12-2012

An Extensible Framework for Selecting Incremental Innovations

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Abstract: There are several innovation methodologies reported in the literature starting from simple concepts such as technology push and market pull all the way to Disruptive innovation. Almost all these methods do not provide for customizability and extensibility. The method described in this paper is called Quick and Dirty Innovation Method or QaDIM in short to represent the fact that the method can be used rather easily to identify incremental innovation opportunities. The paper will first describe the basic concept, and then proceed to give a sample framework before proceeding to describe the extensibility. The method allows firms and individuals to define new operators as well as select operators from an existing operator base thereby offering both extensibility and customizability.

Keywords: Framework; extensible; incremental; innovation; identifying; selecting

1 Background

A company that had introduced an innovation in a chosen market and had achieved some degree of market leadership is often forced to consider creating incremental innovations in order to both extend the life of the innovation as well as to retain or improve its market leadership. Incremental innovations are often created when the market for an innovation reaches the main street of the Technology Adoption Life Cycle as defined by Geoffrey Moore in his book titled Inside the Tornado [Moore].

Incremental innovation could be created for one or more reasons listed below.

i. Cost competitiveness – As explained by Geoffrey Moore, when an innovation reaches the Main Street competitive pressures force innovators to look at reducing the cost of producing the innovation so that they can still enjoy a reasonable profit margin. Others have studied this phenomenon [Song; Utterback; and Van Hippel].
ii. Market Demand – Customers may be demanding increased performance. Examples are computers where there was a constant demand for faster processors and increased storage capacity.
iii. Risk Management – Incremental innovation often require less investments as compared to radical or disruptive innovations and address the demands of an already established customer based thus reducing the risk of failure in the market.

iv. Ease of marketing – Since incremental innovations are delivering small changes to the existing innovations, customers will be able to relate to the enhancements more readily.

The effect of introducing important incremental innovations on market share and business survival was studied by Banbury and Mitchell as early as 1995. There are a number of tools and methodologies deployed for the identification of incremental innovation opportunities. Some innovation managers have used Spider Web diagram as a tool for planning and designing features of an innovation. Innovation managers have used different brainstorming methods to identify incremental innovation opportunities [Osborne; Toubia]. Other methods used for identifying or designing incremental innovations include Triz, and matrix thinking [La Salle]. Blue Ocean Strategy offers strategy canvas and value curve and the set of four operators (increase, decrease, eliminate, introduce) as a framework for identifying / designing innovation that according to the authors would allow innovators to define and dominate a new market opportunity [ChanKim and Mauborgne]. However, none of the methods have provided a structured and extensible framework for selecting incremental innovation opportunities.

The framework reported in this paper is referred to as QaDIM, standing for Quick and Dirty Innovation Method. Section 2 of the paper introduces the basic concept of QaDIM A method for prioritizing the incremental innovations generated from a QaDIM exercise is discussed in the next section. Section 5 concludes with the summary of our findings.

2 A sample QaDIM framework

A sample QaDIM framework is shown in Figure 1. The sample framework is a three by three matrix. The cells can be number (1, 1) through (3, 3).

Figure 1 Sample QaDIM Framework

Increase size (1, 1)	**Add a feature (1, 2)**	**Embed existing product into another product (1, 3)**
Combine two products into one (2, 1)	**Existing Product (2, 2)**	**Separate existing product into two (2, 3)**
Embed another product into existing product (3, 1)	**Remove a feature (3, 2)**	**Reduce size (3. 3)**

The current product is placed in the center cell, i.e. cell numbered (2, 2). We can then place four pairs of operators in pairs of cells that are diagonally opposite. In the sample QaDIM framework shown in the figure, we place operator “Increase Size” in cell number (1, 1) and the operator “Decrease Size” in the diagonally opposite cell numbered (3, 3).

Operators “Increase Size” and “Decrease Size” form a pair and they represent opposite actions. Similarly, operators “Add a Feature” and “Remove a feature” are placed in cells (1, 2) and (3, 2) respectively. The next pair of operators “Combine two products into one” and “Separate a product into two” are placed in cells numbered (2, 1) and (2, 3) respectively. The last pair of operators “Embed existing product into another product” and “Embed another product into existing product” in cells numbered (1, 3) and (3, 1) respectively. Although we show a product in the center, this approach is good for service as well. Figure 2 is a customized QaDIM framework and figures 3 and 4 are examples of how a customized QaDIM could be used for generating candidates for incremental innovation. Some Innovation Designers may choose to use single operators as shown below.

Figure 2 A customized QaDIM framework

Complementary functions	**Add a feature**	**Embed**
Combine two products	**Existing Product/ Service**	**Separate into two products**
Substitute components, materials	**Remove a feature**	**Reduce components / size**

Figure 3 Incremental Service Innovations for airlines using the above framework

Rental car	**Large screens for entertainment**	**Tour package**
Bus + Airline ticket	**Airlines**	**Seat, F&B**
Plastic knives	Not Serving alcohol	Budget airlines

Figure 4 Incremental product Innovations for mobile phone using the above framework

Organizer	**Map**	**Camera**
Phone + MP3 player	**Mobile Phone**	**Phone and Memory card**
Plastic casing	**Remove Clumsy SIM card socket**	**Clam Shell**

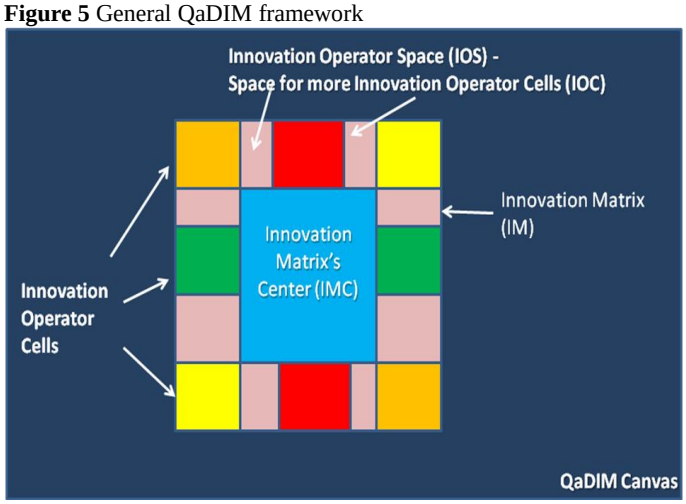
We would like to highlight that there is no real reason why a QaDIM framework should be represented only by a three by three matrix. Users should have the freedom to choose any number of pairs of operators and place them in pairs of cells around the center cell.

The operators come in pairs. Each operator takes the form "Verb Phrase" where Verb refers to some type of action and Phrase describes the action. Let us know move on to the next section for a description of the generalized QaDIM framework.

3 General QaDIM framework

We shall use Figure 5 to explain the general QaDIM framework. The framework has a space called QaDIM canvas which is presented in dark blue colour. Everything to do with the QaDIM operations happens within this canvas. On the QaDIM canvas is a square called Innovation Operator Space (IOS) shown in pink. An Innovation Designer can define / design or choose the required number of pairs of Innovation Operators.

Figure 5 General QaDIM framework



Each Innovation Operator (IO) is placed in a cell called the Innovation Operator Cell (IOC). Since operators come in pairs, an operator's complement (IO') is placed in an IOC that is (preferably) diagonally opposite to its complement. We use the same colour to identify complementary innovation operators. The IOS and IOCs together form the Innovation Matrix (IM). The square in the center surrounded by IOCs is named Innovation Matrix's Centre (IMC).

The general QaDIM framework lends itself to easy customization. For example if an Innovation Designer chooses to work with 6 pairs of Innovation Operators, the QaDIM canvas shown in Figure 6 can be used.

As mentioned previously, Innovation Operators come in pairs with a Verb-Phrase format. Table 1 shows a typical Innovation Operator table containing the pairs of IOs. As can be seen from the table, the verb for IO' which is the complement of the Innovation Operator IO is the opposite of the verb for IO. An Innovation Designer would select an Innovation Operator with a Verb-General Phase combination or Verb-Specific Phrase combination and the complementary Innovation Operator. For example, an Innovation Designer could choose IO1 with either the Verb-Phrase to be Increase Size or Increase Length. And, IO1' will then be Decrease Size or Decrease length respectively.

Figure 6 QaDIM Canvas for six pairs of operators

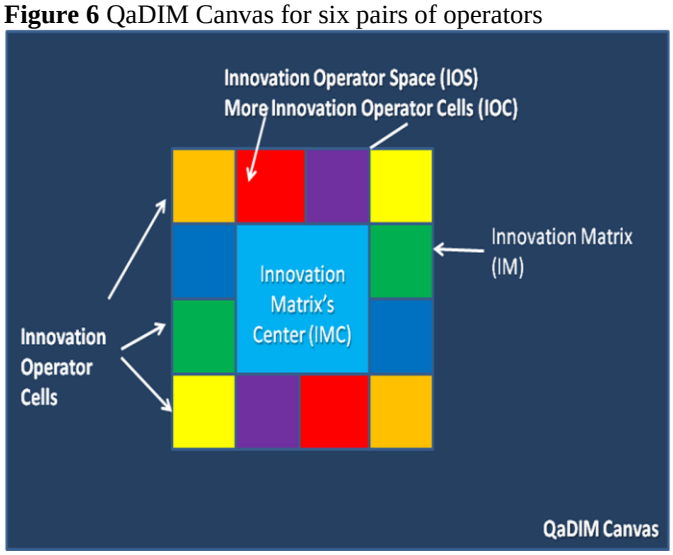


Table 1 Sample Innovation Operator Table

Operator	Verb	General Phrase	Specific Phrase	Dimensions
IO1	Increase	Size	Length / Breadth	Meters
			Volume	Cubic Meters
			…	
IO1'	Decrease	Size	Length / Breadth	Meters
			Volume	Cubic Meters
			…	
IO2	Combine	Two products into one	Two audio products into one	Units
IO2'	Separate	One product into two	One audio product into two	Units
…				
…				

Either an Innovation Designer or Innovation Manager should maintain a table of Innovation Operators. They can maintain the list of Innovation Operators which implied that they can add or delete the list of Innovation Operators of interest to them.

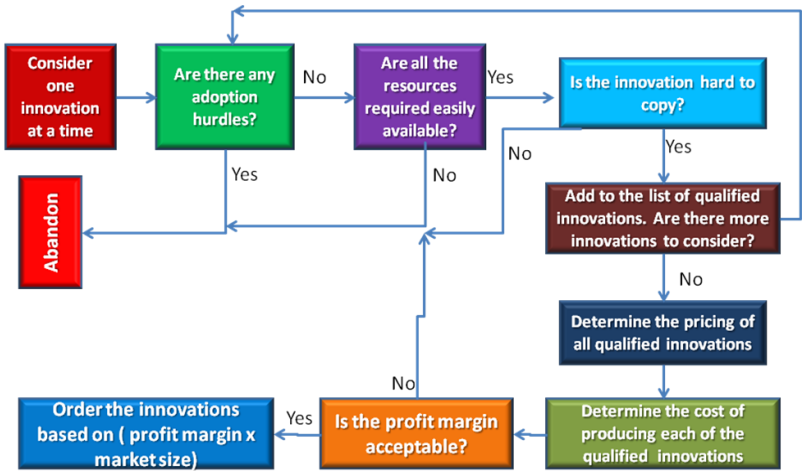
An incremental innovation design exercise should start by designing a customized QaDIM framework for that exercise. This implies selecting the required pairs of Innovation Operators, and populating the Innovation Matrix in the QaDIM canvas. The current innovation for which incremental innovations are sought is placed in the center of the Innovation Matrix, IMC. The innovation design team can then apply one set of operators at a time to generate different incremental innovations. It must be noted that not every operator is guaranteed to result in an incremental innovation. Some of the operators will be fertile and lead to one or more incremental innovations each while the other operators may be infertile as for as the current innovation is considered.

The innovation design team should then list all the incremental innovations generated and then prioritise them according to the algorithm described in the next section.

4 A Method for Prioritizing the incremental innovation opportunities from QaDIM exercise

The factors considered for prioritizing incremental innovations has to be very different from those for other types of innovations given that the market leaders for the current innovation are likely to pose significant threat in the marketing of the innovations. Figure 7 captures the proposed method.

Figure 7 Method for prioritizing incremental innovation generated by a QaDIM framework



We first use a QaDIM framework and generate all possible incremental innovations. We then consider one incremental innovation at a time. We add an incremental innovation to the list of qualified innovations if it satisfies the following three conditions.

i. The innovation does not face any adoption hurdles
ii. The innovation is not easy to copy
iii. All the resources required to develop, deploy and distribute the innovation are easily available.

Conditions ii and iii are particularly important in the case of incremental innovations. The market leader for the current innovation at the center of the Innovation Matrix is likely to have significant resources including deep pockets and can be expected to defend its position. Any innovation that is easy to copy will be quickly copied by the market leader. Again, if any of the resources required for the successful development and distribution of an incremental innovation is either secured by the market leaders or the regulator then it would be difficult to pursue such an innovation. Any of the incremental innovations that do not meet the above requirements should be discarded from further consideration. At the end of this cycle there should be a list of qualified innovation and hopefully that list is not an empty list.

One can then consider each of the qualified innovations and check whether the profit margin for the innovation is acceptable. Any qualified innovation that does not meet the acceptable profit margin should not be considered any further. For each of the remaining incremental innovations one can calculate the total estimated profits. The innovations can then be ordered from the one that offers the highest estimated profits to the lowest estimated profits. The method for ordering them in terms of attractiveness is simple. One can modify the order using other considerations such as the investment required, the development time required and the expected return on investments.

5 Summary and experiences

The QaDIM framework has been tested in several real life situations in both academic and industrial settings since 2009. The framework has received overwhelming endorsements from undergraduate and graduate students from the Singapore Management University. The method has been used by MBA students in an Innovation Management elective and six credible innovation opportunities were identified by the class. One of the students from an MNC mentioned that he had trained all his colleagues on this method and a number of them were using the method on a regular basis. Students have started companies based on innovations identified using the QaDIM framework.

C level and mid level executives from Small and Medium Enterprises have adopted this method for planning the innovation portfolio for their companies. In one of the training programs for SMEs, a C level executive identified several incremental innovation opportunities that were relevant to his company in a ninety minute session. The C level executive was able to then prioritize the innovation opportunities and select those that were most compelling for his company's growth.

The general feedback from most of the users is that the method is a robust, structured and extensible framework that is easy to use for identifying incremental innovation opportunities. The method has been observed to empower innovation managers or

innovators to define their own set of operators that they apply on an existing product or service in order to generate several incremental innovation opportunities and offers them the ability to prioritize them for innovation development and marketing.

The QaDIM framework reported in this paper will provide a step change in the approach towards identifying and selecting incremental innovation opportunities. Unlike other reported methodologies, it totally empowers an individual innovator or an innovation manager to customize the operators that can be applied to an existing product or service to identify incremental innovation opportunities. We hope to continuously refine the framework using the feedback from the academic and user communities.

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