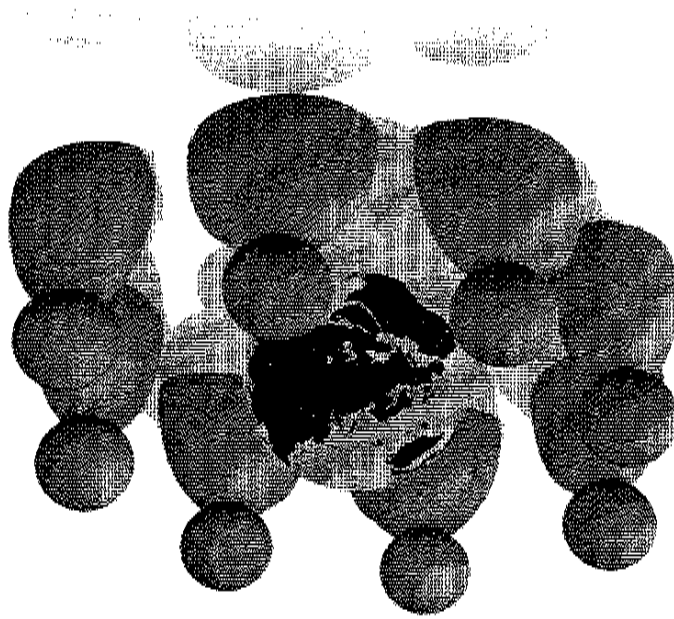


December 3<sup>rd</sup> – 7<sup>th</sup>, 2012



The 1<sup>st</sup> Virtual International Conference

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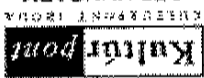
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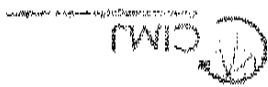
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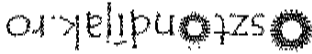
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In the name of the Organizing committee

Finally we would like to say thanks to all participants of this conference. The special thanks belong to authors for their high trust. We also thank all members of the Scientifics Committee for their work during the reviewing process. Our special thanks are due to conference web-administrators, they did excellent work.

We prepared 16 virtual conference rooms, where many discussions have been realized during the conference. From the total amount of 525 received papers the program scientific committee has chosen 440 for the presentation in ARSA virtual Conference. The conference ran continuously during the December 3<sup>rd</sup> - 7<sup>th</sup> 2012 at [www.arsa-conf.com](http://www.arsa-conf.com).

The main motivation of this year's conference edition was "to give the opportunity for a wide range of scientific groups".

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- Informatics
- Information Technology

It is my honor to introduce the new proceedings of the ARSA 2012, which is considered as prestigious, innovative and progressive conference. This year the following main areas have been chosen:



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# Facility Management and IT Support

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## II. METHODOLOGY

The research is based on the Mixed Method Approach (qualitative research paradigm is used for one phase of a study, quantitative research paradigm is used for another phase of the study) to combine qualitative and quantitative research methods. Through the use of this research methodology, it is possible to create a mixture of the best aspects from qualitative (primary qualitative collected data) as well as quantitative (primary quantitative collected data) methods. Based on the Mixed Method Research the study includes qualitative and quantitative research phases. The study consists of four steps. The qualitative steps had the purpose to prepare the next quantitative steps. On the results of the qualitative steps, the questionnaire for the following quantitative steps could be developed. The quantitative studies had the goal to validate the results of the qualitative steps done before [1].

The standardized questionnaire for the survey with closed/quantitative and opened/qualitative questions was subdivided into the parts: Companies in general and FM organisation (for example questions about the industry of the company, number of employees), savings through the use of FM, increase of productivity through the use of FM, cost drivers through the use of FM and IT support (for example questions about the use of a CAFM and ERP System, areas of IT Support).

From the listed Austria's Top 500 companies, 70 companies participated in the survey. Tools for the survey were phone and/or E-Mail. Interviewees of the survey were the Facility Managers themselves or if this position does not exist, the persons responsible for the FM tasks. The data (answers) were entered in a MS Access database and afterwards exported into statistical programmes (SPSS, EViews) and evaluated.

### III. RESULTS/DATA

Examples are the areas of increase in productivity and IT Support (CAFM) as well as areas of cost drivers.

In the evaluation of 2011 "personnel" (13%) was the most named area in which an increase of productivity could be observed, followed by "administration" (11%) and "maintenance/repair" (10%). Reasons for an increase in productivity are (sorted by number of mentions): process optimization, reorganisation, utilization of synergies and employee workload [3].

## I. INTRODUCTION

There are a few existing studies which deal with the efficiency of Facility Management (FM). These studies do not show in detail the economic effects/value added of FM. Also in most cases, the figures are based on the study of only a single company or the data presented is not in specific detail. In this both cases, data cannot be used for a general proof of the economic efficiency/value added of FM [1]. One of the attempts to prove the profitability and efficiency of FM was performed by Susanne Hauk in "Wirtschaftliche von Facility Management". In her study she showed that companies using FM achieve an increase of efficiency and productivity as well as cost savings [2]. This can be confirmed by recent studies.

But FM also creates more cost drivers. According to the statistical analysis based on the (actual) data of the study an own FM department had positive effects on annual savings, especially in the areas cleaning and energy. Actual results show, that savings were possible through technical upgrades, new type of contract, reorganisation and utilization of synergies. In addition, companies with a CAFM (Computer Aided Facility Management) tool tend towards a higher number of cost drivers because of the need to collect and maintain the data [1]. On the other hand tend companies with a CAFM software tend toward a higher number of areas of productivity than companies without a CAFM software. This work focuses primarily on the correlation between IT Support (CAFM) and the cost drivers respectively increase in productivity.

### Facility Management; IT Support; Value Added; Mixed Method Approach

*Abstract* 20% of expenditure is linked to infrastructure (buildings etc.) and services, so the question is what value can Facility Management (FM) add for companies? Since 2005 the Vienna University of Technology (TU Wien) has performed surveys in the area of Facility Management on a yearly basis. Based on Hauk's results (2007) the authors continued the study. Companies for the survey are selected randomly from the Austrian journal "Trend", which publishes a list of Austria's Top 500 companies every year. This paper presents some results, especially FM and IT Support, of the current survey to show the parameters that have positive impact on the efficiency of FM. The research is based on the Mixed Method Approach (one qualitative and one quantitative research step). Based on the research steps hypothesis will be set up and validated.





Figure 4. Number of areas of cost drivers – CAFM software

a. Wilcoxon Signed Ranks Test	
Asymp. Sig. (2-tailed)	p-value
-6,543 <sup>a</sup>	,000
Z	
number of areas of cost drivers - CAFM software	

Test Statistics<sup>a</sup>

a. number of areas of cost drivers - CAFM software		b. number of areas of cost drivers - CAFM software		c. number of areas of cost drivers - CAFM software	
number of areas of cost drivers - CAFM software	number of areas of cost drivers - CAFM software	number of areas of cost drivers - CAFM software	number of areas of cost drivers - CAFM software	number of areas of cost drivers - CAFM software	number of areas of cost drivers - CAFM software
56	0 <sup>a</sup>	56	0 <sup>a</sup>	56	0 <sup>a</sup>
0 <sup>b</sup>	56	0 <sup>b</sup>	56	0 <sup>b</sup>	56
0 <sup>c</sup>	56	0 <sup>c</sup>	56	0 <sup>c</sup>	56
56	0 <sup>d</sup>	56	0 <sup>d</sup>	56	0 <sup>d</sup>
0 <sup>e</sup>	56	0 <sup>e</sup>	56	0 <sup>e</sup>	56
0 <sup>f</sup>	56	0 <sup>f</sup>	56	0 <sup>f</sup>	56
0 <sup>g</sup>	56	0 <sup>g</sup>	56	0 <sup>g</sup>	56
0 <sup>h</sup>	56	0 <sup>h</sup>	56	0 <sup>h</sup>	56
0 <sup>i</sup>	56	0 <sup>i</sup>	56	0 <sup>i</sup>	56
0 <sup>j</sup>	56	0 <sup>j</sup>	56	0 <sup>j</sup>	56
0 <sup>k</sup>	56	0 <sup>k</sup>	56	0 <sup>k</sup>	56
0 <sup>l</sup>	56	0 <sup>l</sup>	56	0 <sup>l</sup>	56
0 <sup>m</sup>	56	0 <sup>m</sup>	56	0 <sup>m</sup>	56
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0 <sup>w</sup>	56	0 <sup>w</sup>	56	0 <sup>w</sup>	56
0 <sup>x</sup>	56	0 <sup>x</sup>	56	0 <sup>x</sup>	56
0 <sup>y</sup>	56	0 <sup>y</sup>	56	0 <sup>y</sup>	56
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0 <sup>bu</sup>	56	0 <sup>bu</sup>	56	0 <sup>bu</sup>	56
0 <sup>bv</sup>	56	0 <sup>bv</sup>	56	0 <sup>bv</sup>	56
0 <sup>bw</sup>	56	0 <sup>bw</sup>	56	0 <sup>bw</sup>	56
0 <sup>bx</sup>	56	0 <sup>bx</sup>	56	0 <sup>bx</sup>	56
0 <sup>by</sup>	56	0 <sup>by</sup>	56	0 <sup>by</sup>	56
0 <sup>bz</sup>	56	0 <sup>bz</sup>	56	0 <sup>bz</sup>	56
0 <sup>ca</sup>	56	0 <sup>ca</sup>	56	0 <sup>ca</sup>	56
0 <sup>cb</sup>	56	0 <sup>cb</sup>	56	0 <sup>cb</sup>	56
0 <sup>cc</sup>	56	0 <sup>cc</sup>	56	0 <sup>cc</sup>	56
0 <sup>cd</sup>	56	0 <sup>cd</sup>	56	0 <sup>cd</sup>	56
0 <sup>ce</sup>	56	0 <sup>ce</sup>	56	0 <sup>ce</sup>	56
0 <sup>cf</sup>	56	0 <sup>cf</sup>	56	0 <sup>cf</sup>	56
0 <sup>cg</sup>	56	0 <sup>cg</sup>	56	0 <sup>cg</sup>	56
0 <sup>ch</sup>	56	0 <sup>ch</sup>	56	0 <sup>ch</sup>	56
0 <sup>ci</sup>	56	0 <sup>ci</sup>	56	0 <sup>ci</sup>	56
0 <sup>cj</sup>	56	0 <sup>cj</sup>	56	0 <sup>cj</sup>	56
0 <sup>ck</sup>	56	0 <sup>ck</sup>	56	0 <sup>ck</sup>	56
0 <sup>cl</sup>	56	0 <sup>cl</sup>	56	0 <sup>cl</sup>	56
0 <sup>cm</sup>	56	0 <sup>cm</sup>	56	0 <sup>cm</sup>	56
0 <sup>cn</sup>	56	0 <sup>cn</sup>	56	0 <sup>cn</sup>	56
0 <sup>co</sup>	56	0 <sup>co</sup>	56	0 <sup>co</sup>	56
0 <sup>cp</sup>	56	0 <sup>cp</sup>	56	0 <sup>cp</sup>	56
0 <sup>cq</sup>	56	0 <sup>cq</sup>	56	0 <sup>cq</sup>	56
0 <sup>cr</sup>	56	0 <sup>cr</sup>	56	0 <sup>cr</sup>	56
0 <sup>cs</sup>	56	0 <sup>cs</sup>	56	0 <sup>cs</sup>	56
0 <sup>ct</sup>	56	0 <sup>ct</sup>	56	0 <sup>ct</sup>	56
0 <sup>cu</sup>	56	0 <sup>cu</sup>	56	0 <sup>cu</sup>	56
0 <sup>cv</sup>	56	0 <sup>cv</sup>	56	0 <sup>cv</sup>	56
0 <sup>cw</sup>	56	0 <sup>cw</sup>	56	0 <sup>cw</sup>	56
0 <sup>cx</sup>	56	0 <sup>cx</sup>	56	0 <sup>cx</sup>	56
0 <sup>cy</sup>	56	0 <sup>cy</sup>	56	0 <sup>cy</sup>	56
0 <sup>cz</sup>	56	0 <sup>cz</sup>	56	0 <sup>cz</sup>	56
0 <sup>da</sup>	56	0 <sup>da</sup>	56	0 <sup>da</sup>	56
0 <sup>db</sup>	56	0 <sup>db</sup>	56	0 <sup>db</sup>	56
0 <sup>dc</sup>	56	0 <sup>dc</sup>	56	0 <sup>dc</sup>	56
0 <sup>dd</sup>	56	0 <sup>dd</sup>	56	0 <sup>dd</sup>	56
0 <sup>de</sup>	56	0 <sup>de</sup>	56	0 <sup>de</sup>	56
0 <sup>df</sup>	56	0 <sup>df</sup>	56	0 <sup>df</sup>	56
0 <sup>dg</sup>	56	0 <sup>dg</sup>	56	0 <sup>dg</sup>	56
0 <sup>dh</sup>	56	0 <sup>dh</sup>	56	0 <sup>dh</sup>	56
0 <sup>di</sup>	56	0 <sup>di</sup>	56	0 <sup>di</sup>	56
0 <sup>dj</sup>	56	0 <sup>dj</sup>	56	0 <sup>dj</sup>	56
0 <sup>dk</sup>	56	0 <sup>dk</sup>	56	0 <sup>dk</sup>	56
0 <sup>dl</sup>	56	0 <sup>dl</sup>	56	0 <sup>dl</sup>	56
0 <sup>dm</sup>	56	0 <sup>dm</sup>	56	0 <sup>dm</sup>	56
0 <sup>dn</sup>	56	0 <sup>dn</sup>	56	0 <sup>dn</sup>	56
0 <sup>do</sup>	56	0 <sup>do</sup>	56	0 <sup>do</sup>	56
0 <sup>dp</sup>	56	0 <sup>dp</sup>	56	0 <sup>dp</sup>	56
0 <sup>dq</sup>	56	0 <sup>dq</sup>	56	0 <sup>dq</sup>	56
0 <sup>dr</sup>	56	0 <sup>dr</sup>	56	0 <sup>dr</sup>	56
0 <sup>ds</sup>	56	0 <sup>ds</sup>	56	0 <sup>ds</sup>	56
0 <sup>dt</sup>	56	0 <sup>dt</sup>	56	0 <sup>dt</sup>	56
0 <sup>du</sup>	56	0 <sup>du</sup>	56	0 <sup>du</sup>	56
0 <sup>dv</sup>	56	0 <sup>dv</sup>	56	0 <sup>dv</sup>	56
0 <sup>dw</sup>	56	0 <sup>dw</sup>	56	0 <sup>dw</sup>	56
0 <sup>dx</sup>	56	0 <sup>dx</sup>	56	0 <sup>dx</sup>	56
0 <sup>dy</sup>	56	0 <sup>dy</sup>	56	0 <sup>dy</sup>	56
0 <sup>dz</sup>	56	0 <sup>dz</sup>	56	0 <sup>dz</sup>	56
0 <sup>ea</sup>	56	0 <sup>ea</sup>	56	0 <sup>ea</sup>	56
0 <sup>eb</sup>	56	0 <sup>eb</sup>	56	0 <sup>eb</sup>	56
0 <sup>ec</sup>	56	0 <sup>ec</sup>	56	0 <sup>ec</sup>	56
0 <sup>ed</sup>	56	0 <sup>ed</sup>	56	0 <sup>ed</sup>	56
0 <sup>ee</sup>	56	0 <sup>ee</sup>	56	0 <sup>ee</sup>	56
0 <sup>ef</sup>	56	0 <sup>ef</sup>	56	0 <sup>ef</sup>	56
0 <sup>eg</sup>	56	0 <sup>eg</sup>	56	0 <sup>eg</sup>	56
0 <sup>eh</sup>	56	0 <sup>eh</sup>	56	0 <sup>eh</sup>	56
0 <sup>ei</sup>	56	0 <sup>ei</sup>	56	0 <sup>ei</sup>	56
0 <sup>ej</sup>	56	0 <sup>ej</sup>	56	0 <sup>ej</sup>	56
0 <sup>ek</sup>	56	0 <sup>ek</sup>	56	0 <sup>ek</sup>	56
0 <sup>el</sup>	56	0 <sup>el</sup>	56	0 <sup>el</sup>	56
0 <sup>em</sup>	56	0 <sup>em</sup>	56	0 <sup>em</sup>	56
0 <sup>en</sup>	56	0 <sup>en</sup>	56	0 <sup>en</sup>	56
0 <sup>eo</sup>	56	0 <sup>eo</sup>	56	0 <sup>eo</sup>	56
0 <sup>ep</sup>	56	0 <sup>ep</sup>	56	0 <sup>ep</sup>	56
0 <sup>eq</sup>	56	0 <sup>eq</sup>	56	0 <sup>eq</sup>	56
0 <sup>er</sup>	56	0 <sup>er</sup>	56	0 <sup>er</sup>	56
0 <sup>es</sup>	56	0 <sup>es</sup>	56	0 <sup>es</sup>	56
0 <sup>et</sup>	56	0 <sup>et</sup>	56	0 <sup>et</sup>	56
0 <sup>eu</sup>	56	0 <sup>eu</sup>	56	0 <sup>eu</sup>	56
0 <sup>ev</sup>	56	0 <sup>ev</sup>	56	0 <sup>ev</sup>	56
0 <sup>ew</sup>	56	0 <sup>ew</sup>	56	0 <sup>ew</sup>	56
0 <sup>ex</sup>	56	0 <sup>ex</sup>	56	0 <sup>ex</sup>	56
0 <sup>ey</sup>	56	0 <sup>ey</sup>	56	0 <sup>ey</sup>	56
0 <sup>ez</sup>	56	0 <sup>ez</sup>	56	0 <sup>ez</sup>	56
0 <sup>fa</sup>	56	0 <sup>fa</sup>	56	0 <sup>fa</sup>	56
0 <sup>fb</sup>	56	0 <sup>fb</sup>	56	0 <sup>fb</sup>	56
0 <sup>fc</sup>	56	0 <sup>fc</sup>	56	0 <sup>fc</sup>	56
0 <sup>fd</sup>	56	0 <sup>fd</sup>	56	0 <sup>fd</sup>	56
0 <sup>fe</sup>	56	0 <sup>fe</sup>	56	0 <sup>fe</sup>	56
0 <sup>ff</sup>	56	0 <sup>ff</sup>	56	0 <sup>ff</sup>	56
0 <sup>fg</sup>	56	0 <sup>fg</sup>	56	0 <sup>fg</sup>	56
0 <sup>fh</sup>	56	0 <sup>fh</sup>	56	0 <sup>fh</sup>	56
0 <sup>fi</sup>	56	0 <sup>fi</sup>	56	0 <sup>fi</sup>	