

# CHRISTENSEN'S INNOVATION MODEL AND RESPONSIBILITY: THE ISSUE OF INTEGRATING RESPONSIBILITY IN A DISRUPTIVE INNOVATION MODEL

LE MODÈLE D'INNOVATION DE CHRISTENSEN ET LA  
RESPONSABILITÉ : LA PROBLÉMATIQUE DE L'INTÉGRATION DE LA  
RESPONSABILITÉ DANS UN MODÈLE D'INNOVATION DE RUPTURE

EL MODELO DE INNOVACIÓN DE CHRISTENSEN Y  
LA RESPONSABILIDAD: ¿COMO INTEGRAR LA RESPONSABILIDAD  
EN UN MODELO DE INNOVACIÓN DISRUPTIVO?

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## ABSTRACT

Progress of modern science and technology provides managers with a very large range of innovation opportunities, which do not necessarily bene-

fit customers and society in the long term, and because they are often primarily concerned with economic value and short-term development, do not take into account the impact and potential threat on society. When the ef-

fects of incremental innovations are relatively limited in terms of societal risks, it is not the case for disruptive innovations, as described by Christensen, which can possibly have a strong impact on society, environment,

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and ecosystems. Responsibility, through the ability to understand and anticipate the consequences of actions, is thus a major criterion which should be integrated in innovation models, and especially Christensen's disruptive model, which only addresses responsible inno-

vation through the prism of social innovation for the low-end of the market. Because responsibility should not be limited to the scope of social business and micro-projects, we must consider responsibility as a major determinant to the innovation process, integrate fore-

casting and anticipation in the models, and develop a deeper understanding of responsibility in the field of innovation, where anticipating consequences is a major challenge and where the integrity of individuals is at stake.

**Key words:** innovation, responsibility, disruptive innovation, Christensen, catalytic innovation.

## RÉSUMÉ

Le progrès de la science moderne et de la technologie donne aux managers une très large palette d'opportunités d'innovation, qui ne bénéficient pas forcément aux clients et à la société dans le long terme, car, souvent, ils concernent surtout la valeur économique et le développement à court terme, ne prennent pas en compte l'impact et la menace potentielle pour la société. Lorsque les effets des innovations incrémentales sont relativement li-

mités en ce qui concerne les risques pour la société, ce n'est pas le cas pour les innovations de rupture, telles qu'elles sont décrites par Christensen, qui peuvent probablement avoir un impact important sur la société, l'environnement et les écosystèmes. La responsabilité, à travers la capacité de comprendre et d'appréhender les conséquences des actions, est donc un critère majeur qui doit être intégré dans des modèles d'innovation, et surtout le modèle de rupture de Christensen, qui traite seulement l'innovation responsable à

travers le prisme social de l'innovation pour le bas de gamme du marché. Puisque la responsabilité ne doit pas se limiter à l'étendue de l'entreprise sociale et des microprojets, nous devons considérer la responsabilité en tant que déterminant fondamental au processus d'innovation, intégrer la prévision et l'anticipation dans les modèles, et développer une compréhension plus approfondie de la responsabilité dans le domaine de l'innovation, où l'anticipation des conséquences est un défi majeur et où l'intégrité des individus est en jeu.

**Mots clés :** innovation, responsabilité, innovation de rupture, Christensen, innovation catalytique.

## RESUMEN

El reciente progreso en la ciencia y tecnología ha provisto a los directivos empresariales de un amplio rango de oportunidades de innovación, las cuales no necesariamente benefician

a los clientes y a la sociedad en el largo plazo. Debido a que están principalmente orientados al valor económico y el desarrollo a corto plazo, no toman en cuenta el impacto y la amenaza potencial que representan para la sociedad. Aunque los efectos

de las innovaciones incrementales son relativamente limitados en términos de riesgos sociales, este no es el caso de las innovaciones disruptivas, tal como las describe Christensen, las cuales pueden posiblemente tener un alto impacto en la sociedad, el medio

ambiente y los ecosistemas. La responsabilidad, o la habilidad de entender y anticipar las consecuencias de las acciones; es por tanto, un criterio importante que se debe integrar en los modelos de innovación, especialmente en el modelo disruptivo de Christensen, el cual sólo señala una

responsabilidad a través del prisma de la innovación social en el mercado de baja gama. Debido a que la responsabilidad no debería sólo limitarse al ámbito de la empresa social y los micro-proyectos, debemos considerar la responsabilidad como un determinante crucial en el proceso de in-

novación, integrar el pronóstico y la anticipación a estos modelos y desarrollar un mayor conocimiento de la responsabilidad en el campo de la innovación, en el cual las consecuencias previstas son un reto importante y donde la integridad de los individuos está en riesgo.

**Palabras clave:** Innovación, Responsabilidad, Innovación Disruptiva, Christensen, Innovación Catalítica.

## BACKGROUND: THE CHALLENGE OF INTEGRATING RESPONSIBILITY IN TRADITIONAL INNOVATION MODELS

Innovation aims at creating value. Progress, particularly technological progress, provides managers with a very large range of innovation opportunities, which do not necessarily benefit customers and society in the long term. Anticipating the future consequences of innovation is now a major challenge because technological progress and modern science give individual real power over the environment and society, and can eventually threaten the integrity of ecosystems upon which human society depends. Man has the duty to protect himself and his sustainability. Innovation is therefore strongly linked to responsibility.

## INTRODUCTION TO CHRISTENSEN'S MODEL

Christensen's model distinguishes between two types of innovations: incremental innovation and disruptive innovation.

Incremental innovation has a minor impact on the market and does not change conditions of use radically. It usually builds upon existing knowledge and resources within companies: it is competence-/performance- enhancing. This type of innovation is usually pulled by the customers.

In contrast, disruptive innovation consists in designing for a different set of consumers. It has by nature an impact that the market does not expect. It

usually modifies conditions of use for customers and usually implies a radical technical or technological change.<sup>1</sup>

Since a company's ability to make technology progress is steeper than customer's acceptance level, "low end disruption" occurs when the rate at which products improve exceeds the rate at which customers can adopt the new performance. At some point, a disruptive technology may enter the market and provide a product which has lower performance than the incumbent but which exceeds the requirements of certain segments. "New market disruption" occurs when a product fits a new or emerging market segment that is not being served by existing industry. Some disruptive innovations can be hybrid: both low-end and new market.<sup>2</sup> When technology outperforms consumers' expectations, only a niche of "premium" consumers will want to buy the product/service at a high price in a very competitive environment. Other consumers may favour disruptive innovation.

Christensen's disruption model<sup>3</sup> provides a comprehensive and useful insight to understanding innovation. This model is a very powerful tool to describe the potential of an innovation, and has proved itself to be particularly helpful for managers to think "out of the box" and to analyze companies' strategies.

## INCREMENTAL INNOVATION AND RESPONSIBILITY: WHAT IS AT STAKE?

As far as incremental innovation is concerned, responsibility does not necessarily appear at first glance as an important feature to be considered: it is indeed possible to anticipate the adoption of incremental innovation using a traditional life cycle and projections based on the results of previous launches.

The traditional life cycle, as described by Everett Rogers<sup>4</sup>, is a S-shaped curve, showing the rate of adoption of an innovation by four different types of consumers<sup>5</sup>: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%). The way to develop a market is to follow the curve from left to right, using each captured group as a reference for the

1. It is a classical example of disruptive innovation since before it came along, computing was done through expensive mainframe centres, each computer costing about \$250,000. Over time, this disruptive innovation has completely transformed the computing industry. Source: « Disruptive Innovation in the Classroom », <http://thejournal.com/articles/2010/01/21/disruptive-innovation-in-the-classroom.aspx>

2. amazon.com: One the one hand, it is a low-end disruption innovation as, since the 1990s, when the music industry phased out the single, many consumers couldn't afford buying music anymore. Amazon put an end to this by enabling "poor" consumers to buy a single song for a cheap amount (\$0.99). On the other hand, it eventually became a new market disruption by undermining the sales of physical CDs: total industry sales were about \$10 billion last year, down from \$14 billion in 2000, according to the Recording Industry Association of America, mainly because of digital music such as music available on amazon.com.  
Knopper, Steve (2009). *Appetite for Self-Destruction: The Spectacular Crash of the Record Industry in the Digital Age*. New York: Free Press.

3. Christensen, Clayton M. (2003). *The Innovator's Solution*, Harvard Business School Press.

4. Rogers, Everett A. (1962). *Diffusion of Innovations*, Free Press.

5. Rogers, Everett A. (1962). *Diffusion of Innovations*, Free Press.

next group to adopt the innovation. The early majority naturally follows early adopters, because of learning and adaptability to technological progress.

But today, shrinking product life cycle and the race for competitiveness through innovation, because of market pressure, give little time for companies launching new products or services. This "time-based competition"<sup>6</sup>, as introduced by Stalk in 1988, considers time a resource, an input in the innovation process: since time consumption acts as an opportunity cost, time-based strategy creates competitive advantage for the company. A product 50% over budget but introduced on time generates higher profit levels than a product brought to market six months late (within budget)<sup>7</sup>. If launched six months late, a product with a five-year life cycle can lose up to 33% of its total lifetime net profit<sup>8</sup>. The speed of the innovation process therefore often poses a threat to responsibility, since it reduces the time dedicated to research and to the analysis of direct and indirect consequences of new products or services.

## DISRUPTION VS. RESPONSIBILITY: AN ANTINOMY?

Being a disruptive innovator sometimes implies "crossing the chasm"<sup>9</sup> of the product/service life cycle, which is different from following the traditional life cycle. According to Moore<sup>10</sup>, for disruptive innovations, the adoption does not come in a predictable way: it makes the transition between visionaries (early adopters) and pragmatists (early majority) a difficult and unpredictable step to follow. Indeed, it is very difficult to convince pragmatists with a totally new product or service. References are very important to them, and they do not necessarily trust early adopters. Pragmatists won't buy until the company and its new offer are established, but in order to establish a company, pragmatists have to be involved... And so if trust is acquired and early majority starts buying, the development can be exponential. But the innovation might as well be rejected by pragmatists and make it have no impact. It is therefore a real challenge for companies to foresee the development of a disruptive innovation in terms of market size.<sup>11</sup>

6. Time-based competition: notion introduced by the US consultant George Stalk, Jr., of Boston Consulting Group and popularised by his book *Competing Against Time*. Time-based competition focuses on reducing cycle time from every facet of the value-delivery system.

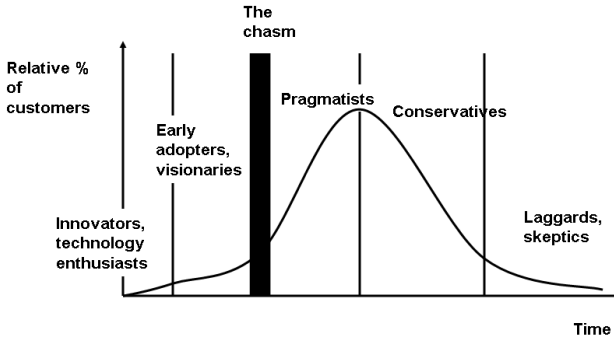
7. R. Anthony Inman, *Time-based competition*.

8. RESPONSE teaching deck on CSR and innovation.

9. Moore, Geoffrey A. (1999). *Crossing the Chasm*, (revised edition), HarperCollins Publishers, New York.

10. Moore, Geoffrey A. (1999). *Crossing the Chasm*, (revised edition), HarperCollins Publishers, New York.

11. Crossing the chasm may depend on internal as well as on external factors: for instance, the success or failure – i.e. crossing the chasm or not – for the i.mode technology (mobile Internet network) mainly depended on two external factors: the nature of the consumers and their environment. In Japan, where the technology was launched in 1999 by NTT DoCoMo, it was a success because consumers didn't have Internet at home and had to commute daily for two hours in public transports. As a matter of fact, the technology solved the problems faced by the consumers. On the contrary, in Singapore, the technology – launched by Star Hub – was a major failure because it didn't create any value for the consumers: most of them had Internet at home and used to spend less than one hour a day in public transport. The i.mode wasn't useful for them.



Geoffrey A. Moore, *Crossing the Chasm*<sup>12</sup>

Following this issue of anticipating the success and the penetration of disruptive innovation in the market, two specific challenges have to be addressed:

- low-end disruption allows a wide range of people to access a product/service they could not previously afford. This generalisation of access can become a threat and have a strong impact on the global balance. When thinking about the Tata car or the Logan, we can wonder whether it is really responsible to widen access to cars in developing countries, given the damages caused by CO<sub>2</sub> emissions. In India for instance, in addition to increasing the general chaos of the streets, the rise in car ownership worsens air quality and lead to more global warming pollution;<sup>13</sup>
- new-market disruption is about developing new markets, whose size can be ignored, providing alternative or brand new solutions to existing products or services. Forecasting the success of this alternative is not easy and the results can often be unexpected to companies.

What is more, disruptive innovations often rely on new techniques or technologies, for which scientific knowledge is still limited, and for which all consequences cannot always be foreseen.

For instance, the impact of nanotechnologies, which are now used in many consumption products, is still uncertain, and the consequences on health and environment are not precisely known. Nanotechnology is science and engineering at the scale of atoms and molecules. Materials of this size display unusual physical and chemical properties. On the one hand, there are about a thousand products with nanotechnologies available on the French market

12. Moore, Geoffrey A. (1999). *Crossing the Chasm*. (revised edition), HarperCollins Publishers, New York.

13. Rajendra Pachauri, chairman of the Intergovernmental Panel on Climate Change, who got Nobel Prize in 2007, said he has "nightmares" about the impact this car will have on environment. As a consequence of its low cost (120,000 rupees, i.e. \$2,500), it will increase by 65% the number of Indian families that can afford a car, a population currently using bicycles and motorcycles. Even if it consumes only at an average of 20 kilometers per gallon – lower than the European average – the impact on the environment is then expected to be high since about 250,000 cars per year are produced, up to 300,000 next year. "Tata Nano may expand market by 65%" in *The Economic Times*, and "Tata Nano production to be tripled to 30,000 units by March 2011" in "WheelsUnplugged Automobile Industry News".

and, in the short term, the greatest advances through nanotechnology should be related to new medical devices and processes, new catalysts for industry and smaller components for computers. The global revenue resulting from nanotechnologies, which was about €40 billion per year in 2001, was estimated at around €700 billion in 2008, and should reach €1,000 billion in 2015: this would represent the employment of 2 billion people worldwide. On the other hand, only about 3% of research publications about nanotechnologies take into consideration the risks on environment and health, despite the fact that it has been proved that nanomaterials can get into the lungs or skin epidermis easier than any other material.<sup>14</sup> The issue of responsibility in the generalisation of nanotechnologies should therefore be discussed.

Nanotechnologies are not the only example of such a dilemma between the economic potential of some scientific developments and the limits of knowledge concerning the consequences of their use. The inability to anticipate the consequences of disruptive innovation, and therefore its consequences on society, ecosystems and the environment, requires the implementation of responsibility as a key element of the model.

## CATALYTIC INNOVATION, A FIRST STEP TOWARDS RESPONSIBILITY?

To a certain extent, Christensen introduced a notion of responsibility, but with a restricted scope.

Admittedly, following Christensen's article on "Disruptive Innovation for Social Change",<sup>15</sup> the disruptive innovation model provides opportunities to create social businesses through catalytic innovation. Indeed, disruptive innovations don't meet existing customers' needs for existing products or services. Certain "high-tech" features of the established goods, which only appeal to high-end consumers, are not included in disruptive offers, which rely on more basic features and capabilities. Being simpler, these offers are often more convenient, and less expensive, so they appeal to the low-end of the market, who can afford to buy them. They can provide access to new products and services for people at the bottom of the pyramid and therefore contribute to the development of groups of people who are marginalised in society.

"Catalytic innovations", which are a subset of disruptive innovations focusing on social development, can be found in sectors such as education, health-care, banking. Catalytic innovations are characterised by four important functions, according to Christensen: they create systemic social change, they meet a need that remained unaddressed or overserved (when they offer a too high level of performance compared with individual needs) by existing companies, they offer good products that are cheaper and simpler, and they generate

14. INRS, dossier *Les Nanomatériaux*, June 2009.

15. Christensen, Clayton M., Baumann, Heiner, Ruggles, Rudy, and Sadtler, Thomas M. (2006). "Disruptive Innovation for Social Change", *Harvard Business Review*.

donations (“micro-businesses”, social funds, volunteer workforce...). They are often considered unattractive by competitors but have a dominant position on their market.

The example of Eko Bank in India<sup>16</sup> shows how using a very simple interface on mobile phones provides access to basic banking services to a large part of the Indian society. The service is available to the customers on all mobile phones including the most basic models. It provides access to a simple mini savings account. Its functionalities range from peer-to-peer money transfers, cash deposit/withdrawal, wage and salary disbursements, to micro-insurance, micro-credit and payments. Mobile technologies provide various opportunities for catalytic innovators, especially in fields like health, or education. These opportunities, when launched successfully on the market, are said to be disruptive innovation, because they provide a simple service to low-end consumers who could not afford it before, based on relatively basic technologies, accessible to the “bottom of the pyramid”.<sup>17</sup>

But what is called “bottom of the pyramid innovation” or “social entrepreneurship” only accounts for a very small part of responsible innovation. Indeed, it focuses on the present more than on the future. What we refer to as “responsible innovation” covers a much larger scope, which is indeed linked not only to the development of society, but which places the individual value at the centre of any product or service development. “Social” is not a synonym for “responsible”, so let’s focus on responsible innovation in a comprehensive way, going far beyond the scope of social development.

## NEW ETHICS AND RESPONSIBILITY: JONAS’ PERSPECTIVE

“Act only in accordance with that maxim whereby you can at the same time will that it should become a universal law.”<sup>18</sup> Referring to this version of Kant’s categorical imperative, Jonas gives his imperative as follows: “Act so that the effects of your action are compatible with the permanence of genuine human life” or so that they are “not destructive of the future possibility of such life.”<sup>19</sup>. For Jonas is in no logical contradiction in favouring the well-being of the present generation to that of future generations, or in allowing the extinction of the human species by destroying our planet. The imperative of responsibility differs from the ethics of Kant because it relies on the principle that we owe something to the future generations, even if we will never be directly in relationship with them.

16. <http://www.netsquared.org/projects/eko-indias-mobile-bank>

17. Prahalad, C.K. (2004). *The Fortune at the Bottom of the Pyramid*. Wharton School Publishing.

18. Kant, Emmanuel, translated by James W. Ellington [1785]. *Grounding for the Metaphysics of Morals*, 3<sup>rd</sup> ed., Hackett, 1993.

19. Jonas, Hans (1979). *The Imperative of Responsibility: In Search of Ethics for the Technological Age*. University of Chicago Press.



Jonas<sup>20</sup> argues that humanity is in a new ethical movement, that the recent scientific, technological and economic developments have raised new challenges for society: Jonas explains that humans now suffer from an ethical gap, created because of the chasm that exists between technological performance and the capacity of individuals for exercising moral responsibility, and that traditional ethics do not provide a clear guidance to the understanding of these issues anymore. Since nature now constitutes an important focus of human responsibility, and since many actions undertaken by individuals can have an irreversible effect on nature, this notion of responsibility spreads beyond human relations, and should thus be incorporated in any long-term effects of forecast. Jonas suggests that every time a potential threat is identified, the worst outcome should be considered in the decision-making process. This can definitively impact strongly on the first stages of the innovation process, from idea generation to testing and customer studies.

## FULFILLING A RESPONSIBLE INNOVATION: A DILEMMA?

Today, companies receive a strong demand from the market for quicker product or service development. As CEOs and managers are rewarded for making quick decisions in complex situations, as they are selected for their ability to “act despite uncertainty”,<sup>21</sup> they no longer afford much time for in-depth study and review before making choices, and they tend to rely on quick decisions, which can threaten responsibility in the medium or long run. Many CEOs acknowledge that they “feel overwhelmed by data while still being short on insight”.<sup>22</sup> But at the same time, they can't wait to act, even in uncertain situations, because if they do not, competitors might consider that taking calculated risks can pay off. The ambiguity is in the notion of “calculated risks”. Even if “good sense is the most evenly distributed thing in the world”,<sup>23</sup> it is no longer sufficient, given the limits to scientific knowledge.

Among the top leadership qualities, creativity is ranked at the top position, followed by integrity and global thinking, but focus on sustainability, humility and fairness stand at the bottom of the list.<sup>24</sup> The more creativity is required in the leadership, the more rapidly decisions are made, and the more responsibility is needed to balance the risks.

Therefore, leaders being aware of market pressure and time constraints, responsibility should remain a strong concern in the innovation process:

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20. Jonas, Hans (1979). *The Imperative of Responsibility: In Search of Ethics for the Technological Age*. University of Chicago Press.

21. *Capitalizing on complexity*, 2010 Insights from IBM's global CEO study.

22. *Capitalizing on complexity*, 2010 Insights from IBM's global CEO study.

23. Descartes, René (1637). *Discourse on Method*.

24. *Capitalizing on complexity*, 2010 Insights from IBM's global CEO study.

- forecasting, anticipation, precaution should be integrated in innovation processes;
- an in-depth analysis of all possible consequences, for instance the use of a new technology in totally different fields and for different purposes, should be performed before the implementation of the innovation;
- managers should have self-control and the ability to step back.

Therefore, further research needs to be done about the formalisation of responsible innovation processes, the relationship between responsibility and economic performance, and the type of organisation optimizing the integration of responsibility in innovation.

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