

# **Business-IT Alignment In Municipalities – The Swiss Case**

*Full Paper*

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## **Abstract**

Municipalities face huge challenges today in the context of rapid technological changes and E-government. Therefore business-IT alignment (BIA) plays a growing role in municipalities today. We consider the level of BIA in Swiss municipalities based on various variables relating to municipality size, artefacts that underpin BIA, and the satisfaction of the municipalities with IT services. We investigate BIA using a deductive approach that employs a survey and develops a behavioral partial least square model. BIA is more of an issue the larger the municipality (number of inhabitants). The results show significant indications that these artefacts and roles make a significant contribution to user satisfaction and hence to BIA. Roles, tasks, competencies and responsibilities, defining- and documentation artefacts as well as structural differentiation of IT and the degree of internal IT management and standardization frameworks are elements which can be clustered into the factors of structural differentiation of IT and IT management.

## **Keywords**

Business-IT alignment, municipalities, IT management, IT governance, E-government

## **Introduction**

### ***Background and problem statement***

From the point of view of municipalities, there are various future challenges: these include funding shortages, demographic change, increasing complexity of IT, networking etc. (cf. e.g. Steiner 2003 on the challenges facing municipalities in general, and Walser 2012 on the opportunities for restructuring through the use of IT). There are various determinants relevant to these challenges. For example, a distinction must be made between the size of the municipalities and, where appropriate, their geographical location. Municipalities today face the task of adopting technical innovation, networking and E-government (Al-Sebie and Irani 2005; Swain et al. 1995; Ward and Mitchell 2007) for the purpose of technological development. As a result the challenges relating to internal or external IT, the management of IT and hence business-IT alignment (BIA) will only become greater (Nielsen and Persson 2010; Nielsen and Persson 2012). Based on the technological changes, administrative organizations will be challenged enormously in the future. As a result of this development, customers, employees and suppliers of administrative organizations are now demanding that the organizations also adopt these technological changes. Also where BIA is concerned in public administration, it is the ability of the organization to deal proactively and harmoniously with these changes that generally appears to be the formula for success

(success in the form of public value; see Kraemer 1977 for a very early study of technology adaptation in public administration, and Wang and Liao 2008 on E-government; Bouwman et al. 2011 on architecture issues and their alignment character, and Campbell et al. 2009 for a comparative study of IT governance in private firms and the public sector). This means that the technological developments in the form of the internet, mobile services (apps), social media, etc. increase pressure on municipalities to develop accordingly (cf. e.g. Bonsón et al. 2012). Not only is the range of communication and media options changing both for citizens and organizations but the number of communication channels is also rising (see, in this regard e.g. Pietersen and Johnson 2011), which may entail further changes for organizations (cf. Walser 2012 amongst others) and their IT management, leading to a strengthened need for BIA and greater importance of IT management (; cf. e.g. De Haas and Van Grembergen 2009 regarding IT governance and its relationship with BIA). Of particular relevance is the assumption of responsibility for IT by management in public administrative organizations in light of its more important status. The question remains as to what areas and scope for action are open to municipalities, e.g. in the areas of sourcing or internal customer relationship management. Based on these facts BIA is of central importance for the further development BIA, if the municipalities want to be able to overcome the future challenges (cf. e.g. ISACA 2011 in connection with this). Given all the above, the issue of BIA (still rarely discussed in the area of public administration) is becoming increasingly important both from a research perspective and in the public sector as a whole. In general, research into BIA in the private sector is more advanced than that in the public sector; this is likely to be due in part to the widely recognized (and largely positive) relationship between business performance and BIA (cf. among others Lye 2006, Andrews et al. 2012, Andrews and Beynon 2011, Maes et al. 2000, De Haas and Van Grembergen 2009, Cragga et al 2002). To promote BIA research in the public sector it might be sufficient to demonstrate a relationship between administrative activity compliance and BIA. The lack of research into public administration BIA is one of the reasons why this broad-based study at municipal level has been undertaken. In Germany and Switzerland the need for public administration BIA is also increasing because of some well publicized IT project failures (cf. Walser 2013 and Mertens 2012). One notable aspect which receives little attention in both the public and private sectors is the role of objects, roles, artifacts, etc. in BIA. This is of particular interest, since BIA may be shaped using these factors. As already mentioned, initial research into strategic alignment was carried out by Henderson and Venkatraman 1993 and subsequent generations of researchers (Kearns and Lederer 2000; Avison et al. 2004; Bashiri et al. 2010; Chan et al. 2006; Beimborn et al. 2009). These later authors repeatedly refer to the strategic BIA and operational BIA models outlined by Henderson and Venkatraman 1993. With this in mind, our research can be seen as work which focuses more on the operational-infrastructure alignment between business and IT while taking into account the fact that objects, artifacts, roles, subjects, bodies, etc. can be consciously designed according to their alignment function for the short to medium term.

## **Objectives**

A first explorative and descriptive study of BIA in Swiss municipalities showed that there is a relationship between the size of a municipality and its effort in BIA (Walser et al. 2014). This study also found that there was a relationship between municipality employees' satisfaction with their IT and BIA. The BIA artifacts (roles, tasks/competences/responsibilities, defining artifacts, documentation artifacts, degree of internal management of IT, usage of standardization frameworks) also make a significant contribution to user satisfaction and to BIA. But it is not surprising that the descriptive analysis had to go in more depth and then followed by multivariate analysis of the data using factor analysis and a structural equation model to further explore multivariate dependencies in the model.

## **Methodology**

This study is both explorative and deductive in character; the reason being, as discussed in the sections above, the relative infancy of BIA research in general and more specifically in the public sector. There are thus limited possibilities for generating hypotheses from the literature. Furthermore, the complexity and multidimensionality of the subject area further hinders research. Based on the presentation of the problem statement described from a subject-specific and technical research perspective, influencing factors and objects, subjects, organizational aspects, etc. are derived from individual academic articles, and are considered as design elements of BIA in municipalities. Where possible, these are related either directly or indirectly to a dependent BIA variable. Alternatively, IT user satisfaction can also be used as a construct

and a dependent variable. Here it must be assumed that there is a significant correlation between user satisfaction and BIA (cf. e.g. Ward and Peppard 1996; Peppard and Ward 2004; Coughlan et al. 2004). The statistical analysis of the data takes the form of factor analysis and is followed by the construction of a SEM model.

## **Swiss municipalities and IT**

This section outlines basic information on the number and structure of Swiss municipalities and their IT. According to the Federal Statistical Office (FSO), Switzerland had 2,584 municipalities in 2010. Between the censuses of 2000 and 2010, the number of municipalities in Switzerland fell by 312 (-11%). This represents an average reduction of 30 municipalities per year (see FSO 2010). The average population of a municipality is 3,000 inhabitants (FSO 2010). There is evidence of clear differences between the average populations of each canton, which could be attributable to the most prevalent type of municipalities in each canton. The Basel City canton and towns in Canton Zürich are typically high density urban municipalities. Municipalities in the cantons of Solothurn, Bern, Vaud and Aargau are characterized by their rural nature. The municipalities in the cantons of Zürich, Geneva and Basel City are typified by agglomeration (in which towns are of key significance). Finally the cantons of Valais, Graubünden and Ticino mainly contain alpine municipalities. Further key parameters of interest regarding municipalities and IT are discussed in the following paragraphs. No official data was available on municipality employee numbers, IT personnel, or IT budgets, therefore the figures had to be gathered by the survey in hand or inferred. The FSO registers more mergers between municipalities with low populations (FSO 2010) and it can thus be concluded that IT has also been merged and consolidated through the merger of municipalities. Additionally it can be inferred (a hypothesis which has to be tested in further studies) that, regardless of municipality mergers, smaller municipalities tend to be less able to cope with IT, show less positive BIA and are more likely to outsource IT or consolidate their IT with other municipalities. This has been noted by Csoka 2006 on the basis of empirical research on forms of cooperation between IT departments in municipalities. The following statements about typical IT facilities of small to medium-sized municipalities are based on an interview by the primary author with a specialist for IT provision in Swiss municipalities operating mainly in the central plateau around Bern. The IT facilities in a smaller or medium-sized municipality are typically as follows: use of specific municipality administration software (back office) based on suites or best-of-breed components; web presence: either stand-alone or integrated into municipal back office applications; workplace: with standard functions such as web access, email, office products etc.; records management solutions: either stand-alone or integrated into municipal back office applications; if the municipal system does not support all municipality issues, the use of an ERP system may be necessary.

## **Investigation of business-IT alignment in Swiss municipalities**

### ***Research methodology and measurement instruments and hypotheses***

We first developed a questionnaire which was sent to all German-speaking municipalities in Switzerland in the form of an email link (See Bigler et al. 2013, Walser et al. 2014 for a first publication based on descriptive and bivariate analysis). We then collected the survey results and performed descriptive statistical analysis, factor analysis and derived a partial least square model for this publication. Because of the explorative nature of the first study (2013 and 2014) it was necessary to assume certain basic correlations when developing the survey: firstly, the size of a municipality determines the municipality's BIA and secondly, the level of BIA in a municipality influences the level of satisfaction of municipality personnel with IT (Figure 1 in the attachment). The online survey was based on 23 questions which were grouped as follows: satisfaction with provided IT services, roles and responsibilities, IT as a service, IT documentation, IT standards used and implemented and characteristics of the municipality. For some questions, numbers of instruments, artifacts, etc. were collected, while other questions were based on a Likert scale of four response options. In a second step we performed multivariate analysis based on the survey data in the form of descriptive analysis, factor analysis and finally structural equation modeling.

## ***Business-IT alignment***

A literature research identified BIA relevant artifacts, roles, objects, subjects, etc. which were taken into account when designing the municipality survey (see Table 1 in the attachment). The literature is listed in the bibliography. The literature search also revealed elements relevant to BIA (maturity), which were grouped as follows: roles, tasks, responsibilities, competencies, defining artifacts, sourcing, documentation artifacts, and standards. The size of the municipality is the key element that determines BIA maturity. In our model, size is defined in terms of the number of inhabitants in the municipality, the number of employees, the municipal budget and the IT budget. The defining artifacts group includes process steps, performance agreements with customers (service level agreements/SLA), IT planning, etc. The term 'sourcing' is a simplified blanket term for how the IT solution is sourced in its simplest form, be it internally or externally. Satisfaction with the IT solution is defined using various factors which will be discussed in the section Business-IT alignment. Where the size of the municipality has a direct influence on IT satisfaction, then it is possible that the maturity level of BIA does not play a significant role. For this reason, a direct correlation between municipality size and satisfaction was assumed for the purposes of this investigation. This study (based on a first study; cf. Bigler et al. 2013, Walser et al. 2014) employs mainly directional hypotheses as described by Kornmeier (2007, p. 75-79) e.g. 'the bigger ... the better'. The hypotheses are also presented in Table 2 (see attachment). 1. The larger the municipality, the better organised IT is in the municipality. 2. The larger the municipality, the more distinctly IT tasks, competencies and responsibilities are defined. 3. The larger the municipality, the better documented the IT landscape is. 4. The smaller the municipality, the more likely it is that IT elements and related aspects are outsourced. 5. The larger the municipality, the more standards are used. 6. The larger the municipality, the greater is the level of satisfaction with the IT in the municipality. 7. The more BIA artefacts are used, the greater is the satisfaction with the IT.

## ***Sample and sampling method***

Friedrichs, quoted in Kromrey (2006, p. 276), defines four requirements for sampling. 1. The sample must represent a scaled-down version of the basis population. 2. It must be possible to specify and empirically define the basis population. 3. The sampling method used must be specifiable. 4. The units or elements of the sample must be defined. Requirements 2-4 are discussed in the following section with regard to their relevance to the research project. The basis population consists of 2,408 Swiss municipalities. These municipalities use the languages: German, French, Italian and Romansh. If only the German-speaking municipalities are taken into account, the number of municipalities is reduced to 1,783 (=N). There are various methods of defining a sample suitable for this survey. Kornmeier (2007, p. 159) describes several methods, all of which could have been applied to our survey. However, the quota sampling method seemed most appropriate to this investigation (i.e. use of defined characteristics as selection criteria). It was readily possible to obtain the email addresses of municipalities so that there were no cost-restraints in this respect (e.g. cost of purchasing email addresses). The criteria used to select the municipalities for the sample are as follows. Neither size nor geographic location played a role in selection, with municipalities of all sizes in all areas being surveyed. Language played the most important role. The survey was limited to German-speaking municipalities (bilingual German municipalities were, for the purpose of this survey, also considered German-speaking). The following cantons in Switzerland are defined as German speaking (number of responding municipalities per canton/percentage): Appenzell-Ausserrhoden (5/1.5), Appenzell-Innerrhoden (0/0), Aargau (31/9.4), Basel City (0/0), Basel Country (11/3.3), Bern (63/19), Fribourg (12/3.6), Glarus (1/0.3), Graubünden (12/3.6), Lucerne (12/3.6), Nidwalden (2/0.6), Obwalden (4/1.2), Schaffhausen (3/0.9), Schwyz (9/2.7), Solothurn (17/5.1), St. Gallen (9/2.7), Thurgau (11/3.3), Uri (2/0.6), Valais (6/1.8), Zug (3/0.9), Zürich (27/8.2). In order to be able to make representative statements about German-speaking municipalities as a whole, a response rate of 327 was considered necessary. This was calculated using a formula proposed by Kornmeier (2007, p. 159 ff.). It was decided that if n=327 was not achieved, analysis of the results would be undertaken; however the results would not be considered representative for all German-speaking (cantons and their) municipalities. Space constraints do not allow a description of the questionnaire development. However, a detailed description in English can be requested from the authors. The response rate per question/item differed. Not every question was answered by all respondents. We received between 178 and 252 answers per question (=n; n=178 was relevant for the computation of the SEM). For the questionnaire as a whole we had 332 respondents (it was possible to skip questions in the questionnaire).

## **Survey results**

### ***Statistical Methods***

First, a descriptive analysis was conducted on all measured variables. Second, a factor analysis was conducted in order to examine (1) the dimensionality of BIA and (2) the dimensionality of satisfaction with IT. In a third step, a structural equation model (SEM) was conducted to investigate the relationships between range of municipality, maturity of BIA, and satisfaction with IT in the municipality, thereby testing the model and the hypotheses described above.

### ***Business-IT alignment descriptive analysis***

#### **Business-IT alignment variables**

Table 3 shows our descriptive analysis of the data. The variable “Where is your IT managed?” was measured using a Likert scale (1 = externally, 2 = more externally, 3 = half externally, half internally, 4 = more internally, 5 = internally). The mean value of 2.33 suggests that IT tends to be outsourced. The other five values indicate the amount of standards, documentation artifacts, IT related roles, task definitions, competencies and responsibilities, and defining artifacts. The resulting values are rather low, indicating that IT standards and frameworks are not widely used, which suggests a low maturity of IT service provision and thus lower overall BIA. Additionally this would seem to imply that most of the municipalities responding were small municipalities with little IT documentation to support BIA. We can also conclude that the bigger the municipality is, the bigger the differentiation of roles supporting BIA. This could indicate that alignment has higher defined degree the bigger the municipality or city is. The numbers show that most of the municipalities use a rather small set of defined IT roles to support BIA. The differentiation of tasks, competencies, and responsibilities also seems to be rather low. Since only 13 cities with complex IT environments answered the online survey and 158 rural municipalities with rather simple IT environments answered the survey it does not seem surprising that the defining artifacts median is quite low (see table 3 in the attachment).

#### **Dimensionality of business-IT alignment: factor analysis**

To examine the dimensionality of BIA we undertook factor analysis using the six BIA indicators described above, with the aim of identifying the underlying variables, components, and concepts. Thus, a principal component factor analysis was conducted. First, we tested if the output variables belong together and are appropriate for factor analysis. The MSA criterion is “meritorious” (Measure of Sampling Adequacy [MSA] = .80) (cf. Kaiser and Rice 1974). The Kaiser criterion suggests a two-factor solution. For the first factor, an eigenvalue of 2.8 and for the second an eigenvalue of 1.0 resulted. The two factors together explain 63.8 percent of the variance and varimax rotation extracts a first factor which explains 46.6 percent of the total variance, and a second factor which explains 17.2 percent of the variance. Table 4 in the attachment shows these results. The first factor mainly consists of four items, which capture structural aspects of IT and through structural differentiation support BIA. This factor is therefore termed structural differentiation. The second factor consists of two items which capture management-oriented aspects of IT. We classified this factor as IT management to support BIA.

### ***Analysis of IT satisfaction***

#### **Satisfaction descriptive analysis**

Table 5 in the attachment shows the descriptive analysis of IT satisfaction. The questions were answered on a four-point Likert scale (1 = not all, 2 = very little, 3 = somewhat, 4 = to a great extent). Thus, a value of 1 indicates the lowest, and 4 the highest possible values. The resulting values are rather high and suggest that Swiss municipalities are generally satisfied with their IT.

### **Dimensionality of satisfaction: factor analysis**

A principal component factor analysis was calculated to examine the dimensionality of satisfaction. The Measure of Sampling Adequacy (MSA) criterion is “middling” (MSA = .74) and thus acceptable (cf. Kaiser and Rice 1974) and the Kaiser criterion (eigenvalue above 1, cf. Kaiser 1970) suggests a three-factor-solution. The first factor produced an eigenvalue of 3.0 while the second and the third factors produced eigenvalues of 1.3 and 1.0. Together, these three factors explain 58.9 percent of the variance. A varimax rotation extracts a first factor which explains 25.7 percent of the variance. It consists of four out of four items, which load higher than .4 on the first factor. One item, however, also loads high on the second factor. Because of its content and because of the higher loading, we decided to assign this item to the second factor. The second factor, which explains 21.0 percent of the variance, consists of four items. The third factor explains 12.2 percent of variance and consists of two items. Table 6 in the attachment shows these results. The first factor we classified as 'support' because the three underlying questions all capture satisfaction with services that are provided to solve specific IT problems. The four questions in the second factor refer to satisfaction with the infrastructure in general, devices and their usability in particular. We termed this factor 'daily interaction with the system'. The third factor contains two questions, which capture the amount of applications used and the amount of malfunctions. We classified this factor as 'system complexity'. It is not surprising that these three factors were derived since the three-factorial solution supports exactly the differentiation of customer satisfaction factors with IT services described by Mayer (2009, p. 79).

### ***Relationship between municipality size, business-IT alignment, and IT satisfaction – the structural equation model (SEM) and discussion***

We used the SEM proposed in the sections above to test the relationship between size of municipality, BIA and satisfaction with IT. However, the original model was adjusted slightly to include IT structure and IT management in light of the results of the factor analyses described above. The tested model is shown in Figure 2 in the attachment. The observed exogenous variable population size was used as a proxy for size of municipality. The two reasons for this substitution are (1) population almost perfectly correlates with the other variables measuring municipality size ( $r > .90$ ) and (2) the number of missing values is lower for population size than other variables relating to municipality size. In line with the results of the factor analysis described above, BIA was represented using two latent variables BIA 1 – structural differentiation, and BIA 2 – IT management. Structural differentiation was estimated via the measured endogenous variables documentation artifacts, roles, tasks, competencies and responsibilities, and defining artifacts. IT management was estimated via the measured endogenous variables degree of internal management of IT and IT standards and frameworks. IT satisfaction was also included as a latent variable using the scores of the three satisfaction sub-dimensions: support, daily interaction with the system and system complexity, in line with the results of our factor analysis. The model described above was analyzed for those municipalities with complete data. The resulting model is shown in Figure 4. The paths within the model are all significant. Non-significant paths were removed from the model. The findings show that the data fitted the model well ( $\chi^2 = 44.8$ ,  $df = 31$ ,  $p > .05$ ; GFI = .95; AGFI = .91; CFI = .96; RMSEA = .05). Therefore, no additional covariance values had to be included to modify the model (see also Figure 3 in the attachment). As predicted, the exogenous variable population size influences both BIA dimensions positively, the model suggests a medium to strong relationship with population size explaining 25 percent of the variance of the endogenous latent variable: structural differentiation, which itself influences IT management. Together, structural differentiation and population size explain almost three quarters of the variance (71%) in IT management. This suggests that better structuring – obviously the case in bigger municipalities – has a positive influence on IT management capabilities. Additionally, better IT structuring may have a positive influence on BIA. Satisfaction with IT – the endogenous target variable – is negatively influenced by population size; a weak to medium inverse statistical relationship was observed, suggesting the larger the municipality, the lower the degree of satisfaction with IT. This may be the case because the delineation between jobs and roles is stronger in large municipalities, creating more complex IT landscapes, which in turn affects IT satisfaction negatively. Our model also suggests that IT management has a strong positive effect on satisfaction. This indicates that big municipalities, for instance cities, use more standards to structure and to manage their IT. The fact that the IT of the city of Zürich was partially certified in ISO/IEC 20000 (Cf. City of Zürich 2012) would seem to back up this assumption. Interestingly, structural differentiation does not influence IT satisfaction

directly. However, additional analysis shows that structural differentiation indirectly influences satisfaction with IT management, i.e. IT management fully mediates the relationship between structural differentiation and satisfaction. This mediation was tested using a procedure proposed by Baron and Kenny (1986). Altogether, more than one quarter of the variance satisfaction (26%) is explained through structural differentiation, IT management, and population size; a substantial percentage. Various other factors not considered in our model may influence BIA and IT satisfaction such as attitude, behavior and culture (cf. Chan and Rich 2007). These factors are certainly worth future investigation. Furthermore, provider staff or the user quality of IT usage may also be influenced by training, etc. The findings show that the data fitted the model well. Finally we can present the findings regarding the hypotheses proposed in section ‘Hypotheses’ in Table 5.

Nr.	Hypothesis	Findings regarding the hypotheses
1	The larger the municipality, the better organised IT is in the municipality.	Based on the SEM model computed, the hypothesis can be confirmed.
2	The larger the municipality, the more distinctly IT tasks, competencies and responsibilities are defined.	Based on the SEM model computed, the hypothesis can be confirmed. Tasks, competences and responsibilities explain 54 percent of the structural differentiation factor.
3	The larger the municipality, the better documented the IT landscape is.	Based on the SEM model computed, the hypothesis can be confirmed. The documentation artefacts explain 72 percent of the structural differentiation factor.
4	The smaller the municipality, the more likely it is that IT services or components of them are outsourced.	Based on the SEM model computed, the hypothesis can be confirmed. But nevertheless it must be stated that .33 percent of IT management factor may be explained by the degree of internal management of IT.
5	The larger the municipality, the more standards are used.	Based on the SEM model computed, the hypothesis can be confirmed. The standards in use explain .65 percent of the IT management factor.
6	The larger the municipality, the greater is the level of satisfaction with the IT in the municipality.	Based on the SEM model computed, this hypothesis cannot be confirmed. There is a negative relationship (-.32 percent) between number of habitants and satisfaction with IT.
7	The more BIA artefacts are used, the greater is the satisfaction with the IT.	Based on the SEM model computed, the hypothesis can be confirmed.

**Table 5: Discussion of the hypotheses based on the computation of the SEM model.**

## General discussion and limitations of research

As stated above, the literature on public-sector BIA and especially BIA in public administration is rather scarce. This led us to undertaking research on BIA in municipalities. The research process was based on a two-step approach. The first step was descriptive and bivariate analysis of the gathered data (Cf. Bigler et al. 2013; Walser et al. 2014). This study showed that: the larger the municipality, the better organized IT is in the municipality; the larger the municipality, the more distinctly IT tasks, competencies and responsibilities are defined; the larger the municipality, the better documented the IT landscape is; the larger the municipality, the more standards are used; the larger the municipality, the greater the level of satisfaction is with the IT solution in the municipality and the nature of the BIA artifacts used leads to greater satisfaction with the IT solution. Since first papers (cf. Bigler et al. 2013; Walser et al. 2014) only computed the results bivariately, we continued with this paper based on multivariate computing. We therefore used a structural equation model. This led us to the following results: Population size positively influences structural differentiation of IT in municipalities (BIA items) in terms of definition of roles, tasks, competencies and responsibilities, defining artifacts and documentation artifacts. Additionally structural differentiation of IT positively influences IT management in terms of the degree of internal management of IT and implementation of standardization frameworks. Thus, the IT management factor positively influences satisfaction with IT, and thus, according to our model, IT management has a strong positive influence on IT satisfaction. IT satisfaction was measured in terms of satisfaction with support, satisfaction with daily interaction, and complexity of the system. The results of the structural equation model suggest that the number of inhabitants has a negative impact on satisfaction with IT. This may be because a higher number of IT workers leads to more division of labor, which leads in turn to the need for more coordination effort. We can only assume that this coordination effort does not result in better BIA or is simply not implemented. Because of  $n=331$  this study cannot be considered a representative sample of the German-speaking municipalities in Switzerland. But nevertheless we think that the study gives a first and interesting impression of how municipalities manage IT, BIA and IT structures in municipalities. Not surprisingly the number of inhabitants has an important influence on how and how structured IT is managed in Swiss municipalities. Perhaps surprising is the result that the number of inhabitants has a negative influence on satisfaction with IT and thus BIA within municipalities. This could prove a fruitful area for future research. In a future study we intend to include a variable to directly measure BIA in

municipalities. The factor analysis in relation to IT satisfaction led us to three factors: support (58%), daily interaction with the system (82%), and complexity of the system (12%). All three factors have a positive influence on satisfaction with IT within the municipalities. We did not receive enough data from the survey to conclude representative results for all Swiss municipalities. But the results do show that for smaller municipalities programs should be initiated to promote the idea and concept of BIA. We also conclude that the search for further elements, for instance roles, objects and steering committees should continue. The search for further factors affecting or influencing BIA since these implicitly hosted or manifest factors (elements, roles, objects, steering committees etc.) can be a design object (analogous to the design of information systems). The structural equation model was suitable for our propositions and the research interest. We suggest that future research should focus on what can be done within smaller municipalities to strengthen skills and organizations in terms of BIA and to what extent standards management and implementation could have a positive effect on BIA. We are convinced that ongoing development of a more and more networked public administration and E-government will further strengthen these tendencies in the future.

## **Summary and Outlook**

Municipalities, not only in Switzerland, face huge challenges today, not merely as administrative units (in terms of demographic change, shortage of funds, etc.) but also in the context of rapid technological development in information technology, E-government etc. There are calls for the increased implementation of E-government solutions and this is being realized, albeit at a fairly slow pace. Additionally internal processes are also slowly being implemented or, where they already exist, rationalized, automated and electronically supported. IT management plays more and more of a central role in business activities and therefore the alignment between these activities and IT is of critical importance. This paper considers the level of BIA in Swiss municipalities based on various variables relating to municipality size, artifacts that underpin BIA, and the satisfaction of the municipalities with IT services. We investigated BIA using a deductive approach that employs a survey and develops a behavioral model. BIA is more of an issue the larger the municipality (i.e. having a greater number of inhabitants). Based on this study, it can be concluded that BIA is being implemented in the following six areas: role definition in all aspects of IT, definition of competencies and responsibility, the definition of the artifacts required for IT management, IT sourcing, documentation of IT artifacts, standards and frameworks (and their use). The results show significant indications that these artifacts and subjects/roles make a significant contribution to user satisfaction and hence to BIA. The partial least square model to compute satisfaction with IT fits very well – we assume that satisfaction with IT and degree of BIA are inextricably and intensely intertwined, and that satisfaction with IT is a relevant measure and can be measured in conjunction with BIA. Roles, tasks, competencies and responsibilities, defining artifacts and documentation artifacts as well as documentation artifacts, structural differentiation of IT and the degree of internal IT management and standardization frameworks are elements which can be clustered into the factors of structural differentiation of IT and IT management. The number of inhabitants of a municipality has a strong influence on structural differentiation of IT and this influences IT management positively. IT management as a factor has a positive effect on customer satisfaction with IT in municipalities. This study is one of the first studies addressing business-IT alignment in (Swiss) municipalities and is also among the first studies of operational aspects of business-IT alignment (in municipalities). Although it is based on a large number of municipalities, it cannot be regarded as representative for all Swiss municipalities. However, the business-IT alignment model developed to explain business-IT alignment and its influence on satisfaction with the IT of the municipalities seems to be promising and will be the basis of additional research.

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## Appendix as Attachment

Due to space restrictions, Figures and Tables were outsourced to a separate attachment/PDF, available on a dropbox-link:

[https://www.dropbox.com/s/2aomn2xc1qvt48k/Walser et al AMCIS 2016 Attachments Dropbox.pdf?dl=0](https://www.dropbox.com/s/2aomn2xc1qvt48k/Walser%20et%20al%20AMCIS%202016%20Attachments%20Dropbox.pdf?dl=0)