INTERDISCIPLINARY APPROACH TO IT OUTSOURCING: PARALLELS WITH SYMBIOSIS

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Abstract. *This paper observes and describes similarity between IT outsourcing and some types of symbiotic relationships (mutualism). Some species practically outsource their IT function (collecting and processing information, mainly from the environment) to other organisms. Research has found that there are 6 main parallels between symbiosis and IT outsourcing:outsourcing of IT function to other party, beneficial relationship, parties are focused on what they do best, risk related to reliability, synergistic effect, and survival as the ultimate objective. Aimed contributions of this article are to direct the researchers at transdisciplinary effort, in order to make better knowledge of system mechanisms which have developed for millions of years in ecological systems, and apply superb and refined relation pattern knowledge existing in those systems into business environment.*

Keywords: *symbiosis, mutualism, IT outsourcing, parallels, interdisciplinary approach, transdisciplinary approach.*

1. INTRODUCTION

Outsourcing is one of the leading business strategies and economic issues nowadays. IT outsourcing can be defined as buying IT-related functions as a service from a third-party instead of performing the functions in-house [1].

As a result of strategy of focusing on core competences, IT has come under scrutiny [2]. There are many motives for IT outsourcing. The entire IT function is frequently viewed as a noncore activity, and also IT service vendors have the economies of scale and technical expertise to provide services more efficiently than do internal IT departments [3]. In the following chapters we are writing about the concept of outsourcing, IT outsourcing and IT outsourcing business models.

Essentially, IT function boils down to collecting, processing and disseminating data, information and knowlege from organizational entity and external environment. Some of these patterns can be also seen in the nature. There is the type of symbiotic relationship between organisms where one species transfer the function of collecting information from the environment (lookout for danger) to another species. In the end of this paper, we examine parallels between IT outsourcing and this kind of symbiotic relationship.

2. THE CONCEPT OF OUTSOURCING

During the most of the 20th century large and integrated companies that owned and directly controlled all its assets and processes were deemed a business success. Being founded in the post-war period, when managers were encouraged to make conglomerates, these corporations tended to achieve economies of scale within their own organizatons, to show greater market power, to ensure stability by widening product range and gain more control either over the sources of raw materials or distribution channals through vertical integrations forward and backward. As in the 1970s and 1980s competition was growing more and more global, these rigid, bureaucratic companies started underperforming. The reason was their inability to adapt to the changes. With the beginning of the global recession in the 1980s such failures became even more evident which was why consensus was reached that corporate strategies should take another direction - companies should be focused on less core activities. In order to achieve this target companies were looking for solutions outside their traditional borders, through establishing partnerships with other organizations.

Outsourcing is „procuring products and services that the company previously used to produce internally, from external provider“[4].The word outsourcing was derived from the phrase „Outside Resource Using“[5]. Essentially, outsourcing involves contracting out business processes to other parties that can provide them with more efficiency and effectiveness. Although its roots can be traced back in the distant past, externalization as a business strategy had not been identified until the 1980s.

One of the most common divisions of outsourcing is into:

a) *onshore outsourcing* - outsourcing within the same country of the company outsourcer (company that outsource),
b) *nearshore outsourcing* - outsourcing to a country in the neighborhood (in a broad sense - on the same continent) that has lower costs and
c) *offshore outsourcing* - outsourcing to a low-cost distant country.

The main reason for outsourcing was cost-cutting, but as time went by motives became more and more strategic such as introducing innovations, reducing risk, increasing flexibility etc. At the beginning organizations used to outsource only non-core activities. However, as the concept was developing they began outsourcing even some core business activities. Until then it had been axiomatic that no organization would outsource core functions because of their huge strategic importance.

Outsourcing can provide numerous benefits.

a) Focusing on core competences.

When competition is fierce organizations are under pressure to achieve supremacy in all business activities which is almost infeasible in practice. In order to provide long-term competitive advantage companies have to focus on their core competences, i.e. key activities. Companies should outsource all the non-core (support) activities[6] and thus free their resources and managerial time that can be afterwards reallocated into core activities.

A company can achieve supremacy in the area of its core activities, still other activities should not be neglected because of greater focus on the core activities [7]. In order to achieve competitive advantage non-core activities must be also competitive. These activities are core for outsourcing providers, hence they can add to the value [8].

b) Reducing costs.

Companies often have to cut costs to remain competitive. Business activities are outsourced to those vendors that can conduct them either at lower costs or better, and often both. Outsourcing vendors achieve cost advantage as the result of economies of scale, experience or their location (due to lower labor costs, infrastructure, lower taxes etc.) [9]. By conducting similar jobs for a large number of clients the provider becomes specialized for those jobs. That experience enables the provider to improve constantly its business processes and thus to reduce costs considerably.

A very important advantage of outsourcing is transforming fixed costs into variable costs [7]. Namely, performing activities in-house brings about not only variable but also quite high fixed costs (capital set-up costs), while outsourcing implies only variable costs – the costs of outsourced services. Thus outsourcing provides efficient capital management since it frees capital for other purposes.

c) Access to a huge pool of experts.

During the previous years we have witnessed swift shift from industrial economy to knowledge economy where sustainable competitive advantage of a company arises from its highly qualified workforce and know-how [10]. Companies often face shortage of experts, when the most practical solution is to find an experienced outsourcing partner. Outsourcing to countries with cheap labourforce (offshore outsourcing) provides companies from developed countries with opportunities to access a huge and insufficiently exploited pool of expert at considerably lower costs [7].

d) Enhancing processes.

Non-core activities that companies outsource are core activities for a vendor, which is why the vendor pays more attention to them unlike the company outsourcer. The vendor tends to manage the outsourced activity efficiently, to introduce improvements and achieve superior quality standard [7]. The experience that the provider has acquired by conducting similar processes for a big number of clients enables the provider to perform the jobs more efficiently and faster.

e) Introducing innovations.

Introducing innovations in the processes that are not core is not a priority for a company. On the other hand, there are outsourcing providers that tend to introduce innovations which provide long-term improvement of operating efficiency and strategic performance of their clients [7] - not only to retain clients, but to increase their competitiveness on market [11]. Vendors have much more experience in performing outsourced jobs, which enables them to make use of best practices and introduce innovations all the time [7].

f) Adjusting time zones.

By outsourcing activities to providers that are in other parts of the world a company can take advantage of time zones. For example, if a company in the USA outsources its business processes to India time differences enable it to conduct a part of the processes in a daytime in the USA, and at night to transfer the processes to India where a working day has just begun [7]. Hiring an outsourcing partner in other time zones is used to assemble a global team which successively performs the common activity 24/7 - non-stop [12]. This is of great importance for jobs such as software development which is to a big extent based on sequential activities such as development, testing, verification [12]. In this way a product or service development cycle is reduced and utilization of resources is improved [7].

On the other hand, hiring an outsourcing vendor in the same time zone provides conducting outsourced activities and the activities in the outsourcer company simultaneously. The working hours of the teams in the outsourcer company and the outsourcing provider match which makes communication and control easier.

g) Increasing flexibility.

Today's business environment demands quick responses to very frequent changes. In such conditions of doing business flexibility is the component that enables a company to survive. By outsourcing a company frees its resources for other purposes. Free resources can be easily reallocated so that companies can quite faster and at lower costs adopt their scales and production framework to meet market demands. By hiring an outsourcing provider the company can meet changes with the required capacity far faster than in the case it conducted the processes internally. This is especially important for the companies that have significant season or cyclic fluctuations in sales.

By focusing on core competences the company can sustain entrepreneurial agility and avoid premature transition from informal entrepreneurial stage into bureaucratic. If there is outsourcing infrastructure, in case of unfavorable market conditions, companies can be reorganized faster and easier, even change the business area completely.

h) Sharing risk with an outsourcing provider.

Outsourcing provides delegating responsibility for business activities to a provider even up to 100%, by which a part of the total business risk is delegated to the provider [7]. If a company performs a certain activity in-house, the company has to take all the risk of investing in that process. On the other hand, finding an outsourcing partner who will accept costs of investing and process development reduces risk for the client's company.

i) *Reducing time-to-market.*

In business it is of key importance to enter a market first when an opportunity arises. In order to reduce time-to-market as much as possible companies find outsourcing partners so that they can operate much more time-effectively than in case they did all the activities in-house. Outsourcing providers already have all the necessary infrastructure, experts and know-how, thus they radically reduce time-to-market.

Some of the main obstacles and risks of outsourcing are related to [7]:

a) service quality,
b) information security,
c) redundancy issue in the company outsourcer,
d) geopolitical risks and
e) cultural differences.

Some of the common disadvantages are overdependence on suppliers and the loss of competencies.

To take advantage of outsourcing and reduce risk companies have to take every step in the outsourcing process consistently and thoughtfully. Outsourcing process consists of the following eleven phases [13, 14]:

1. *Defining targets of outsourcing.*
2. *Making outsourcing decision.*
3. *Determination of outsourcing method.*
4. *Choosing location.*
5. *Choosing providers.*
6. *Decision authority.*
7. *Contract negotiating.*
8. *Service level agreement.*
9. *Organizational adaptation.*
10. *Managing partnership.*
11. *Exit strategy.*

3. IT OUTSOURCING AND BUSINESS MODELS OF IT OUTSOURCING

Information technology (IT) outsourcing is defined as a decision taken by an organisation to contract-out or sell organisation's IT assets, people and/or activities to a third party supplier who in exchange provides and manages assets and services for monetary returns over an agreed time period [15].

Companies usually decide to outsource IT function in order to focus on their core competencies. They outsource a part or the entire IT function to the provider with required know-how and resources [16]. IT outsourcing can reduce the time and money spent on infrastructure and operations and dedicate more resources to the core competencies [1]. The purpose of IT outsourcing is to get the best possible technology and service at the lowest possible cost [1].

In recent years the focus of IT outsourcing has been shifted to processes, which include application development, maintenance, testing, supporting services, new products' implementation and engineering services [13]. Usually the processes such as IT strategy and management are too strategic to be outsourced, thus it is far more appropriate to outsource processes such as support and application development.

In relation to provider's location we can draw a distinction between the following IT outsourcing models:

1. *Onshore IT outsourcing.* In this setup an outsourcing provider is located in the domestic country. The main reason is engaging the best-in-class vendor, while costs can often be higher.
2. *Nearshore IT outsourcing.* In this setup IT function is outsourced to a nearby country. For example, many companies from Western Europe outsource their activities to the countries of Central and Eastern Europe, where costs are lower, workforce is qualified, and cultures are very similar. It implies lower risk but also less savings in comparison with offshore outsourcing.
3. *Offshore IT outsourcing.* In this setup IT function is outsourced to a distant low-cost destination, Such as Asian countries (India, China, the Philippines etc.).

In addition to the afore-mentioned models there is a model of offshore insourcing where companies perform activities abroad drawing on their own resources in order to gain the advantage of lower costs [17].

According to the organization ITSqc, LLC (formerly the Information Technology Qualification Services Center at Carnegie Mellon University) there are 6 IT outsourcing models [18]:

1. *Traditional model* - single service provider delivers service to a single client.
2. *Co-sourcing model* - two service providers work together to deliver service to a single client.
3. *Multi-sourcing* - multiple service providers provide services to a single client (client takes responsibility for managing and integrating the services of the various service providers).
4. *Alliance* - Multiple service providers collaborate to serve one or more clients (often, one service provider has a primary role in interfacing with the client on behalf of the alliance).
5. *Joint Venture* -Multiple service providers form a collaborative business venture to serve one or more clients (often, the first client may be a part of the joint venture).
6. *In-sourcing* - A group within the client organization is selected as a service provider, but it largely managed as an external entity. Often this group must compete with external suppliers or service providers for work.

The model of multi-sourcing is more and more often used nowadays [1]. Hiring several outsourcing providers can eliminate overdependence on just one provider.

Five different IT outsourcing models can be identified [19]:

1. *Staff augmentation*. This IT outsourcing model has the lowest risk and it is mostly used when there is a short-term increase in demand the company outsourcer

contracts out a vendor instead of hiring new personal.

2. *Out-tasking*. By adopting this model a company outsources only some tasks to the vendor and not the whole IT functions.
3. *Project-based outsourcing*. In this setup a company outsources the whole project to a vendor, with a focus on results and desired outcomes.
4. *Managed services*. In this setup a vendor is engaged as a long-term consultant.
5. *Build-operate-transfer* (BOT). This model is adopted by companies that want to have a subsidiary in a lowcost destination. Offshore partner can initiate operations and reach stability a lot faster than company itself with its in-house effort. Offshore partner operates business for a definite period of time, after which the company can buy the entire operation.

According to Robinson and Kalakota there are five business models of new generation (Fig. 1) for processes of outsourcing [13]:

1. *Global Delivery Model or Mix-Outsourcing.* This model is adopted by companies that outsource to multinational service providers that offer a mix of offshore, onshore, onsite and offsite capacities. Global Delivery Model is particularly used by huge global suppliers.
2. *Hybrid Outsourcing Model.* This model is also known as a dual-shore model. It combines advantages of providing onsite and offshore services to deliver results to clients at lower costs. This delivery model is usually adopted by medium-size service providers with offshore headquarters.
3. *Captive centers, offshore insourcing.* These models combine onshore common services and offshore captive centers. They consolidate activities of organizations' internal services into mega-service centers.
4. *Build, operate, transfer – BOT Model.* In this setup an organization contracts with an offshore partner to build a shared services or offshore development center, operates it for a fixed time period (usually 3-5 years) and transfers it at the end. Organizations adopt BOT model with an expectation that an offshore partner can initiate operations and reach operating stability much faster than it can with an in-house effort.
5. *Offshore multisourcing-a model (hub-and-spoke).* This model combines several offshore business models and providers to reduce the power that only one provider, a monopolist, could have. Organizations adopt this outsourcing model in order to take advantage of the best–of-breed strategy, which, in addition, provides flexibility.

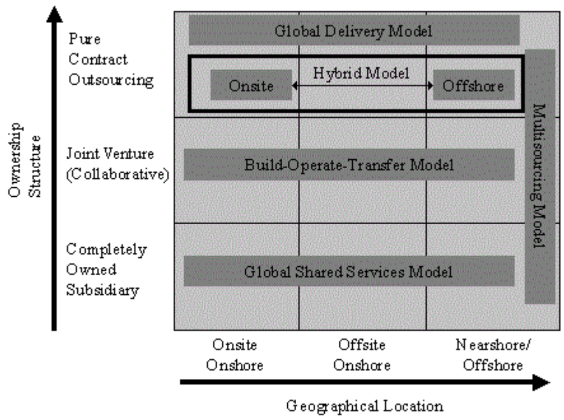

Fig. 1 Outsourcing business models [13]

4. PARALLELS AND A BUSINESS IT OUTSOURCING MODEL IN WILDLIFE

Mutualism is the type of symbiotic relationship that means association between organisms of two different species in which each benefits. [20] Although there are many examples of mutualism, the focus of this paper is on the species which practically outsource their IT function (i.e. collecting information from the environment) to other organisms, which in return get food, habitat, protection or other benefits.

For the start we are giving the example of baboons and impalas that live in the African savannah [21]. Impalas are one of the most common prey species for all predators and need to be constantly wary of predators. On the other hand baboons are higly intelligent animals and by their very nature hyper vigilant.

When impalas graze and browse leaves on branches they stir up insects in grass and leaves that are food for baboons. The insects jump from the grass and leaves running away from the impalas, which makes them an easy prey for the baboons. Following impalas in their pasture, baboons use the opportunity to catch insects far easier.

On the other hand, baboons are in charge of lookout. They climb trees and high termite mounds to check the situation in the environment. Baboons bark an alarm when danger is sensed to alert impalas. When alerted, impalas can easier escape from predator.

The second example of mutualism is one between one kind of birds (Oxpecker) and rhinos (or zebras) [22]. These birds alight on rhinos (or zebras) and eat bugs and other parasites that live on the latter's skin. In this way the birds get food and the rhinos and zebras get rid of bugs and parasites. In addition, if the birds sense danger for rhinos and zebras, they fly above them and scream in token of warning.

Mutualism is found in the underwater wildlife too. A good example is the relationship between Goby fish and shrimps [23]. A shrimp digs a hole in sand where it lives together with Goby fish. In return, the Goby fish touches the shrimp as a sign of warning if a predator is near, as the shrimp is almost completely blind.

The example of symbiotic relationship between fork-tailed drongo birds and meerkats which live in the Kalahari proves that sometimes frauds can occur in this kind of mutualism [24]. Drongos and meerkats live in a symbiotic relationship where they warn each other in case of danger. However, these birds are not reliable partners. It happens that drongos scream false alarms just to steal meerkats' food, which run away when they hear the alarm leaving everything behind them. When meerkats are deceived several times they learn not to trust drongos' warnings. Research have shown that then these clever birds are able to imitate alarm call of other animals so that in the end meerkats get deceived anyway.

In order to draw a parallel between these kinds of mutualism (where some species practically outsource their IT function to another species) and IT outsourcing we will illustrate them with the business model pattern introduced byOsterwalder and Pigneur (Fig. 2 and Fig. 3). The symbiotic relationship between baboons and impalas is taken as a symbiotic example.

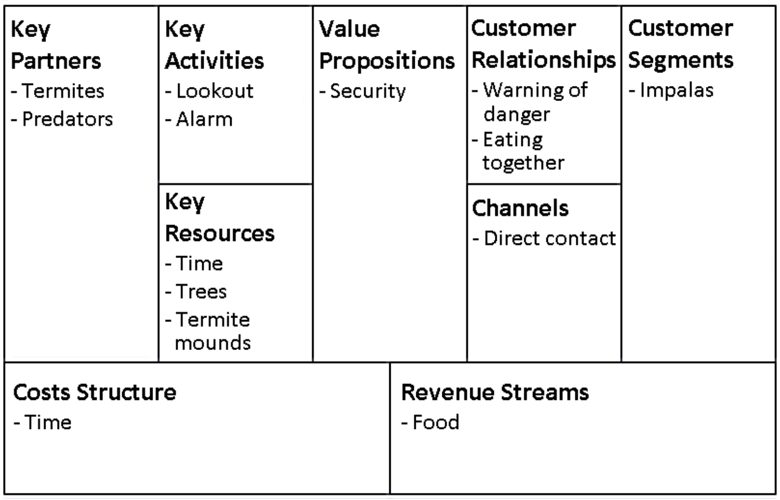

Fig. 2 A business model pattern for IT outsourcing in wildlife (example of mutualism between baboons and impalas)

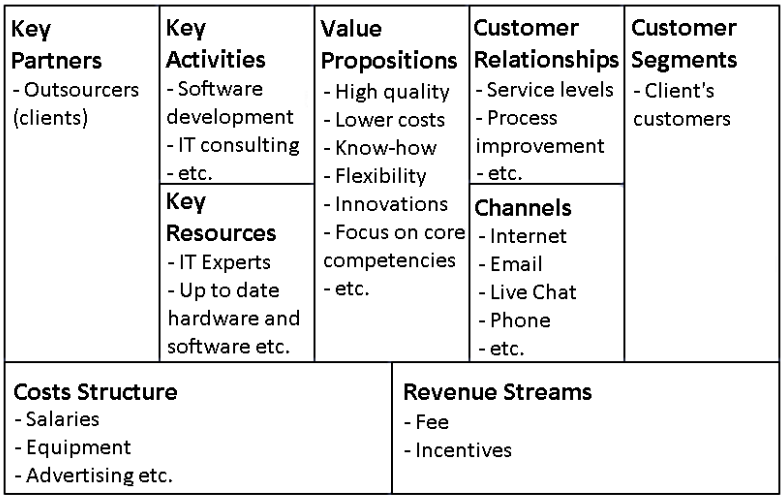

Fig. 3 A business model pattern for IT outsourcing

Table 1 Parallels between mutualism and IT outsourcing

Parallels	Mutualism	IT outsourcing
Outsourcing of IT function	Collecting information from the environment (lookout for danger)	Managing informational system
Beneficial relationship	Both sides benefits (protection, food, place to live etc.)	Outsourcing provider gets fee in exchange for providing service
Focus on specific activities	Species contribute with activity that they are doing better	Focus on core competencies
Risks	Possible false alarm	Information security risk
Synergistic effect	Associations helps animals to defend from predators easier	Gaining advantage that independent parties wouldn't be capable to achieve
Ultimate objective	Survival	To survive on the competitive market

Given all the afore mentioned it can be concluded that there are several significant parallels, i.e. analogies between mutualism as a kind of symbiotic relationship and IT outsourcing (Table 1).

1. Outsourcing of IT function. As impalas let baboons collect information from the environment for them, companies should outsource their IT function to those companies that can conduct it more efficiently and effectively.

2. Beneficial relationship. Mutualism is a kind of symbiotic relationship in which all the parties have benefits. Organisms that live in mutualism can receive protection, food, cleaning from parasites and insects, place to live etc. IT outsourcing also provides advantages for both the outsourcer and outsource provider. Outsourcing provider earns a fee in exchange for providing a service to the outsourcer.

3. Focus on specific activities. Mirroring an outsourcing model where both an outsourcer and vendor are focused on their core competences organisms in a symbiotic relationship are focused on what they do best. In the example of baboons and impalas we can conclude that impalas from the ground cannot observe the situation as well as baboons from trees.

4. Risks. As IT outsourcing implies certain risks, in mutualism sometimes can occur frauds. The example of symbiotic relationship between drongo birds and meerkats is the proof.

In order to reduce the risk of IT outsourcing, it is necessary to find adequate outsourcing partner. In an outsourcing process that is a critical phase. Here it is very important to check experiences of the previous clients of the considered outsourcing provider. The qualifications most frequently requested from the provider are [25]:

a) *quality,*
b) *performance history,*
c) *guarantee and receivables policy,*
d) *objects and capacities,*
e) *geographical position,* *and*
f) *technical qualifications.*

5. Synergistic effect. Living in associations helps animals to defend from predators due to synergistic effect that they achieve. On the other hand partnership between outsourcing vendors and clients is usually strategic. Through common efforts both parties are supposed to gain advantage that otherwise they wouldn't be capable to achieve if they worked independently.

6. *Ultimate objective.* In the same way as the information about the environment impalas gain from baboons is of key importance for their survival, it is necessary that companies as open systems follow changes in the environment and adapt to them. If animals are associated they are more likely to survive. A similar thing is noticed with companies in the face of fierce competition on market.

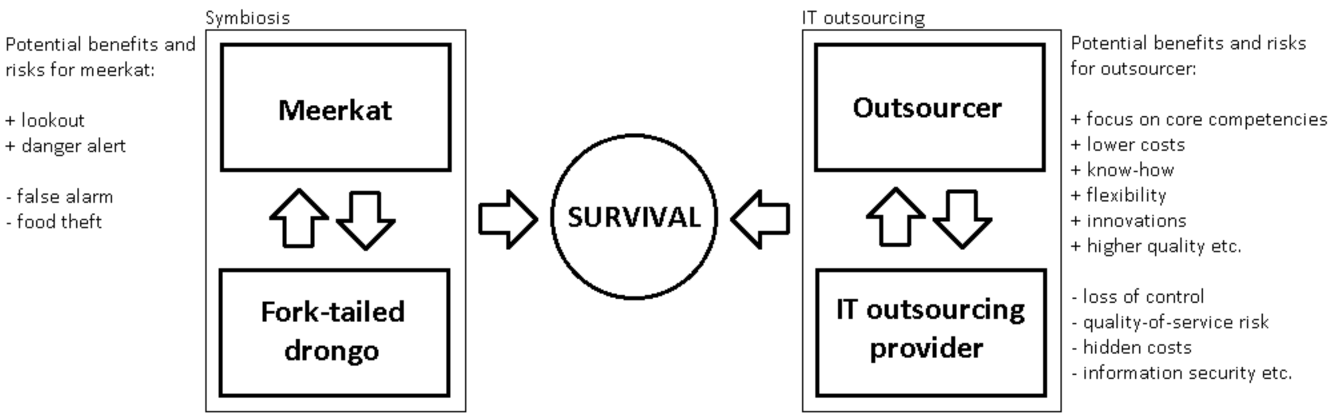

Fig. 4 Parallels between symbiosis and IT outsourcing with potential benefits and risks

5. CONCLUSION

Outsourcing became a key strategic management tool in competitive environment nowadays. It enables companies to focus on core competencies, reduce costs, access to a huge pool of expert, enhance processes, introduce innovations, adjust time zones, increase flexibility, share risk with outsourcing provider, and reduce time-to-market. In order to lower the risk of outsourcing (overdependence on supplier, loss of competencies, quality-of-service risk, information security, redundancy issues, geopolitical risk and cultural differences) client company have to take every step in the outsourcing process consistently and thoughtfully.

IT outsourcing can be defined as relocation of IT function to external parties. The entire IT function is often viewed as a noncore activity, so the outsourcing partners can perform it with more efficiency and effectiveness. There are many IT outsourcing business models, but the one that is more and more often used at the time is multi-sourcing model that eliminates overdependence on just one provider.

Some of the IT outsourcing patterns can be recognized in symbiotic relationships. The matter of fact, some species practically outsource their IT function (collecting security information from the environment) to other organisms. They are achieving mutually beneficial symbiotic relationship or mutualism in which one party provides lookout and security alerts and the other party provides food, habitat or something else in return. Therefore certain parallels between this type of mutualism and IT outsourcing can be noticed:

- outsourcing of IT function to other party,
- beneficial relationship,
- parties are focused on what they do best,
- risk related to reliability,
- synergistic effect, and
- survival as the ultimate objective.

Main direction for the future research is mutualism abstracted in the form of business model. This article provides currently most valuable information that the resources exchange between the cooperating species in the relation that resembles IT outsourcing have completely different value for the parties, e.g. impalas drive away insects, which uses practically no resources they would not spend otherwise, while baboons raise alarm, again at marginally low cost. Parallel in the business environment can be illustrated by supposed relation where one company gives its data for processing to the IT outsourcer. In return, outsourcer is free to combine received data with the others in data mining, as long as direct identification and personal data from the outsourcer are not revealed. Outsourcer can compensate little or no direct income by selling synthetized analysis and data mining conclusion. Thus both parties create value without exchanging valuable resources, mimicking parallels of IT outsourcing in the wildlife environment.

Other future research aims are to recognize patterns developed and finely honed for millions of years in IT outsourcing parallels of ecological systems and try to maximize its usage and gains for the business systems.

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