Meaning and Role of Prototyping in Entropic and Extreme Business Environment in Georgia

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For a couple of years, the term entropy is gaining popularity as a term to cover the various dimensions of fast and rapidly developing, ‘uncontrollable’ business environment. The more complex and volatile an industry is – the higher is the level of entropy, that means - the harder to predict and therefore more uncertain will be process of new project or product implementation. In simple words, entropy as a measure of uncertainty or randomness, is permanently growing in nowadays business environment.

In common use, A prototype is an early sample, model, or release of a product built to test a concept or process or to act as a thing to be replicated or learned from. Technique of prototyping becomes more efficient if analyzing of prototype occurs together with the potential consumer. Based on received feedback, or analyzing customer experience, lessons learned, company makes decision how to develop the product on the next phase.

In Georgia, use of prototypes started with development of projects related to Information Systems. But later it was successfully applied to product development and Business model development, especially for startups and small entrepreneurs.

Keywords: prototype; Entropy; Extreme Management; Georgia; business culture; MVP

JEL Classification M29

Introduction

Over history of civilization there were several information revolutions when fundamental changes in information processing area involved transformation in social relations and a new level of society standing. Along with the wealth of information, are growing exponents of entropy among the whole society and within business environment as well.

Entropy

Entropy, the measure of a system's thermal energy per unit temperature that is unavailable for doing useful work. Because work is obtained from ordered molecular motion, the amount of entropy is also a measure of the molecular disorder, or randomness, of a system. The second law of thermodynamics tells us that the whole amount of internal energy of any substance is not convertible into useful work. A portion of this energy which is used for doing useful work is called available energy. The remaining part of the energy which cannot be converted into useful work is called unavailable energy. Entropy is a measure of this unavailable energy. In fact, the entropy may be regarded as the unavailable energy per unit temperature.

I.e.

$$\text{Entropy} = \frac{\text{Unavailable energy}}{\text{Temperature}}$$

or,
$$\text{Unavailable energy} = \text{Entropy} \times \text{Temperature}$$

The concept of entropy is of great value and it provides the information regarding structural changes accompanying a given process.

Entropy and unavailable energy:

This can be answered by considering an example, when a single coin is flipped, there is an equal chance that head or tail will show up. When two coins are flipped, there is a chance of two heads or two tails showing up but there is double chance of occurrence of one head and one tail. This shows, that disorder is more frequent than order. Changes in order are expressed quantitatively in terms of entropy change. Since a disordered state is more probable for systems than of order, the entropy and thermodynamic probabilities are closely related.

Entropy in business environment.

In the study, entropy concept is used as metaphor and it is aimed to construct the conceptual basis of a modern values in management and new leadership, which can be implemented to manage business environment with high scale of entropy. The business environment is made up of internal and external elements. External elements include technology, law, politics, competition, media and trends. Internal environmental factors include management, physical assets, cash flow, your business's culture and the knowledge and skill of your workforce. One of the main reasons of entropy in business environment are frequent changes, due to:

- Customers' needs and requirements change;
- New technologies become established. These encourage companies to enrich the industry with better products and cheaper ways of doing things;
- Employees' skills need revising to take advantage of new technologies;
- Traditional sources of supplies of raw materials and components begin to look less reliable;
- New laws are passed that require changes in how businesses operate (for ex-l. restrictions in working hours and tougher health and safety requirements);

All of the listed reasons have direct or indirect link with information and technology development. A concept of information society was developed at the end of the previous century. A term "information society" was firstly used by professor from Tokyo Technological Institute Yujiro Hayashi (林雄二郎), who led a scientific group for Japanese Economic Perspectives. The mentioned group concluded that information society is determined as a social medium where process of computerization facilitates to obtain reliable sources of information and makes an opportunity to replace routine processes with automated processes. At the same time production is to be changed as well – products become more innovative and enriched from information point of view (product design and marketing). Japanese version of the above mentioned concept was elaborated first of all in order to resolve Japanese economic development

tasks. Although, later that concept was named and is widely known as "Japanese Economic Miracle".

Information technologies significantly reduce time spent for information gathering and processing as well as for execution of transaction. Implementation of information systems in business makes possible to use productive sources more efficiently. Simultaneously, despite of high degree of readiness to put in place information systems by manufactures, approaches to this process are at least different. However, any production unit starting implementation of information systems, is eager to complete process in a shortest time and with maximum quality while there are high requirements to put it in place.

Review of the main stages of project implementation of information systems.

Standard project of implementation of information systems generally includes the following stages:

- analysis of requirements and necessities
- projection
- execution of requirements
- testing
- implementation and further maintenance

Let us consider content of the main stages.

Analysis of requirements and necessities:

At this stage are defined the main aims and tasks of implementation of information systems that frequently are connected with recognition of strategy for company's business model and development, often with renewal and sometimes with changes as well. At this stage are defined also initial budget and terms of project implementation as well as basic interested and responsible persons.

Projection:

Projection of system is based on the results of the previous stage. Thus, are generated architecture of system, selection of methods of management and storage of database, description of business processes and an agreement on software and hardware resources. This information is fixed in various documents according to procedures and methodologies of company, is formed a project team and roadmap in details.

Execution of requirements:

Release version of information system is elaborated as a result of steps taken at this stage in compliance with the roadmap. Some companies use in addition a stage of prototyping in order to visualize and analyze weak and strong sides of this version at the early stages.

Testing:

A stage of testing is aimed to check correspondence between the assigned task and the resultant product and its correction in case of necessity. Traditionally, testing carries several levels and this stage is finalized on the basis of conclusion for system's readiness.

Implementation and further maintenance:

Implementation of system implies the following actions:

- Technical implementation/installation of system
- informing of all potential consumers and sometimes trainings
- revelation of potential problems of operating and preliminary description of the proper response in this matter
- final documentation of system
- pilot implementation of system, pilot operation and other actions taken in order to reduce risks might be caused during implementation
- Documentation and storage of knowhow and experience in implementation process in order to use that within the framework of further projects.

Change Management and prototyping.

Contemporary business environment is characterized by frequent changes. It's only natural that within the period of creation of information system might be expected minor or big changes and a stage of analysis should be based on those procedures that facilitate timely and effective fulfillment of changes. It might be change of project result (final product), budget, duration, requirements for quality, participants etc. In addition, process of changes management includes creation of requirements in regard to changes, adoption and execution of that as well as work of committee for changes.

Therefore, if it comes necessity for some changes owing to any circumstances (for instance, envisaged or unenvisaged risk), these changes must be done and all interested persons and project team members should be informed on this subject. It is necessary also to adopt these changes, or, in other words, to provide that in project plan, documentation etc. Although, it is to be noted that any change is connected with additional allocation of resources and with other project risks as well (term, quality etc.) Consequently, in most cases, as far as changes are made in the content of information system at the early stages, the value of this change remains moreless stable, and on the contrary, as far as changes are made at the late stages, arise complexity and the costs of such changes. In order to solve the problem, the latest tendencies in project management brought practice of prototyping.

Notion of prototyping is widely used in cognitive psychology, particularly, in the models of understanding, processing and keeping of information. Prototype is an assembling of material feature of either object (appearance) that in a best way and in full represents this object (or appearance) or classes of that. Identification of information, or "cognitive search", takes place in comparing of received information with prototype.

From 1970- years is considered technique of prototyping, that means description of functional elements on the basis of the simple methods for implementation of information systems at the early stages, creation of visual elements and creation of process that in one way or another makes an impression of working with system. Technique of prototyping becomes more efficient if analyzing of prototype occurs together with the potential consumer. According to initial conclusions, changes might be done either in visual component, or from other indications of product. It means that as far as prototyping and adaptation of system takes

place at the earlier stages, the costs of these changes should be reduced.

Following are the main reasons why prototyping is important:

1. Evaluating and Testing Product Design, (By creating a prototype, it is possible to determine which aspects are worthwhile and which parts need to be revised or discarded)
2. Clarifying Production Costs and Issues, evaluating Operations Process or even Business Model (By prototyping before production begins, it is possible to take a glimpse at the production process and see if any steps can be changed, combined or even removed. This not only streamlines production, but keeps the cost of the actual production to a minimum)
3. Feedback from potential customers (No matter how great the designers and testers think a prototype may be, real consumers may not like certain aspects of it. If the end customer doesn't like it, they won't buy it, which is why focus groups and external testing with prototypes needs to be addressed before production begins)
4. Adapt unpredictable external changes (environment, technology, etc.)

Within our experiment, in 2016, Georgian company (<http://gustav.ge>) elaborated concept of a new product that aimed to bind population (especially occupied persons) with dry cleaners and laundries. The product was consist of three components. First, fireproof wardrobes with electronic lock placed in apartment building entrances where potential consumers could put own things for cleaning reasons. Second, an information system intended to set up communication with population and to pick up information from consumers about things left in wardrobes. Owing to the same system the consumer should be informed on the cleaned thing and the lock code. Third, using of courier service. Despite of the very optimistic business plan and initial positive opinions of respondents, the company took decision to use method of prototyping and implemented an information system just for the main part. As for wardrobes, those have been place just in two apartment buildings. After one month observation it was held that the company has got no any order. The founders decided to study a case of results received. They discussed the issue with population, after involved other partners in business and as a result they changed the whole business model of the company and enriched the product itself. At present time, the company makes successful business and is operating without the second component (wardrobes).

Minimal Viable Product.

Lean Startup author Eric Ries gives a commonly accepted MVP definition, describing 'a version of a new product which allows a team to collect the maximum amount of validated learnings about customers with the least effort'. For Example, in mobile applications development, minimum viable product includes the feature or functions required to solve a core problem for a set of users and be released to market. The goal is to provide immediate value, quickly, while minimizing development costs. Planning the MVP should include several steps:

1. Clarify and understand general strategy and business needs
 - a) Determine the long-term goal of the product and write it down
 - b) Identify the success criteria that will indicate whether or not the product is successful
2. Find the development opportunities
 - a) Identify the customer segments
 - b) Identify the value for segments
 - c) Identify links between the customer segments and product values
3. Identify all actions user must take to meet that end goal
 - a) Create a "pain and gain" map for each action
 - b) Write down the action the user completes when using the product
 - c) Write down the pain points for each action, constraints and limits
 - d) Write down the gains for each action
 - c) Summarize the pains and gains into opportunity statements
4. Decide What Features needs to be built within MVP
 - a) Use opportunity statements to finalize features
 - b) Provide a breakdown of the features to include in the product roadmap
 - c) Use a prioritization matrix (or similar method) to prioritize features

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Conclusion

In contemporary dynamic world is growing more and more company's dependence on information, and, consequently, interest and requirements to information. Processing of information needs more accuracy and reliability and, as a result, purposefully and step by step the companies are envisaged against implementation of reality in order to make comfortable specific models or practice of management. Moreover, business partners willingly cooperate with colleagues who foresee necessity of information processing in an accurate and reliable way and considering that in the own activity.

Consequently, it is a good assumption for company's development to make changes oriented to the needs of consumers and market trends and to adjust to the unalterable circumstances. That is what technique of prototyping makes it possible.

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