An Empirical Study on Business/ICT Alignment in European Organisations

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Abstract

The information and communication technology (ICT) literature has demonstrated that alignment between business and ICT has a positive effect on business performance and effectiveness. This study builds on these results, complemented with some theoretical foundations of the firm, to argue that Business/ICT alignment can be the basis of a sustainable competitive advantage for organisations. To do so, we first evaluate how well-aligned European organisation really are. We report on the results of a survey[1] carried out in Belgium, France, Germany, United Kingdom, The Netherlands, Italy and Spain. More than 640 valid responses were analysed. The goal of the study is twofold: to analyse context dependency of business/ICT alignment and to deduce some practical guidelines for managers in the field. Two important results are discussed: First, we demonstrate the influence of different ICT strategies on alignment performance. Next, we describe how organisations which establish specific ICT management routines obtain, on average, better alignment performance scores.

1. Introduction

Numerous articles in the area of information systems have examined the necessity and desirability of business/ICT alignment [5-11], and its importance is now well recognised. Many articles argue [12-13] that greater alignment between business and ICT domains leads to superior performance or perceived business performance [11]. Some can even prove this with empirical evidence [7]. This paper will not try to replicate these studies. Most of the models used in these articles focus on a certain point in time and examine the performance implications of business/ICT alignment. These models are rather static in nature. Other theories focus on the dynamics of business/ICT alignment [14] arguing that it is important to understand how alignment evolves over time. These studies focus more on the evolving alignment process rather than on how to obtain a state of alignment. It is important to stress that most authors agree on the fact that business/ICT alignment is a *dynamic process* rather than a *static state.* It is the methodology of studying the alignment phenomenon that gives rise to static (cross-sectional analysis) or dynamic studies (longitudinal analysis). We can say that there have been two main streams in alignment literature, each focusing on a different yet complementary question: How do organisations *obtain a state of alignment*? How do organisations *maintain a state of alignment* over time? Our research is to be situated in this first research stream, focussing on how organisations can obtain business/ICT alignment.

Much of the prior research on business/ICT alignment is limited in two ways. First, alignment research that incorporates *context dependency* is scarce. Previous research established that there is not "one design fits all contexts" in business/ICT alignment [15, 16], yet empirical research looking at different organisations in different operating environments is rather limited. Second, many of the conceptual models developed, although valuable awareness and positioning frameworks, lack *practical handles* for managers and organisations. This shortcoming has been argued before in alignment literature [15, 10]. This paper seeks to contribute to the business/ICT alignment body of literature by addressing these limitations. It analyses whether there are significant differences in business/ICT alignment performance for different

[1] This survey was made possible by and carried out with PricewaterhouseCoopers Belgium.

countries, industries and organisation sizes thus incorporating context dependency in the study. Furthermore, it examines which specific variables are able to differentiate between highly aligned and poorly aligned organisations. Since those variables include a number of ICT management practices, practical applicability is taken into account in the study. Finally, rather than examining the relationship between business/ICT alignment and business performance, the focus is on understanding which factors are important in obtaining alignment. With this introspective view, we try to look into the black box of business/ICT alignment.

The rest of the paper is organised as follows. We first develop the theoretical background for this study, and then explain the research methodology. The next section describes the results obtained from this study. Finally, the paper's findings, limitations and implications are discussed.

2. Theoretical Development

Information system researchers have suggested that organisations can possibly create a competitive advantage by investing in and exploiting ICT. This type of competitive advantage, however, will be short-lived, and thus not sustainable, if it solely results from the deployment of superior technology. This is because the same ICT, once deployed as a strategic advantage, easily becomes a competitive necessity over time [17, 18]. Grasping how organisations exactly obtain competitive value and business value from their investments in ICT has been a challenge for the research community. It has been suggested that a sustainable competitive advantage from ICT investments results from good management of ICT [1-4] and the organisation's ability to harness and leverage complementary organisational resources in designing, acquiring, deploying and using ICT [19, 20]. Other researchers suggest that effective strategic information systems planning [21], business/ICT alignment [7, 22] or ICT infrastructural capabilities [18] are the critical factors in obtaining business value from ICT investments. In this section, we focus on business/ICT alignment and use the resource-based view of the firm in combination with the evolutionary view of the firm to argue *why* alignment can be the basis of a sustainable competitive advantage for organisations.

2.1 The Resource-Based View of the Firm

Before we can enter into a discussion on the resource-based view of the firm we need to clearly define the terms and concepts surrounding this stream of literature. We use the framework of Peppard & Ward (2004), which makes a clear distinction between resources, competences and capabilities. *Resources* are stocks of available factors that are owned or controlled by the organisation i.e. information, systems, technology, skills and knowledge. *Competences* refer to an organisation's capacity to deploy resources using processes, practices and structures to effect a desired end. Finally, a *capability* refers to the strategic application of competences to accomplish organisational goals. Figure 1 (adapted from [29]) gives an overview of the model used in this paper. In section 3.1 we elaborate further on the competences used to measure the alignment *capability* of organisations. Section 3.3 looks at the structures, processes and practices used to create alignment *competences*. To summarise, resources are what an organisation has under its control or at its disposal; competences are the abilities of the organisation to develop, mobilise and use those resources; capability is what the business can achieve through focused investment and deployment of competences [29].

The Resource-Based View of the firm argues that an organisation's bundle of resources, which include tangible and intangible assets, knowledge and skills are the primary predictors of superior financial performance. The logic is that a sustainable competitive advantage can be created when there is *resource heterogeneity* (resources are different across organisations) and *resource immobility* (competitors find it hard to imitate or substitute these resources). Therefore, this theory argues that an organisation should create unique, inimitable competences as a means to create a sustainable marketplace advantage [23, 24]. Business/ICT alignment can become a unique capability as the alignment competences satisfy both conditions of resource heterogeneity and resource immobility. Much of the knowledge and expertise on how to align business and ICT in an organisation is company-specific, tacit in nature and difficult to codify and replicate. Company-specific competences develop in a cumulative and evolutionary matter and generally exhibit path-dependent characteristics [24]. Furthermore, the ICT infrastructure and

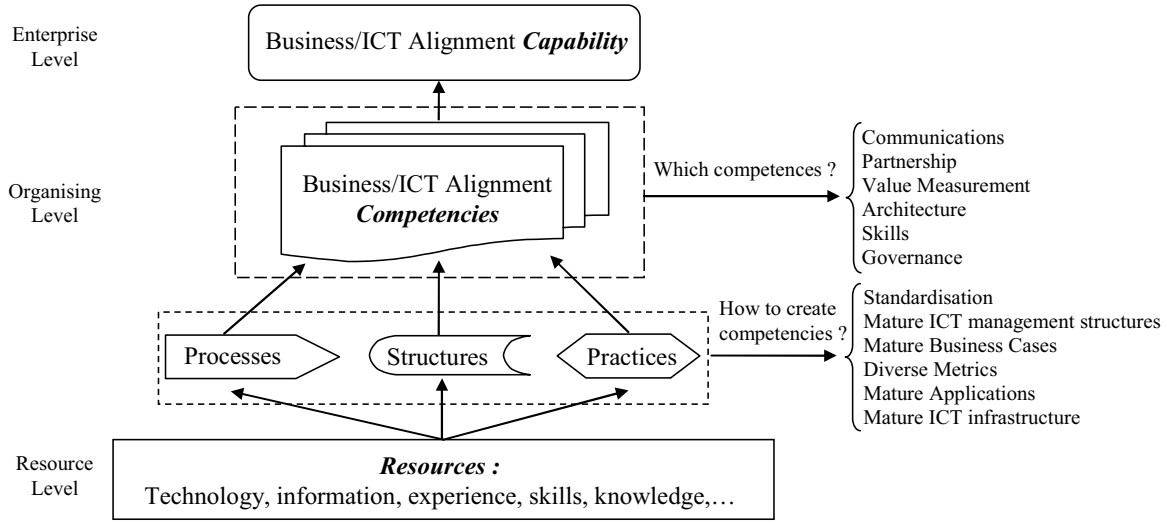

Figure 1. Alignment Capability, Competences and Resources (Adapted from Peppard & Ward, 2004)

architecture, the resources available, organisational structures, the company culture and many other aspects uniquely define an organisation. Only those organisations that manage to align business and ICT using their unique mix of company-specific resources create a resource-based view alignment capability that can lead to a sustainable competitive advantage.

2.2 Evolutionary-Based View of the Firm

The evolutionary-based view of the firm is complementary to the resource-based view as they both support the notion of organisational heterogeneity and give primary consideration to how organisations develop and accumulate company-specific knowledge and expertise that provides the basis for their distinctiveness [24]. Evolutionary economists challenge the idea that organisations only achieve long-term success by innovations and major breakthroughs. Instead, they focus more on continuous learning, knowledge accumulation and gradual build-up of knowledge as a means for organisations to become successful. At the basis of the evolutionary-based view is the concept of *routines*. Routines are the result of past learning efforts and constitute the organisational memory of a firm. Tacit knowledge, know-how, skills and expertise are stored as routines in organisations [25]. The evolutionary view is important to the study of business/ICT alignment in at least two ways. Firstly, it suggests that organisations will not develop high levels of alignment overnight. It will not be sufficient to align an organisation once every 2 or 3 years and think everything will work fine. Rather, alignment develops through an extended phase of learning and unlearning, knowledge accumulation and builds on organisation-specific routines. Secondly, the concept of routines combines quite well with the resource-based conditions of resource heterogeneity and resource immobility. Alignment routines are typically organisation-specific and thus difficult to copy.

3. The Research Model and Constructs

Figure 2 shows that this paper consists of two main parts. We start by constructing an *alignment score variable* and then use this variable to answer two questions:

1. Which *descriptive variables* are important in relation to the alignment score variable?

2. Which *ICT management practices, structures and processes* are able to discriminate between highly aligned and poorly aligned organisations?

The first part of the study answers the question of *context dependency* (cf. supra). Here we analyse whether variables as country, industry, company size, turnover, M&A activity, business strategy and ICT strategy have a significant influence on the alignment score variable. The alignment score, as will be discussed in section 3.1, gives us an indication of the alignment *capability* of an

organisation and is the aggregation of business/ICT alignment *competences* as defined in figure 1. The second part of the study provides some *practical handles* for managers in the field. We look at some specific, actionable ICT management practices, structures and processes (cfr. figure 1) and determine if they are able to discriminate between highly aligned (= high score on the alignment variable) and poorly aligned organisations.

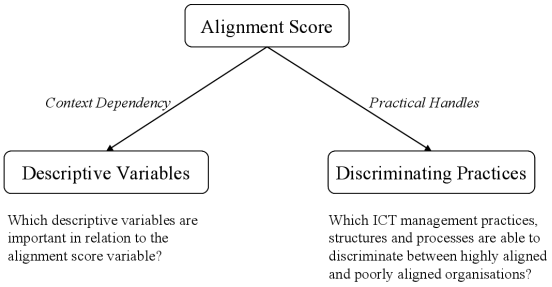

Figure 2. Overview of the Paper

3.1 Alignment Diagnosis: High or Low Alignment Capability

In a first phase, we constructed an alignment score variable. This variable gives us an indication of the alignment capability of an organisation. It is made up of six groups of alignment competences. We selected the alignment competences based on Luftman's components of alignment [27]. Some of the questions are also inspired by the recent work of Benson et al. [28]. Table 1 gives an overview of the alignment competences used for constructing the alignment score variable along with some examples. This alignment score variable is what we call a *diagnostic variable*. Using this variable, we can diagnose an organisation to have a poor alignment capability, to show some of the symptoms of alignment or to have a high alignment capability.

It is important to understand that, throughout this paper, when we talk about high or low alignment we refer to a high or low score on the alignment score variable that we designed. Therefore, alignment as defined here is a relative concept, based on the organisation's perception and scored on a theoretical framework. We used 26 survey questions to calculate this alignment score. Organisations were asked to evaluate themselves using the following scale; 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree.

3.2 Context Dependency Variables

The survey was carried out in seven western European *countries*: Belgium, France, UK, Germany, The Netherlands, Italy and Spain. We divided the organisations into five different *industry groups*: Consumer and Industrial Products and Services (CIPS), Financial Services (FS), Technology, Information, Communication and Entertainment (TICE), Public Sector (PS) and Healthcare and Pharma (PHARMA). In order to limit guessing and missing values we asked organisations to position their turnover into one of five ranges going from less than 10 million euro to more than 1 billion euro.

Alignment Competences	The ability to …
Communications	Use a common language between business and ICT
Partnership	Connect and integrate business and ICT planning and management processes.
Value Measurement	Monitor and benchmark the performance of ICT investments projects against strategic objectives.
Architecture	Systematically determine the impact of new ICT investments on existing business processes.
Skills	Minimise the resistance to change that comes with new ICT projects.
Governance	Have transparency and accountability for outcomes of ICT projects.

Table 1: Definition of Business/ICT Alignment Competences

This way we constructed five turnover ranges for the *turnover variable*. The same goes for the *company size* variable. The variable *M&A activity* measures whether merger or acquisition activity of the organisation influences ICT spending. Table 2 gives an overview of the descriptive variables along with their possible values.

Variable	Values
Country	Belgium, France, UK, Germany, The Netherlands, Italy, Spain.
Industry	CIPS, TICE, Financial, Pharma, Public.
Company Size	50-100, 100-500, 500-1000, 1000-3000, more than 3000 employees.
Turnover	Less 10 mio €, 10-50, 50-100, 100-500, 500-1 bn, more than 1 bn €.
M&A Activity	Influenced, not influenced.
Business Strategy	Operational Excellence, Product leadership, Customer Intimacy
ICT Strategy	Conservative, Essential, Innovative

Table 2: Descriptive Variables

We viewed business strategy types in terms of Treacy and Wiersema's (1994) typology of operational excellence, product leadership and customer intimacy. Successful organisations usually excel in at least one value discipline but also meet a minimum threshold of competence in the other two. In order to determine the organisation's ICT strategy type we looked at ICT adoption ranging from conservative to innovative. Table 3 gives a more detailed description of the business and ICT strategy typology used in this survey research. There are reasons to believe that different ICT strategies would be appropriate for the three business strategies.

Previous research, although sometimes using a different strategy typology, suggests that certain combinations of business and ICT strategies work better than others [11]. Weill and Broadbent suggest that the different business strategies (value disciplines) will lead to different types of ICT strategies and different technology portfolios [18]. In this paper (cf. infra) we examine whether certain combinations of business and ICT strategies obtain significant better alignment performance scores.

3.3 Building Alignment Competencies from Resources: Processes, Structures, Practices

Here we will look at more actionable variables i.e. variables that managers can influence through their daily management of the organisation. The reason that we consider business and ICT strategies as descriptive variables rather than actionable variables is that in most organisations these are long-term strategic choices that are a given in the short run. In this section, we focus on variables that relate to every-day management processes, structures, practices and concepts that are measurable, manageable and that can be built into *organisational routines*. In the end section of the paper we will show that the alignment capability increases when organisations create more routines from their processes, structures and practices and rely less on ad-hoc management. The goal of this analysis is to come up with some practical guidelines for managers in the field. To do so, we constructed six *composite variables*. These are variables, which are the result of several sub-questions from the survey. Table 4 gives an overview of the composite variables along with a short explanation.

The *ICT management practices variable* includes some governance and management practices such as programme, project, performance, risk and change management. Organisations obtain higher scores on this variable as they adopt more of these practices in combination with a high maturity of these practices. The same goes for the *business case maturity variable*. As organisations include more aspects more frequently when building their business cases, they will obtain higher scores on this variable. Some of these aspects include economic and financial contributions, match with strategic plans and impact on ICT architecture. This is similar for the *metrics diversity variable*. As organisations incorporate more metrics more frequently in their evaluation of ICT projects they will obtain higher scores on this variable. For example, an organisation that always uses ROI to evaluate ICT investments will obtain a lower score than an organisation that frequently uses ROI, cost benefit analysis, total cost of ownership and an ICT balanced scorecard. To summarise, the combination of *thoroughness* and *consistency* is necessary to obtain high scores on these three variables.

	Strategy	Description
Business Strategies	Operational Excellence	Emphasis on efficiency and reliability, price leadership, cost control and supply chain optimisation.
	Product Leadership	Emphasis on continuing product development, innovation, fast time-to-market and high margins.
	Customer Intimacy	Emphasis on customer service, responsiveness, tailoring products and services to individual customer needs.
ICT Strategies	Conservative	ICT is primarily regarded as a tool for reducing costs and the organisation only relies on proven and mature technologies.
	Essential	ICT is critical and essential to the business and the organisation invests in leading technologies.
	Innovative	ICT is used as a competitive weapon and the organisation uses it to compete at the cutting edge of innovation.

Table 3: Description of the Business and ICT Strategy Typology

Next to these variables we also included two variables that measure the technical structures of organisations. The *applications maturity variable* incorporates the use of different applications such as ERP, SCM, CRM, BI and more. As organisations have more of these applications that are fully implemented and adopted they will obtain a higher score on this variable. Finally, the *infrastructural capabilities variable* is an adaptation of the reach and range concept as used in Weill and Broadbent [18]. As organisations can reach more locations and people and if their infrastructure provides more functionality, they will obtain higher scores on this variable. The reason we included the variable COTS (Common-Of-The-Shelve) applications is to examine whether there is a difference in averagee alignment scores between organisations that custom-build their applications and organisations that rely on package solutions, with or without customisation.

4. Research Methodology

The questionnaire consisted of 25 closed questions covering several themes: facts and figures, strategic choices, alignment practices, systems, tools and techniques. Many of these questions consisted of several sub-questions or multiple options. For most of the questions, organisations had to evaluate themselves on five-point scales ranging from 1=strongly disagree to 5=strongly agree. The themes and questions included were all subjected to a *three-phased Delphi-test*. A first questionnaire was tested on a group of academics with an expertise in ICT and survey design. Their suggestions and comments were included in a second version of the questionnaire, which was tested on a group of consultants. Finally, a third version of the questionnaire was tested on a number of ICT managers from the field. The Delphi-testing contributed to a survey that is both *academically sound* and has *practical relevance*.

4.1 Data Collection

We gathered the data using a restricted, web-based survey carried out in seven European countries (cfr. supra). Lists of organisations from different industries and different sizes were compiled and all organisations received an invitation and access code. From the 790 responses received, we removed responses with inconsistent answers or too many missing values from the dataset, leaving us with 641 valid responses to the survey. We have a valid spread of countries, industries and company sizes. About 78% of respondents have an ICT function from whom 22% are CIO's and 30% are head ICT managers.

Variable	Explanation
COTS Applications	*Categorical variable*: mostly custom-built applications; mostly COTS with little customisation, mostly COTS with extensive customisation.
ICT Management Practices Maturity	*Continuous variable* which measures the thoroughness and maturity of the adoption of a number of ICT governance practices in organisations.
Business Case Maturity	*Continuous variable* which measures the thoroughness and maturity with which organisations build their business cases for ICT projects.
Metrics Diversity	*Continuous variable* which measures the thoroughness and maturity with which organisations evaluate their ICT projects.
Applications Maturity	*Continuous variable* which scores organisations on the broadness and maturity of their applications portfolio.
Infrastructural Capabilities	*Continuous variable* which scores organisations on their infrastructural ICT capabilities.

Table 4: Composite Variables for Processes, Structures and Practices

4.2 Data Analysis

In a first phase, we prepared the data for further analysis. We searched for correlations among the variables in order to avoid bias in the analysis. Furthermore, we also standardised variable scores. Next, we used two different statistical techniques to analyse the survey data. We used MANOVA (Multivariate ANalysis Of Variance) to study *the context dependency problem*. The variables from table 2 were coded thus obtaining seven categorical variables, which each have two or more levels. We are interested in determining if the categorical independent variables (country, industry, company size, turnover, M&A activity, business strategy or ICT strategy) affect the metric dependent variable (alignment score).

Secondly, we used logistic regression to analyse *the practices data.* The general idea is to look for discriminating management practices, structures and processes i.e. variables, or combinations of variables, from table 4 that are able that discriminate between highly aligned (=high alignment capability) and poorly aligned (=low alignment capability) organisations. For this analysis, the dependent variable is the alignment score variable and the independent variables are the variables from table 4. The dependent variable alignment score has been discretised for this analysis. We put together two groups, one containing highly aligned organisations and the other the poorly aligned organisations. For the analysis, all organisations obtaining an alignment score higher than the average score of 57 out of 100 were classified as highly aligned organisations. The others are poorly aligned organisations. In order to check the robustness of our analysis we used different methods to form these two groups. For example, we performed the same analysis on the 90^{th} (highly aligned) and 10^{th} (poorly aligned) percentiles of alignment scores in order to check whether the results still hold for the extremely good performers versus the extremely poor performers. All analyses resulted in the same combination of discriminating factors. Again, the goal of this analysis is not to build an accurate predictive model but to see which combination of variables have high discriminating power.

5. Results

Alignment performance varies significantly across enterprises and is approximately bell shaped. The average alignment score was 57 out of 100. The top third performing organisations had scores over 67 but only about 5% of organisations scored 80 or above. Figure 3 shows the distribution of the alignment score variable for all 641 western European organisations. It is clear that most organisations can be found in the middle belly of the distribution. These are the organisations that either posses insufficient alignment competences and/or fail to succesfully deploy them to an alignment capability on enterprise level (figure 1). This shows that for many European organisations there still is a lot of room for improvement. Furthermore, only those organisations that can be found in the right tail of the distribution can potentially create a sustainable competitive advantage from their

alignment capability. So, for the bulk of western European organisations, there still is a lot of potential to improve business/ICT alignment and use it as a way to differentiate themselves from the competition.

From the *context dependency analysis,* we conclude that organisations have to deal with alignment problems regardless their size, industry, country, turnover, M&A activity or business strategy. Each of the subgroups of the variables are characterised by a high within-group variance. For example, if we look at *company size* we see that regardless whether we look at small or large organisations, they all have very low and very high alignment performers. There is a large spread within each subgroup of the variables. The average alignment scores are not significantly different between different countries, sizes, turnovers and business strategies.

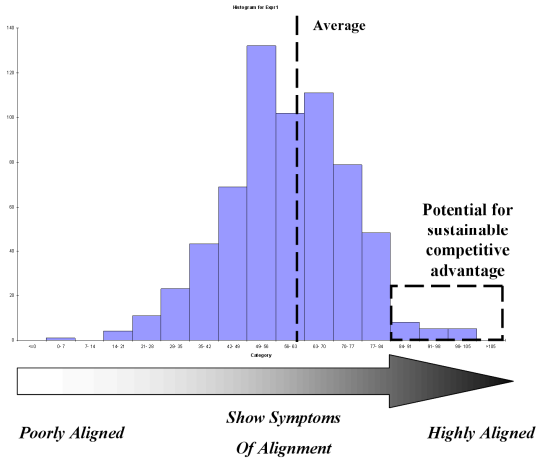

Figure 3. Distribution of Alignment Scores

The MANOVA analysis showed no interaction effects between the variables and only a main effect of the ICT strategy variable on the alignment score variable. The ICT strategy variable is the only variable from table 2 that has an important influence on alignment scores. We discovered that as we move from conservative over essential towards innovative ICT strategies, the average alignment score increases and the distribution of scores shifts to the right, towards higher alignment scores. Much more organisations with an innovative ICT strategy can potentially build a sustainable competitive advantage from alignment than for example organisations with a conservative ICT strategy. The degree of innovativeness in ICT strategy clearly influences the alignment score. On the other hand, business strategy has no noticeable influence on alignment scores. Thus, only those combinations of business and ICT strategies with more innovative ICT strategies, regardless the business strategy, outperform the other combinations.

By crosschecking the ICT strategies with other survey questions we found out that organisations that are more innovative in their ICT strategy are typically those organisations that use ICT as a business investment that enables new ways of organisation and management. They consider ICT as an important investment that impacts the current and future competitive performance of their organisation. On the other hand, organisations with more conservative ICT strategies consider ICT more as a cost center that is only needed to keep the organisation running. The danger of this approach of course is that ICT can quickly become an island of automation that is isolated from the business. The results from this survey confirm that conservative ICT strategies on average obtain much lower alignment scores. In conclusion, we can say that *context, in general, does not play a determining role in alignment issues*. Looking at alignment performance, we did not find any significant differences for most of the contextual variables.

In the following section we analyse which practices, structures and processes are associated with high alignment scores e.g. which organisations do we find in the right tail of the distribution? We used logistic regression. When we look at table 4, we discovered that only three of the six variables are significant at a 5% level: business case, ICT management practices maturity and application maturity. This means that organisations that have mature ICT Services, applications and build good and extensive business cases are likely to be much better aligned than organisations that do not. These are the only variables from our study that have a significant influence on the alignment score. The most important one is the business case variable. Organisations that build broad and thorough business cases for their ICT investments, including different aspects more frequently, have higher odds of belonging to the group of highly aligned organisations. This means that organisations should not only consider the financial aspects of an ICT investment but also the impact on the existing ICT architecture, how the investment supports the organisation's strategic objectives, the contibution of the investment in keeping up with the competition etc. In fact, the financial aspects (economic impact)

have the least differentiating power between highly and poorly aligned organisations (figure 4).

Combining these different criteria allows organisations to better evaluate the contribution of the ICT investment to the business goals. An evaluation based purely on economic impact can lead an organisation to launch projects that appear less expensive, yet they contribute little or nothing to their strategic intentions. Furthermore, not considering the impact of the investment on the existing ICT architecture can lead to a dispersed ICT infrastructure or application portfolio, which will quickly become less manageable or more expensive to operate. Finally, in the context of project and portfolio management, the combination of various criteria allows better investment prioritisation, which is more likely to sustain the organisation's long-term strategic objectives.

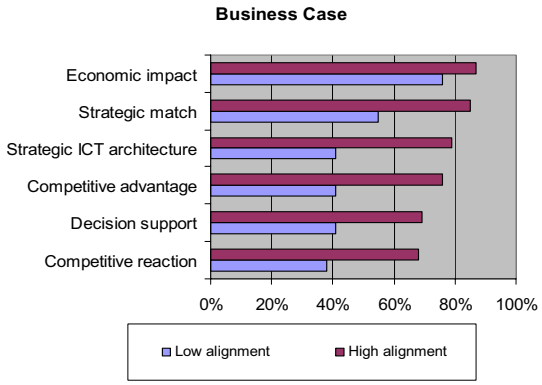

Figure 4. Business Case and Alignment

Furthermore, organisations that have more extensive and mature portfolio, project, program, risk, change, performance, service and enterprise architecture management practices have a higher probability of belonging to the group of highly aligned organisations. These are typical structural elements used to govern an organisation's ICT investments. Figure 5 shows that as the maturity of these practices increases (ranging from *level 1:ad-hoc* to *level 5: managed and measurable; CMM levels*), the fraction of highly aligned organisations also increases. Typically, what we see is that organisations with high alignment scores have more mature structures, practices and processes in place for measuring and managing their ICT investments. So building routines into your structures, practices and processes rather than ad-hoc management of ICT investments contributes to an organisation's alignment capability. This adds to the idea that alignment should be continuous and an every-day concern that has to be built-in through the organisation's routines. By consistently and thourougly measuring and managing ICT investments these routines become more mature and contribute to managing ICT as a regular business investment.

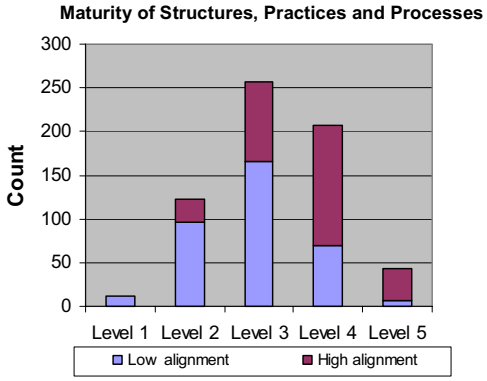

Figure 5. Effect of Building Routines

6. Conclusion

This study clearly shows that alignment is a problem that affects all types of organisations, industries and strategies. We also showed how a number of aspects of good governance of ICT investments have an important impact on business/ICT alignment. Organisations that use ICT as a real business enabler and include the impact of ICT investments on different aspects of the business when building their business cases will be better aligned. Managing, measuring and optimising ICT management processes for ICT investments also brings business and ICT closer together. In this paper we stressed the importance of creating alignment competences that can lead to an enterprise-level alignment capability. Alignment competences are created by leveraging the organisation's specific resources through processes, structures and practices. Alignment should be every-day business for organisations which should result in the presence of mature alignment routines. Alignment is different for each organisation and therefore should be cultivated as a unique, inimitable company capability thus using it to build a sustainable competitive advantage.

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