

Semantic Web Approach for Organizations Management

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Abstract

To step in the business world, the entrepreneurs may have good idea to induce in the market. The idea may penetrate well, and that the customer size may increase rapidly. However the issue lies that what if the customers' size increases rapidly, what if we get a competitor's strong response, how internally the companies are built to challenge accordingly, what external factors can impact strongly to let down the vision and mission, and how to continue providing prompt services to end-users. With this paper, the idea is to introduce the concept of what hierarchy should an organization follow, to directly cope-up with them according to the best practice, so not much time in thinking or evaluation of different practices are put into. Publishing the same in the open-source environment in the form of Semantic Web by following OWL Ontology will let it be modified by different stakeholders around the world to optimize the structure further, in order to come up with streamlined organization hierarchies around the world. The same may also help in introducing ISO standard to better rate the efficiency of the organization.

1. Introduction

To rely on the available content over the web rather depending on the actual text, the organogram as

well as the business processes should be well defined over semantic web. As per the research[1], to transform the entire business processes, we follow approach of first well documenting the entire Business Processes in BPDM format. We then transform it to BPEL then to OWL-S to make it a searchable as per content. This was about business processes.

Regarding organogram, we can define directly by extensive working over its Meta-Data, and transforming the same to OWL-S. But for that, we need to have strong grip over the content on different functions of an organization.

2. Related Work

Business Processes Modelling itself is a problematic task, and applying semantics to it is much more difficult. As rightly mentioned in [5], adding semantics to business process, though a tough task, but to make it machine understandable, it is the only way out. Also, issue pertaining documenting the business processes, and their purpose is well define in [6], which itself is challenging. Work over organizational ontology was done previously in [7], where business terms are well defined. Other than that, a relationship is shown among different integration components in [8]. An environment to model is proposed [9], while multi-level is followed from [10].

With heterogeneous knowledge representation and reasoning with agent based services, provided in conducted research [11], we have a method of defining agents, that can be connected to systems to develop organization structure in the form of machine readable format. But before agents, well defined process [12], are extremely important. Familiar semantics of agents for business processes [13] are mandatory for execution-based process ontology. However, manufacturing industry is

comprehensive in relation to other industries, which is complex to get into Ontology [14]. Thus, cross-functional integration, well provided in [15], is a must for such organizations, being inter-related with other industries. But agents need communication protocol to have build relationship with Organization [16], before providing semantic annotation.

After agents, business components are integral part of making the entire structure to machine readable. As said in [17], Information systems are being made to make it a reusable element. Being reusable, the semantic notions can be applied. Thus deriving the facts and make it an integral component of structure. The concept is repeatedly endorsed in [18], [19], and [20].

Changes within the processes [21] may lead to changes in structure of an organization as well. Thus, accordingly organization restructure becomes mandatory. If semantics are well defined, it will automatically be done. BPM approach is therefore required for effective implementation. OWL-S is therefore recommended for defining enterprise levels semantics [22]. However, for short term incorporation of changes, [23] methodology can be referred. Changes however, make it cumbersome to incorporate within structure, being discussed numerously [24], [25] explained well of how should be changed efficiently in distributed environment.

Though, it is rightly defined that a process should be followed to make a structure [3]. That is, going with Business Model, accordingly working over the application and then checking if financial in favour to organization. However, it should better be in a position if organization is rightly defined, and then down the line, linking other components. IT Capabilities [26], is a mandatory for comprehensive architecture. Also, external influences [27] plays major role in getting the hierarchy well define, semantically.

3. Business and Information Technology Alignment

IT provides infrastructure for quick process of internal functions and message passing and processing with internal and external stakeholders. For that much dependency, IT should be well aligned with business, from maintaining the data repository to processing the data. Research [2], better explained the dependency. Investment on IT is therefore mandatory for streamlined processing.

4. Ontology and Organization Components

Start with the processing to develop an ontology we need to segregate the concept on the basis, given below. However, the issue remains the same. To make the business dependent model, IT people should be well aware of the business. This remains the most difficult task. If the ISO 1087-1, which is the Terminology Work – Vocabulary, becomes extensive enough, the business people can come up with the semantic definition. IT Consultants though are available but they are highly paid, plus it is not easy to find the right consultant for the industry. Further, if an entrepreneur is going to come up with idea, there is no chance in investing in internal functions, to maintain.

Thus adoption is the best idea, provided ontology is available. For that, Business Vocabulary should be extensive enough to develop semantic formulations, which can further be translated to OWL-S. Further, this step can be recursive that can be elaborated more in different levels. Say, high level business processes, e.g. Financials, then down to next level with Accounts Payables and Receivables, then down to next Level with Down Payments, Invoice Processing, then down to next level with Approvals at each process steps, etc.

4.1. Business Processes and Information Technology

The most appropriate issue is the difference between the currently implemented business processes with the industry's best practice. In this research, we are focused on structure of an organization; however extensive work [3] is already done on this issue. But none provides in the semantics that if the best practice of an organization of specific industry is semantically defined in OWL, and that the currently implemented business processes are properly documented for Semantic Translation by defining semantic rules, it is easy to translate the same to OWL. Further, to compare and come up with where to penetrate the implementation. This will also come up with where the change management is required and how they can be implemented. The entire exercise, without being defined semantically, takes around 4 to 5 years. But limiting it within defined boundaries will drastically reduce the time.

4.2. Project Management and Business Processes

Program Management, or more specifically Project Management, helps in monitoring our targets, goals, mission and vision. At the backend, Business Processes are implemented that particular Project should follow. Although, business processes can be mould with Projects, but the best practice is to coup up projects as per the business processes. Ideally,

business processes should be adopted as per industry's best practice.

As explained in [3], business processes are comprised of the main resources i.e. Internal and External Actors, but by what time they would be able to complete their process can be translated from Project Management application. Thus, developing meta-data for defining business processes for semantic web, it will surely be beneficial.

4.3. Industry-Organization Relationship

Extension to the research [2], which depicted 3D model, the mapping is much easier to document properly. This therefore, can better be transformed to semantic web.

4.3.1. Core business

This part is the same as developing ontology of Business Process Management [2]. This is applicable to all organizations around the globe, therefore applicable for all industries. This includes Roles, Business Process, Rules, Application and Organization Unit.

4.3.2. Expansion

There may surely be the reason to let it be unique with other competitors. For the reason, a different process is implemented for one or more functions. For that, organizations should also develop meta-data and translate the same into Ontology so that it can be incorporate the same to Organization's ontology. However, to restrict it, management can set it to Private so others cannot be able to go for the same model.

4.3.3. Industry

The external requirements are not specific to industries, and therefore ontology of similar things can be developed for maintaining the consistency in between. However, OWL restrictions to industry specific, say industry based procurement functions can be defined. The same is therefore can be utilized as sub-class in organization. This will inherit all the features and therefore, a unique set will come into.

4.3.4. Organization

Although everything is derived either from Industry or from core business, however at times organization likes to make them different with others. Thus this layer may be optional.

With above, Ontology for entire Industry can be developed which can be utilized by others to check, implement, optimize the same and share for further assistance for others.

5. Organization Structure and Information Technology

Implemented business processes should be owned by the functions of organization. This is required to make a person responsible for any issue, going behind the baseline, degrading performance, optimization within their structure, and consistent performance within their functions. For that, they should be well defined. This actually depicts entire structure of the organization and therefore can be evaluated when required. Ideally, the high level structure should be like as follows

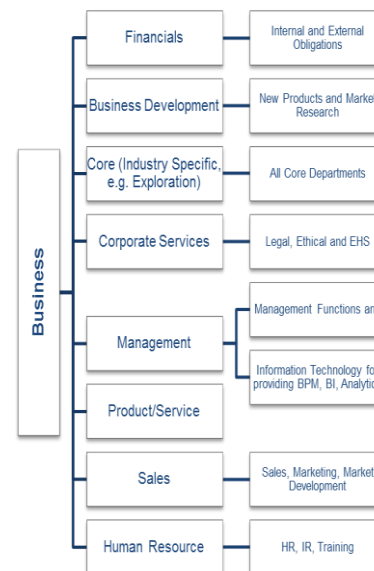


Figure 1: Business Function Hierarchy

It may be seen that if the above structure is rightly defined with in-depth metadata, we can map it to OWL and publish over Semantic Web to get more insights of its related resources that includes department, section etc.

To extend the concept, the well-defined attributes can also be derived in identifying and hiring resources. For instance, if semantics are well-defined for IT Systems Analyst, the system can be connected to LinkedIn or other related resource finding websites, from where the valuable resource can directly be contacted. Further, if they have published their related work over semantic web, the same can be analyzed by the management to hire the best resource. Further, if semantics metadata are documented enough, the evaluation can be made automatically, and entire hiring process may

get automated, thus HR function would get limited to analyzing the process only.

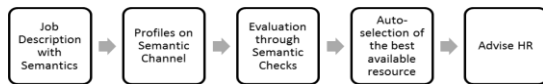


Figure 2: Process Automation through Semantic Web

Further to the concept, defining applications, its metadata and its connectivity with different actors, which are further interconnected to Structure of an organization, plays important role in being well-defined. The better they are defined, the better the related function will perform. Thus, the entire of concepts of aforementioned function, with semantically being defined is in-depth related processes [2], application and actors [3]

Thus, in OWL, we can better depict our concept that may be published for more improvement, being as a ground, would be as follows:

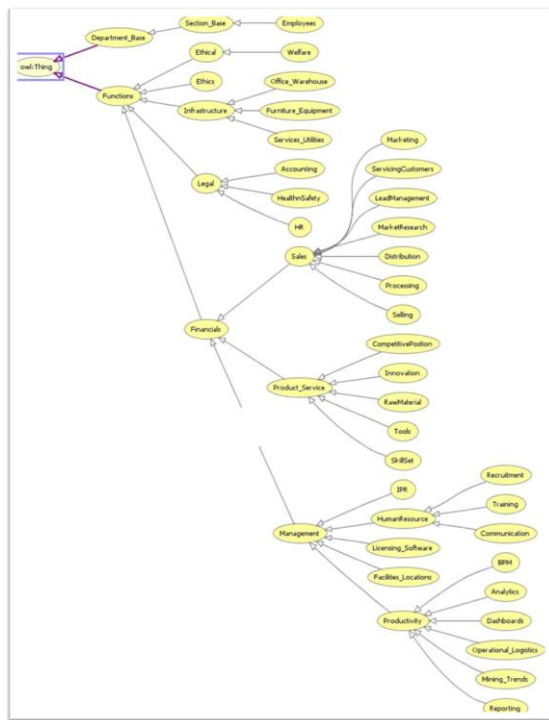


Figure 3: Hierarchy In OWL

6. Future Work

After defining the basis of the entire organization and its internal function, the next step is to make meta-data to bring external stakeholders to the ground to interconnect with organizations for better evaluation of their systems and streamline connectivity for optimized processing within inter-industry. This, for example, Supplier Relationship Management on Semantic Web will help suppliers

to interconnect with the Organization. The supplier could be from other industry, thus leading to inter-industry connectivity. Then comes the Customer Relationship Management, which when provided over Semantics, can better analyse patterns and provide the same to end-users. In parallel, social networking can be brought to semantic world for resource hiring and outsourcing, so the systems can automatically finds best people around the globe.

7. Conclusion

Thus, the core concept is to adopt the Ontology of industry, cope-up with industry's best practice, define roles, organization unit, resource, applications, sections, functions and therefore leading to transform entire organization on OWL ontology to better operate in Semantic World. For instance, automating the hiring process, be part of customer oriented to let them evaluate on Semantic Web, identify and find best suppliers over the semantic web through the B2B platform, and thus integrating entire infrastructure virtually and semantically over the provided platform for effective and efficient execution of processes for the best performance

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