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Understanding the Modularization of Business Services: the Maturity of Firms in Bundling Services

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Abstract.
Sourcing literature reveals that large firms bundle or unbundle existing business services by means of modularization to achieve organizational agility. However, one may assume that firms need some degree of maturity to manage the complexity that comes along with bundling modularized services. The aim of our research is to understand how modularization interrelates with firm maturity when bundling business services, a topic that has been given limited attention in sourcing literature. Based on an exploratory research amongst 110 firms we found evidence for the relevance of influencing factors on firm maturity in bundling services. The findings provide evidence that the number of business services and the size of the firm correlate with the maturity of the firm. More specifically, our analysis identified that the type of market in which a firm acts (i.e. private or public) and adding the Marketing business function to a bundle does not increase firm maturity. Our empirical research contributes to sourcing literature as we expanded previous research by taking a more in-depth view on business services while providing up-to-date insights.

Keywords: Bundled business services, Modularization, Outsourcing, Maturity

1 Introduction

Sourcing research reveals that large firms apply various sourcing strategies over time to cater for business demands effectively [1, 2]. These sourcing strategies relate to common used business services, such as Finance and Accounting, Procurement, Human Resources, R&D, and Information Technology [3, 4, 5] to respond quickly to changing market circumstances [6, 1]. During the past decade firms extended existing sourcing strategies, for example by selecting multiple providers (i.e. multisouring) or bundling multiple services [1, 7] to achieve organizational agility. However, existing business services can be bundled and unbundled by means of modularization. By bundling various modules (e.g. business services) internally or with an external provider firms are able to achieve their sourcing objectives more effectively, while mitigating the degree of organizational complexity. As a result, modularization can be perceived as a

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prerequisite to adapt to changing circumstances, while bundling complementary and supplementary services offers advantages in management and governance. When dealing with bundled business services, firms need a certain degree of maturity to manage the complexity that comes along with modularization and bundling consequences. As this topic has been given limited attention in sourcing literature [1, 8], we need to understand how modularization interrelates with firm maturity when bundling business services. Despite the prominence of bundled business services, a greater understanding is required of the interrelation with firm maturity. As such, the research objective of this paper is to study the interrelation between modularization, bundling services and firm maturity. The contribution of this study is twofold. First, since empirical research on the bundling of modularized business services is scarce, our approach to study modularization endeavors on bundling vis-à-vis firm maturity. Second, this study also contributes to IT sourcing practitioners by increasing the awareness of firms of the relevance of bundling business services and its relation with maturity. Consequently, firms have the opportunity to assess their sourcing strategy and modularization in combination with an assessment of their maturity in managing bundled business services.

2 Literature Background

In an effort to adapt to dynamic circumstances, today, large firms apply a service perspective and transform themselves into a service-oriented enterprise (SOE). [9, p. 39] argue that a SOE 'can be viewed as a particular kind of sourcing arrangement', that comprise both in-house services, which are often established as service services, and outsourced services. The goal of a service-oriented enterprise is to cater for changes effectively that may relate to market, organizational, and technological developments [10, 11]. [5] review of sourcing literature reveals that firms use various sourcing models to provide services (i.e. in-house, shared services and outsourcing) extending [9] from information technology (IT) to business services. The choice to select a sourcing model, however, is affected by the characteristics of a firm, such as their business strategy, degree of risk aversion and internal capabilities, and market attractiveness. As a result of sourcing motivations and transaction attributes firms decide to keep specific functions or tasks in-house so the staff of the firms consciously focus on critical services.

2.1 Modularization

In response to creating organizational agility firms are unbundling their business processes by means of modularization and explore new sourcing arrangements [12]. [13] argues that the concept of modularization is considered as a generic concept, which can be viewed from a content perspective as well as an organization perspective. Some components of a module can be hidden and can be changed or adapted without affecting other modules. Other components of a module need to be visible and might be subject to change as they are interconnected with other modules. In this paper we use the definition of [14] who state that 'a module is a unit of whose structural elements are

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powerfully connected among themselves and relatively weakly connected to elements in other units‘. [15] explored lessons for modularity that were drawn from the outsourcing of knowledge-intensive business services. Their research show that intangibility of services exacerbates the conflicts between clients and service providers, which may hinder innovation initiatives. Advantages of organizational modularity are studied by [16], who focus on the role of dedicated core initiative teams and ‘loose coupling’ by using rather simple coordination mechanisms. By implementing standardized modules the integration of group tasks and specialization of dedicated teams may create focus and flexibility to cater for changing capabilities. Ultimately, the goal of modularization is threefold: manage organizational complexity, enable parallel work and improvements, and limit the degree of uncertainty. From a SOE perspective, various business functions such as F&A, HR and IT, are supported by services [17]. Therefore, by means of modularization firms are able to bundle and unbundle business services and as such manage organizational complexity [18].

2.2 Bundled Services

[19] argue that firms business functions are bundled in modules in which each module represent a service. For example, the business function Finance and Accounting is modularized and exists of various services such as: Procure to Pay, Order to Cash and Record to Report. Next, services can be bundled or unbundled and subsequently organized internally or outsourced to the market. However, despite the fact that bundling services will contribute to manage complexity, the effort to govern such arrangements will increase significantly as bundling outcomes may vary within and across BPO and ITO services [20]. We define bundled services as ‘a combination of business services and IT services that can be organized internally or outsourced to one or multiple service providers to achieve joint value creation and /or cost efficiencies’ [based on 7]. A study conducted by [8] reveals that IT infrastructure, IT applications, and accounting are bundled and outsourced to the market representing 70% of the bundling activity. Bundled business processes like billing, finance, and accounting represents 15% of bundling activity. A comprehensive study conducted by [21] underpinned the importance of bundled services, which was reconfirmed in their 2016 study. [7] studied goals of firms in the period 2003-2008 to bundle business functions. Their study shows that based on the bundle ‘*Application outsourcing and Business process outsourcing*’ and the bundle ‘*Application, IT infrastructure, and business process*’ outsourcing firms select a second service provider to deliver services. The sourcing decision to bundle services is influenced by both the characteristics of a firm (e.g. organizational and technological factors), and market circumstances (e.g. regulatory and innovation factors). Taking these factors into account the strategic intent to bundle services is influenced by the experience, skills, and knowledge of a firm to bundle and unbundle business functions. Therefore, we assume that the maturity level of a firm can be seen as being related to the capability to manage bundled services.

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2.3 Organizational Maturity

In management literature the organizational context is perceived to be a key determinant for business maturity and performance [22, 23]. Scholars have studied the degree of maturity in management and outsourcing research and identified various key influencing factors, namely: focus on core or non-core activities [24], risk strategies [25], IT and business orientation relationship management [26], governance [27], integration potential [28], and sourcing capabilities [29]. As the performance of an organization is affected by the staff's behavior and quality we may assume that their degree of maturity may differ. As a result, process readiness and business management readiness, which affect organizations' capability to manage business functions, may differ too. A firm's methodological capability is defined as an organization's level of maturity in terms of technical or process-related standards and best practices [30]. We draw on the definition of [31] who define organizational maturity as 'growth stages that are based on the assumption of predictable patterns (conceptualized in terms of stages) that exist in the growth of organizations..., and the diffusion of information technology, p 280'.

Organizational maturity to bundle or unbundle services will be influenced by the characteristics of a firm. Examples relate to: number and type of business services, type of responsibility (local, regional, global), and geographical reach. Since various business functions including F&A, HR, and Procurement are interwoven with IT, the complexity to manage various type of business functions increases. Hence, clear coordination mechanisms are required to achieve a certain degree of organizational maturity in managing business services. [32] state that organizations do not necessarily demonstrate change by means of a linear sequence of maturity levels, but rather that observed configurations of problems, strategies, structures, and processes will determine a firm's progress. [33] argues that an important feature of maturity levels and their manifestations is to identify transition points that can be used to improve the quality of organizations. Notably, a firm's organizational culture also influences the behavior of an organization [34] and consequently the maturity of an organization.

2.4 Framework of the Study

As prior research on bundling business services is limited [1], a straightforward research model was used for investigating characteristics of a firm and their effect on maturity. The research model, as depicted in Figure 1, consists of five interrelated constructs. The first embedded element is formed by a firm's bundle strategy. Our basic assumption is that a firm's decision to bundle modularized business services must be derived from a conscious strategy as the type and number of services effects organizational complexity. Therefore, we argue that firms who aim to bundle business services need to be mature in order to be ultimately capable to manage the complexity of bundled business services. [35] argue that business processes, organizational structures, and souring have to be redesigned to create a fit with existing business functions. Thus, we may expect that firms have the experience to manage organizational complexity, which can be considered as a characteristic that impacts the

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strategic intent of firms to bundling decisions. Consequently, the experience of a firm in managing bundled business services is related to their maturity, which is represented by the second embedded element. Moreover, we may expect that market characteristics influence the ability of a firm to bundle and manage business services effectively. Literature [36] suggests that managers in the public sector are more skillful in handling complex business services, compared to managers in the private sector. Since market characteristics (private or public) determine the degree of competition and cooperation between firms, it is important to understand if market characteristics influence firm maturity in bundling services. When considering bundled services it is assumed that both the type of service (e.g. F&A, HR, IT) and the number of services have an impact on organizational complexity. As such, the type of bundling combination and an increase of the number of services that are bundled may impact firm maturity.

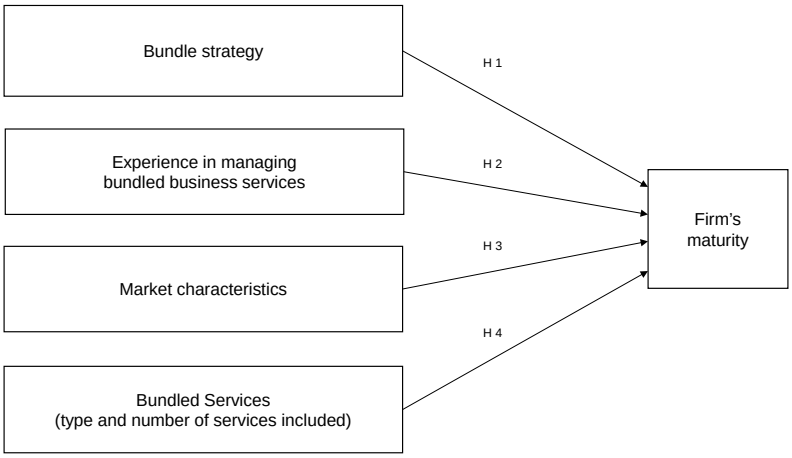

Fig. 1. Research Model

The hypotheses, listed in table 1, are derived from the research model and the reviewed literature. The hypotheses claim that there is a significant difference in maturity between firms.

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Table 1. Core hypotheses overview

Core constructs	Hypotheses
Bundle strategy	Hypothesis 1: There is a difference in maturity between firms who bundle business services and firms who does not bundle business services.
Experience in managing bundled services	Hypothesis 2: There is a difference in maturity between firms that are more experienced in managing bundled business services and firms that has less experience.
Market characteristics	Hypothesis 3: There is a difference in maturity between firms that act in the private sector and firms that act in the public sector.
Bundled related constructs	**Hypotheses**
Finance and Accounting as part of a bundle	Hypothesis 4a: There is a difference in maturity between firms that include Finance and Accounting in a bundle and firms that exclude Finance and Accounting.
IT as part of a bundle	Hypothesis 4b: There is a difference in maturity between firms that include IT in a bundle and firms that exclude IT.
HR as part of a bundle	Hypothesis 4c: There is a difference in maturity between firms that include HR in a bundle and firms that exclude HR.
Procurement as part of a bundle	Hypothesis 4d: There is a difference in maturity between firms that include Procurement in a bundle and firms that exclude Procurement.
Marketing as part of a bundle	Hypothesis 4e: There is a difference in maturity between firms that include Marketing in a bundle and firms that exclude Marketing.
Data Analytics as part of a bundle	Hypothesis 4f: There is a difference in maturity between firms that include Data Analytics in a bundle and firms that exclude Data Analytics.

The research model will be tested, based on empirical data. We will explain the way we collected data in the next section.

3 Research Method

In order to fathom the maturity of a firm in bundling business services we followed a research approach that focusses on a number of case-firms. Within each case we used a questionnaire to collect data. There are no existing scales to measure our core concepts, so we use the concepts only in an exploratory way. First, we will explain the selection of the cases and the selection of respondents, after which we will discuss the questionnaire used, as well as the way in which the constructs were measured, and the data analysed. The selection criteria were based on the constructs modularization and maturity. First, the variance of business services, i.e. type and number, were taken into account when selecting the firms. Next, we selected firms that started after 1999 in providing services. The selected firms met all criteria. Identifying distinctions between the firms result in valuable observations. Next, we started to execute interviews in the selected firms.

Selection of respondents

The data was collected on the basis of in-depth face-to-face interviews supported by a web questionnaire that was sent to the interviewees afterwards. The questionnaire was refined during several pre-tests and accompanied by a short cover letter that explained the purpose of the study. The data was collected between 2013 and early 2016. The interviewees that participated in the questionnaire are all responsible for managing

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multiple services. In total, 110 interviews were conducted, to explain the questionnaire addressing the selected firms on senior management level. Interviewees held positions in the firms like CEO, CIO, CFO, Head of business services, (Senior) Vice President, and director. A small number of respondents had an alternative function description. Their responsibility regarding business services varies, ranging from regional to global responsibility for a varying number of bundled services. Interviews varied from 60 to 90 minutes in length. Table 2 shows some descriptive data about the selected cases. The international firms under study are acting in a wide range of industries, such as: Pharma, Energy and Utilities, Financial Services, Logistics, Manufacturing, Food and Beverages and Consumer Products. Nine business functions were studied including Finance and Accounting (F&A), Information Technology (IT), Human Resources (HR), Procurement, Marketing, Analytics, Master Data Management (MDM), Customer Care (CC) and Manufacturing.

Table 2. Example - descriptive information about the selected cases

Case	Industry	Sector	Country	Employees	Number of Business Services	Type of Business Services	Start year Business Services	Geographical reach
Firm 1	Pharmaceutical	Private	USA	500 to 1,000	3	Finance & Accounting, IT, HR	2014	North America, Europe, South America, Asia Pacific
Firm 2	Professional services	Private	Finland	1,001 to 5,000	3	Finance & Accounting, IT, HR	2009	Western Europe
Firm 3	Hospitality	Private	Brazil	5,001 to 10,000	3	Finance & Accounting, HR, Other SG&A	2014	South America, Europe
Firm 4	Chemicals	Private	Brazil	5,001 to 10,000	3	Finance & Accounting, HR, Other SG&A	2009	North America, South America
Firm 5	Energy & Utilities	Private	South Africa	1,001 to 5,000	4	Finance & Accounting, HR, Procurement / Supply Chain,	2010	Middle East & Africa
Firm 6	Education	Public	Netherlands	5,001 to 10,000	5	Finance & Accounting, IT, HR, Procurement / Supply Chain	2012	Europe
Firm 7	Publishing	Private	Netherlands	10,001 to 20,000	5	Finance & Accounting, IT, HR, Procurement / Supply Chain	2009	North America, Europe, Asia Pacific
Firm 8	Manufacturing	Private	Mexico	10,001 to 20,000	3	Finance & Accounting, Procurement / Supply Chain	2009	North America
Firm 9	Government	Public	Netherlands	10,001 to 20,000	5	Finance & Accounting, IT, HR, Procurement / Supply Chain	2014	Europe
Firm 10	Energy & Utilities	Private	USA	20,001 to 75,000	2	Procurement / Supply Chain	2006	South America, Asia Pacific
Firm 11	Diversified Conglomerate	Private	Norway	10,001 to 20,000	3	Finance & Accounting, IT, HR	2007	Europe
Firm 12	Diversified Conglomerate	Private	Panama	10,001 to 20,000	2	Finance & Accounting, Procurement / Supply Chain	2005	South America
Firm 13	Logistics	Private	Australia	1,001 to 5,000	2	Finance & Accounting, IT	2014	Asia Pacific
Firm 14	Energy & Utilities	Private	United Kingdom	10,001 to 20,000	2	Finance & Accounting, HR	2007	Europe, Asia Pacific
Firm 15	Financial Services	Private	Switzerland	5,001 to 10,000	4	Finance & Accounting, HR, Procurement / Supply Chain	2011	North America, Europe, South America, Asia Pacific, Middle East &
Firm 16	Chemicals	Private	Peru	1,001 to 5,000	3	Finance & Accounting, IT, HR	2009	South America

Web questionnaire

The questionnaire consisted of four sections, and was sent to the interviewees directly. The questionnaire was accompanied by a short cover letter which summarized the purpose of the study. The first section addressed the organizational context including the organizational structure of business services (e.g. centralized, decentralized, or federative) and reporting lines how business services are managed in practice. The second section investigated the geographical reach in which business services were provided: domestic, regional or global. The third section studied the type and number of business services while the fourth section addressed the driver for bundling services. The questionnaire was refined during several pre-tests. While a vast majority of the questions are identical, minor modifications were made to the questionnaire to fit particular departments, terminology and practices. These changes did not affect the basic intentions of the items used. Moreover, considering the need for clarity, and preventing the terminology from being interpreted differently, an explanation of the questions was included , relating to the topics. In addition, maturity infographics were added to the questionnaire to improve the interviewees' understanding.The maturity

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items were rated on 5-point Likert scales, ranging from: very low (1), below average (2), average (3), above average (4), very high (5).

Data analyses
All the data is screened on their normal distribution, based on the Kolmogorov-Smirnov and the Shapiro-Wilk tests, and homogeneity of variance based on the Levene's test. Depending on the measurement level of the concepts, a specific statistical test is used. In the case of data that does not meet assumptions of normality we used Mann Whitney tests, in other cases we used t-tests or regression analysis, making use of SPSS.

4 Results

We tested the research model as depicted in figure 1. Some hypothesized effects were found significant while other were rejected. With regard to hypothesis 1 our results indicate that the maturity of firms that bundle services consciously as part of their strategy (mdn = 3,00) is significantly higher, compared to firms that do not bundle business services (mdn = 2,30) U = 460,50, Z = -3,724, p < 0,001, r = -0,33. This means that the hypothesis was supported. With regard to hypothesis 2, the results show that the maturity of firms that have more than 6 years of experience in managing bundled services (mdn, = 3,00; U = 146,50; Z = -0,828 p < .03, r = -0,21) is significantly higher than firms that have less experience (mdn = 2,10). Consequently, our hypothesis can be accepted. Furthermore, the analysis show that the maturity of firms that act in the private sector (mdn = 3,10), which relate to hypothesis 3, is similar to firms that act in the public sector (mdn = 300; (U =673,50; Z= -2,237, ns, r = -0,09). Consequently, our hypothesis is rejected. When considering the relationship between the Finance and Accounting function and bundles (hypothesis 4a) we found that the maturity of firms that included F&A in a bundle (mdn = 3,00) is significantly higher compared to firms that excluded F&A (mdn = 2,30; U = 596,50; Z= -3,908, p <.001, r =-0,34). As such, we find evidence for the support of our hypothesis. In contrast our analyses of hypothesis 4b indicate that there is no difference in maturity between firms that included (mdn IT= 2,90) or excluded the IT function in a bundle (mdn = 2,80, U = 1810,00; Z= -1,501, ns, r =-0,13), which result in the rejection of our hypothesis. With regard to hypothesis 4c we found that the maturity of firms that included HR in a bundle (mdn = 3,10) is significantly higher compared to firms that excluded HR (mdn = 2,60, U = 1333,50; Z= -3,531, p <.001, r =0- ,31). Thus, our hypothesis is accepted. Moreover, our analysis of hypothesis 4d show that firms that include their Procurement function in a bundle (mdn Pro= 3,20) are significantly more mature, compared to firms that exclude Procurement in a bundle (mdn = 2,60, U = 1185,00; Z= -4,420, p <.001, r =- 0,39). Hence, our hypothesis is accepted. Furthermore, the results of hypothesis 4e indicate that there is a significant difference between firms that included their Marketing function in a bundle (mdn = 3,10) and firms which excluded Marketing (mdn = 2,85, U = 603,00; Z= -0,473, p <.001, r =- 0,04). This means that the hypothesis was accepted. Finally, when addressing hypothesis 4f, our analysis show that firms which included Data Analytics as part of a bundle (mdn = 3,20) are significantly more mature compared to firms that excluded Data Analytics (mdn = 2,80, U = 541,00; Z= -2,380,

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p <.002, r =- 0,21. Consequently, this hypothesis is accepted. The results of the research model is shown in Table 3.

Table 3. Core relations as tested

Core constructs	Hypotheses	Company maturity (Mann Whitney test)	Effect on difference in maturity
Bundle strategy	Hypothesis 1: There is a difference in maturity between firms who bundle business services and firms who does not bundle business services.	Mdn, = 3.00 vs mdn = 2.30; U =480.50; Z= -3.724, p< .001, r = -0.33	Yes
Experience in managing bundled services	Hypothesis 2: There is a difference in maturity between firms that are more experienced in managing bundled business services and firms that has less experience.	Mdn, = 3.00 vs mdn = 2.10; U = 146.50; Z = -0.828 p< .03, r = -0.21	Yes
Market characteristics	Hypothesis 3: There is a difference in maturity between firms that act in the private sector and firms that act in the public sector.	Mdn, = 3.10 vs mdn = 3.00; U =673.50; Z= -2.237, ns, r = -0.09)	No
Bundled related constructs	**Hypotheses**	**Company maturity (Mann Whitney test)**	**Effect on difference in maturity**
Finance and Accounting as part of a bundle	Hypothesis 4a: There is a difference in maturity between firms that include Finance and Accounting in a bundle and firms that exclude Finance and Accounting.	Mdn F&A= 3.00 vs. mdn non F&A = 2.30; U = 596.50; Z= -3.908, p <.001, r =-0.34	Yes
IT as part of a bundle	Hypothesis 4b: There is a difference in maturity between firms that include IT in a bundle and firms that exclude IT.	Mdn IT= 2.90 vs. mdn non IT = 2.80, U = 1810.00; Z= -1.501, ns, r =-0.13	No
HR as part of a bundle	Hypothesis 4c: There is a difference in maturity between firms that include HR in a bundle and firms that exclude HR.	Mdn HR= 3.10 vs. mdn non HR = 2.60, U = 1333.50; Z= -3.531, p <.001, r =-0.31	Yes
Procurement as part of a bundle	Hypothesis 4d: There is a difference in maturity between firms that include Procurement in a bundle and firms that exclude Procurement.	Mdn Pro= 3.20 vs. mdn non Pro = 2.60, U = 1185.00; Z= -4.420, p <.001, r =- 0.39	Yes
Marketing as part of a bundle	Hypothesis 4e: There is a difference in maturity between firms that include Marketing in a bundle and firms that exclude Marketing.	Mdn Mar= 3.10 vs. mdn non Mar = 2.85, U = 603.00; Z= -0.473, p <.001, r =- 0.04	Yes
Data Analytics as part of a bundle	Hypothesis 4f: There is a difference in maturity between firms that include Data Analytics in a bundle and firms that exclude Data Analytics.	Mdn DA= 3.20 vs. mdn non DA = 2.80, U = 541.00; Z= -2.380, p <.002, r =- 0.21	Yes

As a next step in our analysis we decoded a number of variables to dummy variables, basically because they were measured on a nominal or ordinal level. Examples include: type of sector (private or public), number of firm employees provided in classes, geographical regions, and also the services as included or excluded in a bundle. We checked for multi-collinearity, making use of the VIF function to indicate the degree of significance between independent variables [37]. Moreover, tolerance values were defined to check multi-collinearity [38]. All variables included met the required criteria for tolerance (> .2) and VIF (>10). We also checked the homogeneity of variance, residuals and linearity. We deleted outliers from the analyses [39]. Consequently, 104 observations could be used. As the data set is relatively small we opt to pairwise exclude cases of the sample to deal with missing values.

Our data contains five (5) firms that can be indicated as high leverage points, meaning that we have to conduct additional analyses to see if they influence the regression model. First, we measured the standardized difference between independent variables by means of a standardized DF Beta analysis to indicate if these five firms influence the model parameters. Based on the measurements we concluded that the five cases did not influence the model as a whole. Second, based on Cook's distance analyses (highest value is 0.19) we find evidence that the five cases do not affect the model. From a leverage value perspective we also tested the five cases to determine if a single case influences the model. [40] argue that if the leverage-value is higher than *(3*(k+1)/N)*, in which k indicates the number of predictors and N the number of the sample, an individual case influences the model significantly resulting in an additional analyses. By conducting this third step we find that the highest leverage value is 0.11 which means that no evidence was found that the model was affected. Fourth, by using Mahalanobis distance we find that based on 4 predictors and a sample of approximately

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100 cases the highest value is 7, which is far below 18. The latter is seen as a critical level to conduct additional research. Finally, to measure if a single case influences the variance of regression coefficients we used the covariance ratio. Table 4 shows that all values that were found are lower than the critical value (0.85), which means that the influence of the cases are not significant.

Table 4. Results of high leverage points

Case	Standardized DF Beta constant	Standardized DF Beta (number of bundled services)	Standardized DF Beta (Private firm versus Public firm)	Standardized DF Beta (Marketing excluded versus included)
Firm 2	0.06	-0.11	0.07	0.18
Firm 6	0.61	-0.82	0.23	0.51
Firm 14	0.09	-0.09	-0.02	-0.06
Firm 17	-0.20	-0.10	0.14	0.13
Firm 87	-0.17	-0.09	0.12	0.11

Case	Standardized DF Beta (0 - 5,000 employees or 20,000 and more)	Cook's Distance	Leverage Value	Mahalanobis Distance	Covariance Ratio
Firm 2	-0.44	0.06	0.03	1.91	0.83
Firm 6	-0.48	0.19	0.11	6.82	0.68
Firm 14	0.35	0.04	0.03	1.91	0.78
Firm 17	0.26	0.04	0.01	0.88	0.84
Firm 87	0.22	0.03	0.01	0.88	0.75

As we opted to conduct an explorative study a stepwise regression was used. The results of the regression analysis is shown in table 5. The first step of the stepwise method exists of the constant combined with the 'number of bundled business services' resulting in 26% explained variance (R^2 = 0.26). Next, we combined the dummy's number of bundled business services, Market characteristics, and Marketing excluded from a bundle versus included, resulting in an increase of the explained variance to 41% (R^2 = 0.41). Finally, in the third step the constant, the number of bundled business services, Market characteristics, Marketing excluded from a bundle versus included, and the dummy number of employees were included. The explained variance increased further to 46%.

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Table 5. Stepwise regression

	Beta	Standard Error Beta	Standardized Beta
Step 1			
Constant	2.26	0.15	-
Number of Business Services	0.21	0.05	0.51***
F = 21.76 (p < 0.001)			
R^2 *=.26*			
Step 2			
Constant	2.17	0.14	-
Number of Business Services	0.29	0.05	0.69***
Market characteristsics (Private firm with Business Services versus Public firm with Business Services)	-1.18	0.33	-0.37**
Marketing excluded from a bundle versus included	-0.70	0.29	0.27*
F = 14.37 (p < 0.001)			
R^2 *= .41*			
Step 3			
Constant	2.05	0.15	-
Number of Business Services	0.29	0.05	0.69***
Market characteristsics (Private firm with Business Services versus Public firm with Business Services)	-1.12	0.41	-0.26**
Marketing excluded from a bundle versus included	-0.74	0.28	-0.28*
Number of employees (0 to 5,000 versus 20,000 employees or more)	0.32	0.15	0.21*
F = 12.59 (p < 0.001)			
R^2 *= .46*			

** p < .05 ** p < 0.01 *** p < 0.001*

5 Discussion

5.1 Constructs

When discussing the construct *Bundle strategy* our results indicate a correlation between the strategy of firms to bundle business services and a perceived degree of maturity. This finding may assume that firms that apply this strategy may achieve a higher degree of organizational effectiveness. Sourcing literature [41] illustrate that firms that put effort in developing and shaping a sound sourcing strategy are more able to outsource operational tasks while mitigating risks. This implies that firms need some degree of maturity to deal with complex arrangements. The survey results of the firms' *experience in managing bundled services* show that the degree of experience in managing multiple business services correlate with their maturity. The interviews as well as the questionnaire data demonstrate that the vast majority of firms started with centralization of business services by means of implementing SSCs. Based on previous research [42], we argue that firms that originally set up modularized business services already gained experience in managing complex services. As such, firm experiences

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influenced their maturity level positively. With regard to the construct *Market characteristics* we found no difference in maturity between private and public firms. We assumed that there would be a difference as firms that act in the public sector have better process management skills to deal with organizational complexity [36], which, in turn, influence the maturity level of firms positively. An explanation might be the limited number of public firms that were part of the survey. An equal percentage of private and public firms might show other insights. Regarding the construct *Finance and Accounting* our research demonstrate that when the F&A function forms a part of a bundle this correlates with the level of firm maturity. An explanation for this finding could be that F&A was one of the first business functions that was organized by means of a shared service center [43]. We may assume that since then firms have built dedicated capabilities and have gained experience in managing complex services. Consequently, their maturity increased over time. The results show no difference in maturity when firms include or exclude the construct *IT* as part of a bundle business services. The fact that no significant differences were found could be explained by previous insights in management concerns, relating to IT. Based on an extensive survey [26] found a number of business-IT related concerns, including business-IT alignment, increase business agility and managing influential technologies (i.e. Business Intelligence, cloud computing). We may assume that if firms are able to deal with these concerns effectively, their degree of maturity will increase.

With respect to the constructs *HR*, *Procurement*, *Marketing*, *Data Analytics*, our research shows significant differences in correlations between these functions and firm maturity. It may be assumed that these type of services can be characterized as knowledge-intensive, which is a prerequisite to support primary business processes. Literature [44] reveal that firms that include knowledge-intensive business services as part of their strategy are more ready to apply innovation. As such, these firms should be mature enough to manage organizational complexity. Another explanation might be the influencing role of capabilities. Bundling multiple business services implies that firms have to accumulate specific capabilities that can only developed over a long period of time (i.e. path dependency). This is consistent with [45] who studied bundled services from a multisourcing perspective. They argue that the replication of client specific capabilities takes significant time and effort. As a result, the presence of firm specific capabilities assume a certain degree of maturity to manage business services effectively.

When interpreting the results of the regression analysis we focus on step 3 as we used the stepwise method in particular. Based on the standardized regression coefficients the research shows that the number of business services has the strongest impact on maturity. An increase of business services correlates with a higher degree of maturity. In the second step the dummy Market characteristics and Marketing were included. We found a negative linear relationship between these variables and maturity. This means that the maturity of a firm acting in the public market is lower, compared to a firm in the private market. The same goes for the Marketing function, as adding this function to a bundle does not increase firm maturity. Finally, addressing the size of the firm, we find a positive linear relationship to the level of firm maturity. Based on the outcome of the regression model the R^2 measure of 0.46 indicate that 46% of the data is

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predicative. This fits with our aim to conduct a highly exploratory study. The final regression function can be constructed as:
Maturity of business services = 2.05 + 0.29 (number of business services) -1.12 (public or private firm with business services) -0.74 (marketing as part of business services) + 0.32 (>20.000 employees).

In other words the maturity of firms in managing business services correlate with the number of business services included and the size of the firm. With regard to the number of business services our interviews revealed that before the bundling process firms modularized services by means of separate entities (i.e. shared service centers). As a next step firms gradually added services to a bundle to deal with organizational complexity. This finding is related to previous research [7] in which the authors call for more research why firms gradually bundle services over time. With regard to the size of the firm we argue that specifically large private-oriented firms have the capacity to attract highly skilled personnel with the experience to deal with the complexity of managing bundled services. Moreover, we may assume that large firms are more able to develop capabilities to support bundled services compared to smaller firms. As the research objective of this paper is to study the effects of bundling business services on firm maturity we used variance tests and regression analysis. Both analyses demonstrate that private-oriented firms are more mature compared to public-oriented firms. Moreover, firms with a high number of employees are more mature compared to smaller sized firms. However, our study reveals significant differences between both analyses. Variance tests show that firms that bundle business services are more mature compared to firms that manage a single type of service. The same goes for the functions Finance and Accounting, HR, Procurement, and Data Analytics that are more mature compared to firms that exclude these functions in a bundle.

These differences do not show up in the results of the regression analysis. It can be argued that these differences in analyses are due to other effects. Mann-Whitney variance tests are based on bi-variate relationships, which exclude other effects as is the case in using regression tests. Another difference between both tests lies in the Marketing function. Variance tests show that firms that include Marketing are more mature compared to firms that exclude Marketing in a bundle. This result is in contrast with the regression test that illustrates that including Marking in a bundle does not lead to a higher maturity. An explanation can be found in the way in which the variables are tested. When using regression analysis the variables under study are tested without changing other variables. This means that the other variables are seen as constant and only the partial correlation between the two variables is tested which are controlled by the other constant variables, as is not the case when conducting variance tests. We may argue that the outcome of the regression test is, therefore, more robust compared to the variance test.

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5.2 Implications for Practice, Limitations and Suggestions for Further Research

Addressing the managerial implications, firms' executive management should develop a conscious bundling strategy taking the studied influencing factors into account. By gradually adding business services to a bundle, managers are able to strengthen their capabilities and redesign their organizational structure. As such, they are able to manage organizational complexity while limiting the degree of uncertainty. Importantly, firms should modularize their business services first as a prerequisite to bundle and unbundle business functions. Moreover, firms should develop processes to cater for changing circumstances when business services are added or removed of a bundle.

Our study identifies multiple issues that require further research. First, considering the managerial complexity of bundled services we recommend more detailed research to the effects of establishing relationships between business departments (demand-oriented) and delivery units (supply-oriented). Relevant topics are related to the effects of managing bundles services on existing or new type of sourcing capabilities and governance mechanisms. Second, a limitation is imposed by the unbalanced response to what extent sourcing modes are provided in-house (i.e. shared service centers) or outsourced to the market. We suggest that future research will examine this effect and their influence on firm maturity in more detail. Third, in future research, a more extensive survey among firms is helpful to develop our model further in order to generalize the results. Future empirical research is necessary to study the relationships between the variables and their effect on firm maturity. To really understand causal mechanisms a longitudinal research approach is necessary. In this paper we only try to focus on covariance and we refrained from statements implying effects or impacts, being aware that effects may also be inverse to what is proposed in the research model. In addition, scholars may create insights in how bundled services have an impact on firm effectiveness and performance. Future research could examine this effect.

6 Conclusions and Contribution

The aim of this research was to study the effects of modularization and, next, bundling services on firm maturity in the context of business services. Based on a questionnaire and in-depth face-to-face interviews we found evidence for the relevance of influencing factors. Although directed on model testing, this research is highly exploratory. The results as presented in this paper are a first attempt to interpret bundling effects on firm maturity. The findings provide evidence that the number of business services and the size of the firm correlate with the maturity of a firm.

Since empirical research on the bundling of modularized business services is scarce, our contribution of this study is threefold. First, the vast majority of research on business services studied individual sourcing modes (i.e. shared services centers or outsourcing services). We studied various influencing factors from a holistic perspective (i.e. complementary sourcing modes) and relate the outcome of bundling

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effects to firm maturity. This is contrary to previous research that studies bundling effects from an outsourcing perspective [7]. Secondly, as the topic of modularization of business services is under-researched, our study contributes to partially filling this gap by studying specific business services in more detail and explain bundling effects on firm maturity. Third, this study also contributes to IT sourcing practitioners by increasing the awareness of the relevance of bundling various business services and its effect on maturity. We expanded previous research of [7], who studied bundled ITO/BPO services in the period 2003 and 2008 by taking a more in-depth view on business services and provided actual insights.

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