

Effects of Subcontracting in Information Technologies on Competitive Advantage of GSM Operators in Turkey

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Business support functions like Information Technologies are always considered as cost centers. Today's companies generally focus on core business functions and outsource support functions. Also some of them choose subcontracting which is a type of outsourcing. This article represents an investigation of the effects of subcontracting at information technologies function on competitive advantage of the Mobile Telecommunication service providers in Turkey by a case study of a GSM Operator in Turkey. We explain the negative correlation between subcontracting and competitive advantage by demonstrating the changes on the business requests' completions of the company in the period of 2006 to 2010 in a qualitative way.

1. Introduction

Outsourcing has been more popular since 1980' s, especially at IT function. Also outsourcing has been a choice at all other business support functions, too. Today' s business trend is 'focusing on core business competencies'. But is it really efficient to outsource IT for your competencies if your core services/products are all produced by IT capabilities? Companies often ask this question before the outsourcing decisions and they become noncommittal about outsourcing issue. Subcontracting is also a type of outsourcing. We see that, 'outsourcing by subcontracting' have been applied at Turkish Mobile Telecommunication Operators' IT functions. They prefer to use outsourced IT resources for their IT works. But these resources are usually used at core product and service developments and administrations, which are the main competition instruments for Turkish GSM market.

Is there a relation between subcontracting in IT and competitive advantage of the GSM operators in Turkey? There are many articles investigating outsourcing in IT - operational effectiveness or cost reduction relation in the current literature. But none of the past and recent studies have focused on subcontracting - competitive advantage relation in Turkish GSM IT. So, this is the motivation behind our study. We want to clarify the effectiveness of subcontracting and its effects on competitive advantage of the GSM operators in Turkey. We investigate this issue by a case study of one of the GSM operator in the Turkish GSM market. The findings that are shown on methodology and results sections, clarify the negative correlation between subcontracting in IT and competitive advantage.

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2. Literature Review

When we look to the literature about subcontracting and outsourcing IT function at Turkish mobile telecommunications. We can't find any research about the effects of outsourcing/subcontracting IT function on competitive advantage of Turkish GSM companies. We can't find an article about this specified issue also in global literature. So we focused on the literature about outsourcing, subcontracting and competition at mobile telecommunications.

McMillan (1995) enumerates the main changes introduced by the U.S. firms in their supplier relationships. One of these changes is the increment in the production subcontracting. Earl (1996) considered the eleven risks of outsourcing. On the other hand, Abraham and Taylor (1996) show the increment in the contracting out of business services in U.S. Industry. Bakke (1996) analyzed the competition at telecom sector by case studies.

The “outsourcing” should be included in the general context of the “make” or “buy” decision. Just as it exposed by Coase (1937), this type of decisions determines the boundaries of the firm. Since Williamson (1985) and Grossman and Hart (1986), a body of literature has focused on the role of transaction costs, asset specificity, and incomplete contracts in the “make” or “buy” decision. However, most of this literature has treated the industry environment as given and has focused on the relation between a single producer and a potential supplier.

Olmsted and Jamison (2001) investigated the forces contributing to the globalization of telecommunications services, major telecommunications strategies and strategic alliances in the global market, and factors that may have contributed to the outcome of these alliances. They also analyzed best product differentiation as a competitive advantage. Grossman and Helpman (2002) have developed a model in which integration and “outsourcing” are treated as equilibrium phenomena (taking into account the interdependence among the firms' choices). These authors focus on the trade-off between the costs of running a larger and less specialized firm and the costs from search frictions.

In many organizations there are often subsets of experiments that are regularly carried out to determine the effects of new processes or technologies that might have the potential to modify the competitive environment of an established firm; these experiments are ‘strategic’ in the sense that the outcome could add to or change the critical resources, competencies or product markets that a firm uses as its basis for competition (Govindarajan and Trimble 2004). Kervinen (2005) analyzed competitive advantage of cross-functional teams in New Zealand's telecommunication industry. Savasci and Gunay (2008) analyzed creating customer values as a competitive advantage at Turkish mobile telecommunications.

MacKenzie (2008) traced the development of subcontracting within Eircom, the Irish telecommunications provider, from its relatively ad hoc origins in the mid-1990s to the development of a far more sophisticated contracting regime by 2003. The article explores the relationship between internal and external organizational changes associated with the construction of the subcontracting regime and the development of inter-organizational relationships.

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Global and local literature has focused on outsourcing/subcontracting and competitive advantage issues separately. We haven't found any article considering subcontracting – competitive advantage issue. According to the gap in the literature, this article is investigating the relation between subcontracting in IT and competitive advantage.

Mobile Telecommunications in Turkey

Turkey met Mobile Telecommunications at 1994. There are currently three mobile communications operators in Turkey: Turkcell, Vodafone and Avea. As of the end of September 2010, the mobile line penetration rate was approximately 85% and there were over 65 million subscriptions in Turkey according to the operators' announcements and market estimates.

The Turkish population is young with an estimated average age of 29, which is lower than elsewhere in Western Europe, and the majority of the population lives in urban areas. These factors indicate growth potential for the mobile communications market in Turkey. This market potential also increases competition level for these three existing mobile operators.

Milestones for the competition in the Turkish mobile telecommunications are:

- Mobile Number Portability system, which allows GSM customers to carry their unique mobile number to another mobile operator (2008).

- * 22,871,324 mobile numbers are ported between 3 mobile operators in two years time.

- * Operators lost the advantage of being the owner of the mobile number. This advantage passed to the subscribers. So a harder competition occurred at the market.

- Launching of 3G services by the operators (2009).

- * This new technology brought new product opportunities to the operators. New tariffs and campaigns are launched.

- * Mobile operators became a competitor for fixed lined operators, because of broadband data usage advantage of 3G infrastructures.

- * New players entered the market, like 3G modem producers.

It is observed that, operators create competitive advantage by two ways by using Information Technologies. These are *time to market* and *product differentiation*.

Time to Market is the length of time it takes to get a product from idea to marketplace. It is important for Turkish GSM operators for product launching dates. Tariffs, campaigns and promotions must be declared to the customers quicker than the competitors.

Product Differentiation is a process that showcases the differences between products. Differentiation looks to make a product more attractive by contrasting its unique qualities with other competing products. Successful product differentiation creates a competitive advantage for the GSM operator, as customers view these products as unique or superior.

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IT Services at Turkish Mobile Telecommunications

Customer Care & Billing Services

Billing includes rating, collections, accounting, payment processing, invoice formatting, tariff, bookkeeping and reporting. Billing is a business support process, which communicates with other system components, enables the invoicing of all offered services and assures the operators' revenue streams.

A billing service consists of a data processing system and the people running the system. The IT system itself is divided into the hardware that provides the Infrastructure Hosting and Operations and the software which includes the billing application, the database, necessary licenses and the functional application operations. Billing also includes a subscriber management system, which is used for customer care. Billing system use the data produced by customer care system.

Customer Care System is the interface of all customer operations and complaints. Agents use this interface to operate all these customer activities. Also customers themselves can operate their own transactions by 'self service' channels. These channels are; IVR, SMS and WEB.

Billing Process:

- Event Sources and Tracking (triggered by CRM software)
- Mediation Devices
- Call Detail Records (CDRs)

Major Billing Functions:

- The Rating Engine: Processing the Usage (CDR processing)
- The Invoicing Engine: Month-End Processing (for every billing period)
- Invoicing
- Processing Payments
- Posting to the Financial System

Customer Relationship Management (CRM) :

- Account Activation
- Account Management (including tariff & campaign management and customer information updating, product offerings etc.)

Mediation Services

A billing mediation platform is a system used to convert data of certain data types to other data types, usually for billing purposes. Billing Mediation Platforms are used mostly by telephone companies, who typically need to process UDRs (Usage Detail Records). In call scenarios UDRs are most often known as CDRs (Call Detail Records), and among broadband carriers they are often referred to as IPDR.

The CDR/UDR data types could hold data such as NPX, NPA, Call Duration, peak time flag, call length and this data may be represented in binary formats. The billing mediation platform

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typically reads this data and converts into common normalized format. Billing Systems and all other downstream systems, in turn, converts this data to component understandable format. Billing mediation platforms get their name from their behavior: they "mediate" between a variety of other systems. In the typical telephone company scenario, the upstream systems (those providing data to the mediation platform) are network elements, such as telephone switches, and the downstream systems (those receiving data from the mediation platform) perform accounting, auditing, archiving or bill-generation functions. The mediation system collects, collates and prepares data for consumption by the downstream systems, which often accept data only in a limited set of formats.

Typically a mediation platform is used for the following tasks:

- Collection and validation of CDRs
- Filtering out of non billing-relevant CDRs
- Collating
- Correlation of different input sources CDRs
- Aggregation of partial CDRs related to the same call
- Format change and CDRs normalization
- Business transformation of data

In a telecom-billing scenario, mediation is the first step after receiving a CDR. The mediated CDR is forwarded to a rating engine, which calculates the charge associated with the CDRs. In today's world Rating Engines are more becoming necessary for the telecom billing system to meet the growing variant customer needs for different services.

Despite the name, not all of the data transferred via billing mediation platforms is actually used for billing purposes. For instance, the mediation software might generate traffic volume statistics based on the number and origin of the records passing through it. Those statistics could then be used for capacity planning, as part of a network monitoring procedure, or for any other business intelligence applications. (www.wikipedia.org)

Outsourcing

Outsourcing can be defined as “the strategic use of outside resources to perform activities traditionally handled by internal staff and resources”. Sometimes known also as “facilities management”, outsourcing is a strategy by which an organization contracts out major functions to specialized and efficient service providers, who become valued business partners. Companies have always hired contractors for particular types of work, or to level-off peaks and troughs in their workload, and have formed long-term relationships with firms whose capabilities complement or supplement their own. However, the difference between simply supplementing resources by subcontracting and actual outsourcing, is that the latter involves substantial restructuring of particular business activities including, often, the transfer of staff from a host company to a specialist, usually smaller, company with the required core competencies. (Handfield, 2006)

The outsourcing or contracting out of manufacturing activities and business services has been a growing characteristic of manufacturing firms during the eighties and nineties. The

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systematic modification of the boundaries of the firm must be seen as part of the organizational innovation process, carried out in the search for increasing flexibility and efficiency.

Some common reasons for outsourcing:

- Reduce and control operating costs
- Improve host company focus
- Gain access to world-class capabilities
- Free internal resources for other purposes
- A function is time-consuming to manage or is out of control
- Insufficient resources are available internally
- Share risks with a partner company

In earlier periods, cost or headcount reductions were the most common reasons to outsource. In today's world the drivers are often more strategic, and focus on carrying out core value-adding activities in-house where an organization can best utilize its own core competencies. Companies, outsource IT for many reasons, ranging from its high profile and current popularity to cost pressures from competition and economic recession. The interest in IT outsourcing, largely results from a shift in business strategy.

Most operators outsource IT to focus on core competencies and business. Senior executives frequently view the entire IT function as a noncore activity and reason that IT service vendors have the economies of scale and technical expertise to provide services more efficiently than do internal IT departments.

Uncertainty about IT's value is another reason for the growth of outsourcing. In many companies, senior executives perceive that IT has failed to deliver the promise of competitive advantage propagated in the 1980s and 1990s. Consequently, many senior executives view IT as a necessary cost to be minimized (Lacity et al., 1996). In situations where a firm does not want to tie up some of its capital resources in IT, it can hire the IT tasks to be performed by outside companies or vendors.

Schniederjans, Hamaker and Schniederjans (2004) distinguish between the following three outsourcing strategies:

1. **Subcontracting limited work assignments:** Short-term, overflow work beyond existing capacity is assigned to subcontractors or vendors. This is just a temporary assignment in much the same way as temporary staffers are hired to fill in for summer vacation assignment of fulltime staffers. This strategy is ideal with security issues or when cost prohibits more inclusion from a subcontractor.
2. **Subcontracting project assignments:** Whole IT projects are assigned to subcontractors or vendors. These assignments would entail a complete project where the management of the project would be delegated to the subcontractor and not under the control of the IT management of the hiring firm. This strategy is ideal when a company has unique skill or technology requirements too expensive for

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them to maintain but affordable for contractors to offer their clients.

3. **Total outsource assignment:** All of the IT function is subcontracted out to a subcontractor or vendor. Here a company may lease all its IT from a subcontractor but run the equipment with its own staff. This strategy is ideal when a company may have a market that requires constant changes in IT or cannot afford to tie up capital in IT. (Gottschalk, P., Solli-Saether, H. 2006)

Subcontracting

Subcontracting is the practice of assigning part of the obligations and tasks under a contract to another party known as a subcontractor. Subcontracting is especially prevalent in areas where complex projects are the norm, such as construction and information technology. The project's general contractor, who continues to have overall responsibility for project completion and execution within its stipulated parameters and deadlines, hires subcontractors. According to the literature, we can define subcontracting as an outsourcing strategy.

Hiring subcontractors offers a number of advantages for companies. For example, subcontracting mundane but necessary tasks can free up time and resources to enable the business owner to concentrate on making money and growing the business. In addition, hiring a subcontractor is usually less expensive than hiring a full-time employee, because the business owner is not required to pay Social Security taxes, workers' compensation benefits, severance payments or health insurance for independent contractors. Subcontracting does pose some potential pitfalls, however, such as a loss of control over the quality and timeliness of work.

Turkish Mobile Operators generally use subcontracting method at IT and Technology functions. It is used for long periods and sometimes for project-based works. They usually renew the contracts yearly.

3. The Methodology and Model

At this section, we will investigate our research question by analyzing the Yellow Mobile case. We will test our hypotheses below:

- There is a relation between IT and time to market competitive advantage.
- There is a relation between IT and product differentiation competitive advantage.
- There is a positive correlation between subcontracting percentage and mistake percentage.
- There is a positive correlation between subcontracting percentage and development duration.
- Lack of know-how and business knowledge effects product development lifecycle negatively.

“Yellow Mobile” represents a GSM Operator in Turkey. We will not talk about the real name of the company. We will observe the changes after the company applied subcontracting at its

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information technologies function.

Yellow Mobile started to give mobile telecommunications services at the beginning of 1990's. The company uses all IT services we considered at the IT Services section. The company's all IT products had been in house developed by full-time employees, also these products had been served by full-time employees until 2007.

Product development and customization stages at the company:

- Creation of the work request to IT by business
- Business Analysis and requirement definition by IT.
- Architecture for solution by IT
- Development / Configuration by IT
- Testing by IT
- Implementing to live platforms by IT

As we see above, after the request arrives to IT there are five stages. Each stage needs time to finish the assigned work. When we add the time wasted during all stages we reach the total time spent for the request. This total time is the measurement of the *time to market*, which we defined as a competitive advantage.

' There is a relation between IT and time to market competitive advantage '. (Hypothesis 1)

The company's all products like tariffs, campaigns, promotions etc. are created by IT department and by this product development lifecycle. Quality of these IT stages effects the quality of the product and product's specialties. Product differentiation is also built in these IT stages.

' There is a relation between IT and product differentiation competitive advantage '. (Hypothesis 2)

At 2007, the company decided to enlarge IT department because there had been resource needs for big projects and ongoing IT operations. At that time the company had had outsourcing plan for all technology units so subcontracting method was chosen for this need.

There have been several firms which gives outsourcing and subcontracting services in telecommunications area and company chose 3 of them to get these services.

The advantages the firm thought to have with these deals:

- Having experienced IT staff without wasting training time and money.
- Having the advantage of reducing resources when not needed and not having to pay severance payments.
- It would be the first step for total outsourcing and the employees would get used to it.

At first, the contractors employed at Development department, other departments consisted of full-time employees at that period. Several months later the company employed contractors

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for the other departments, too. At the end of 2007, the company's IT department was working with almost 40% contractors. The Company had followed this strategy at 2008, 2009 and 2010, too.

Our samples consist of 17,361 work requests, which represent all the work requests received by IT between the period of 2006 and 2010. We will measure product differentiation by ' New Development ' and ' Change on Existing Product ' work requests that the company' s IT department completed. 'Bug Fix' requests will show the quality of the work (less is better). On the other hand 'Average Time' wasted for these requests will measure Time to market.

Table 1: shows yearly numbers and ratios of IT requests.

Year	New Product Development	Change on Existing Product	Bug Fix	Bug-fix Ratio to Other Developments (Percent)	Contractor Ratio to Total IT Staff (Percent)
2006	2104	826	475	16	0
2007	1521	651	850	39	40
2008	2219	1106	1218	37	55
2009	900	523	1800	126	60
2010	973	450	1745	123	51

Table 2: shows durations of IT requests.

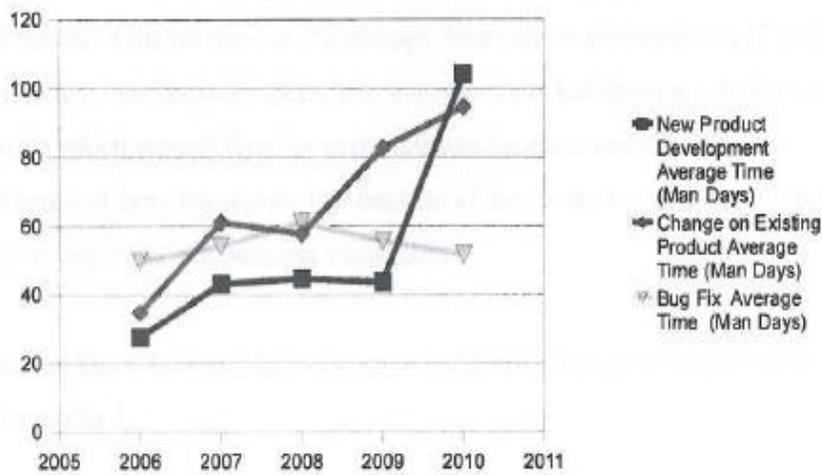
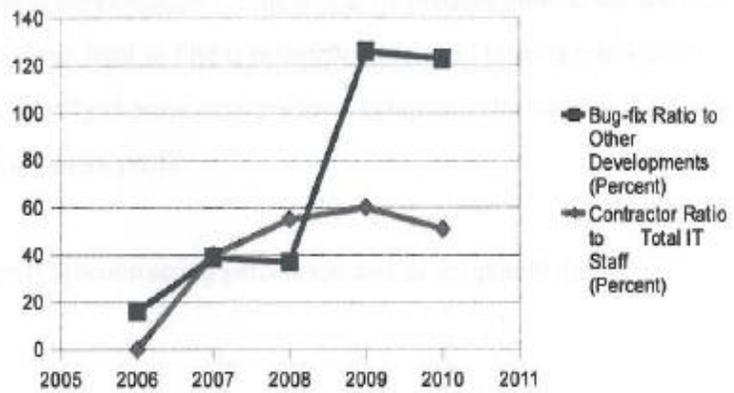
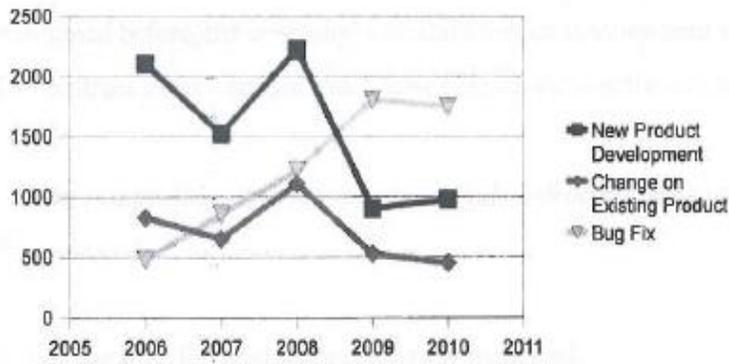
Year	New Product Development Total Time (Man Days)	Change on Existing Product Total Time (Man Days)	Bug Fix Total Time (Man Days)
2006	58184	28716	23619
2007	65705	39732	45997
2008	99165	63800	74188
2009	39327	43280	99978
2010	101361	42567	90057

Table 3: shows average durations of IT requests.

Year	New Product Development Average Time (Man Days)	Change on Existing Product Average Time (Man Days)	Bug Fix Average Time (Man Days)	Contractor Ratio to Total IT Staff (Percent)
2006	27.65	34.77	49.72	0
2007	43.2	61.03	54.11	40
2008	44.69	57.69	60.91	50
2009	43.7	82.75	55.54	55
2010	104.17	94.59	51.61	60

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Below are the trend graphics of IT requests.



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4. The Findings

At this section we will analyze the changes and outputs of Yellow Mobile' s subcontracting process. Also we will go through the results that we brought from this case.

As we saw from the IT work requests' numbers and the trend of them;

1. Since subcontracting had been applied, bug-fix requests raised dramatically. IT had wasted much time to fix the system and couldn't spend enough time to develop new products. (Year 2008 was an exception; there were changes at all systems because of MNP compliance.)

This was because of the lack of contractors' competency on company' s legacy systems. As we mentioned before, the company's product/service development software were all in-house developed. The contractors had needed much time to learn this software and get competency on them.

There is a positive correlation between subcontracting percentage and mistake percentage. (Hypothesis 3)

2. Average time for product development increased. It had taken much time to explain telecommunication business and the product ideas to contractors and so much time to implement. It had been hard to find contractors, which had telecommunication knowledge. Subcontractor companies, usually choose new graduate contractors because of the salary advantage. They usually focus on getting more profit.

There is a positive correlation between subcontracting percentage and development duration. (Hypothesis 4)

3. Number of new developments and changes on existing products decreased. Because of the increase at the average durations of developments IT couldn't have enough time to implement new business ideas. Also business units had spent much time to describe their requests to the people, which weren't familiar to the telecom business and organization. There had been know-how lost because of the contractor turn over. Subcontractor company' s had not shown importance to business continuity.

Lack of know-how and business knowledge effects product development lifecycle negatively. (Hypothesis 5)

5. Summary and Conclusions

When we look at the results and hypothesis we have brought up from this case study, We can say that '*Subcontracting has a negative correlation with competitive advantage*'. Because lack of business knowledge of subcontractors, effects competitive business negatively. Especially, if the company develops the products/services in-house, subcontracting is not a good alternative for IT function. Risk of 'loss of innovative capacity' has occurred at the company' s IT Function. (Earl, M.J. 1996) The trends of the company's IT

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work requests support us strongly about our conclusion. It must be considered that, we investigated the relation of subcontracting and competitive advantage on the company's core products' development/change lifecycle. Other IT functionalities like 'helpdesk' or 'operating systems management' were out of our scope.

At this research we investigated the subcontracting and competitive advantage relation on legacy IT systems but this relation should be investigated on vendor supplied systems. Also complete outsourced IT strategies should be investigated. We used 'product differentiation' and 'time to market' competition forces. Other competition forces, like 'cost reduction' can be investigated at further researches.

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