

Business Model Canvas and Competition to Understand Exploitation of Cybersecurity Project Results

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Abstract: The European Commission (EC) has lately funded 22 different cybersecurity projects (European Commission, 2024), and the European Union (EU) expects a return for the investment and requires these projects to demonstrate efficient exploitation activities that emphasize their influence on the European economy. The Business Model Canvas (BMC) is a tool to actively guide discussion and processes that evolve and adapt based on their environments. Yet, the tool does not address the competition on the marketplace. For this reason, this study introduces the ‘Business Model Canvas and Competition’ (BMC&C) by including the element of competence to the traditional BMC and examines its usefulness to understand the relations between an organisation and its competitive environment. The data collection method for this study was action research through actively participating in the exploitation workshops activities and reading what materials were produced. The BMC by Osterwalder and Pigneur (2011) consists of the nine building blocks. This study modified the BMC as a framework of analysis by adding tenth building block ‘Competition’ (&C) that acknowledges that an organization is not alone but is part of a market where it encounters competition by active direct competitors and by indirect alternative ways to achieve similar results. This tenth building block ‘Competition’ (&C) was deemed important to better understand what possible competitive advantages and challenges the analysed assets of the ECHO project may encounter. The BMC&C was used in ECHO exploitation workshop that addressed the ECHO asset ECHO Early Warning System (E-EWS). The E-EWS asset BMC&C example show that users found the BMC&C easy to use. As the &C was added as a tenth element or building block the use of the tool was familiar to anyone who had used a conventional BMC. Those who had no prior experience of the BMC tool received guidance from the more experienced users. The workshops included active and co-creative discussions that shaped the outcomes of the BMC&C for each individual ECHO asset. The results of this study indicate that the BMC&C can be a valuable tool to assess how an organisation that is active in a marketplace may need to take their competition into account. The contribution of this study to practice is a deeper understanding of competition and market on a very practical case level, while its contribution to theory is the accumulation of data from multiple cases.

Keywords: Business Model Canvas, Competition, Cyber Range, Co-Creation

1. Introduction

The latest round of European Commission (EC) funding included 22 cybersecurity projects, which together receive €10.9 million in funding (European Commission, 2024). This is an investment for the European Union (EU), which is why its funding instruments, such as Horizon and the Digital Europe program require efficient exploitation activities to emphasize the influence that these funded projects have on European economy. Di Cagno et al. (2014, p. 853) write: “given the large and increasing amount of European resources devoted to promote scientific co-operations among countries, it is important trying to assess their actual technological and economic impact.” Project results should be taken up by end users, policymakers, industry, and the scientific community (European Commission, 2014).

Projects can be seen to function as organizations, they have action plans, visions, missions, budgets, and time and exploitation plans. A very important objective of funded projects is that they expand the benefits of their results throughout the European Union. Exploitation of project results is, thus a key activity that builds lasting impacts for projects that develop cybersecurity solutions. Business Model Canvas (BMC) can be a useful practical tool to actively guide discussion and processes in a way where they evolve and adapt to their changing environments (Fritscher and Pigneur, 2015). Despite this notion of adapting to the environment, the BCM tool does not address the competitive situation on the marketplace. For this reason, this study introduces the ‘Business Model Canvas and Competition’ (BMC&C) by including the element of competition to the traditional BMC and examines its usefulness to understand the relations between an organisation and its competitive environment.

This BMC&C ideology was developed by the author at Laurea University of Applied Sciences, to provide students who use the BMC for business concept analysis, with a better view of what competitive elements the business may encounter on the marketplace. Students have found the framework useful. So, this concept was also adopted in practice in the ECHO project efforts, in a series of exploitation workshops that analysed how the main outputs of the project can be take advantage of by the project partners as a future business.

This paper contributes to the pathway from the development of cybersecurity solutions to their practical uptake. This contribution will mainly be toward the body of knowledge regarding e-business. By using a structured framework to describe the business models of each partner organization in relation to the solutions and assets that were developed in this case project. When identifying opportunities, it is very relevant to also look at competition, which is why we offer a Business Model Canvas (BMC) that also includes the element of competition (&C).

The transition from idea to market-ready innovation is not easy. One way to facilitate the exploitation of developed solutions is to map potential opportunities as business models when offering e.g., risk analysis, modelling, and early warning solutions for critical infrastructure protection (as in project ECHO), or incident response strategies (as in project DYNAMO).

The research question of this study: Can the BMC&C help address competition on the marketplace?

2. Literature Review

This section discusses customer relationships and organizational focus on relationships and how these can be visualised with the Business Model Canvas (BMC) approach.

2.1 Customer Relationships

Project communication and dissemination activities should begin early enough, ideally at the start of the project to create and expand stakeholder communities; it is in the interest of the EC that “as many end users as possible adopt new innovations, which in turn will generate more business possibilities for the industry, and further research projects for the academia” (Henriksson, Ruoslahti & Hyttinen, 2018; p. 211). Funded cybersecurity projects often include end-user and stakeholder relationships that can be looked as being similar to customer relationships.

Customer relationships direct organizational focus on relationships rather than on transactions, (Vargo & Lusch, 2008; Vargo & Lusch, 2004). According to Holmlund (2004) relationships take place between two counterparts as developing and evolving sequences of interactions, as goal-oriented activities to establish, develop, and maintain successful exchanges between company and customer (Morgan & Hunt 1994; Deszczynski & Beresewicz, 2021). Relationships can be seen as a means and a result for organizations operating with one another in network settings (Holmlund, 2004). Establishing a customer relationship evolves in two stages: first attracting a customer and second actively building this relationship to achieve the economic goals set for the relationship (Grönroos, 1994). Companies need to engage in interaction through various means, to have meaningful relationships with its customers, and successfully satisfy their needs (Payne, 2005), by seeing these relationships through the meaningful individual encounters and experiences by each counterpart (Holmlund, 2004).

Customers can, thus be viewed as assets for the business, as the market value for a company or cybersecurity solution can be viewed as possible future profit streams that can become generated over the lifespan of the customer relationship (Payne, 2005). Negative critical incidents may threaten to terminate a relationship, while a positively handled critical incident may have the potential to strengthen and deepen it (Holmlund, 2004). Exceptional service can become a key differentiator because of consistency of service with continuous customer input and involvement is very difficult to imitate (Payne, 2005), and can be analysed as elements on an episode and a relationship level (Storbacka, Strandvik & Grönroos, 1994).

According to Grönroos (1994) establishing, maintaining, and enhancing relationships with customers and partners, “is achieved by a mutual exchange and fulfilment of promises” (p. 9). Relationship strength is important when implementing customer relationship enhancing actions (Storbacka et. al., 1994); service customers themselves create value when use the resources provided by the service provider, making the customer into a value creator (Grönroos & Helle, 2010), and besides personal contacts, the Internet is a powerful

tool to involve customers in one-to-one dialogue, and to capture data that can help understand what a customer may want (Payne, 2005).

Putting focus on the specific context of one customer at a time can, as iterative process where new ideas are likely to emerge, promote the analysis and development of a business model (Ojasalo & Ojasalo, 2015). Galvagno and Dalli (2014) note that literature on co-creation mostly emerges from management and marketing studies, service management, and consumer research. Knowing what forms of interaction can lead to intertwined successful customer relationships is important (Grönroos & Helle, 2010), as successful co-creation processes need active facilitation (Ruoslahti, 2018). “Successful companies harness the creativity and energy of stakeholders by establishing projects and systems for marrying their collaborators’ interests with corporate knowledge and resources” (Bhalla, 2014, p. 19). Co-creation can enhance innovation and unlock new sources of competitive advantage and occurs in physical and/or digital arenas, where users are innovators, co-designers, and co-producers, as members of open-innovation networks that integrate user-centered collaboration, research, and innovation (Leminen, Westerlund & Nyström, 2012).

2.2 Business Model Canvas

Osterwalder and Pigneur (2011; 2013) introduced the Business Model Canvas (BMC) that uses design-thinking processes to explore business models and patterns. The BMC by Osterwalder and Pigneur (2010) consists of nine building blocks. 1) Customer segments refers to the different groups of people and organisations that the company aims to reach and serve. 2) Channels describes how the company reaches its customer segments and communicates with them. 3) Customer relationships defines what types of relationships the company establishes with the identified customer segments. 4) Value proposition describes the products and services that create value for specific customer segments (with characteristics such as novelty, performance, customisation, status, accessibility, convenience, usability, price, cost, or risk reduction). 5) Revenue stream represents the sales revenues that the company generates from each segment. 6) Key resources are the most important assets that are required to successfully provide the products or services to the customer segments. 7) Key activities describe what the company must do to make the business model work (e.g., production, problem-solving, platform and networking activities). 8) Key partnerships constitute the network of suppliers and partners (these may be strategic alliances sub-contractors, providers, joint ventures and even competitors) that enable to successfully make the business model work, and to develop new business or buyer–supplier relationships. 9) Cost structure describes all costs incurred to operate the business model (Figure 1).

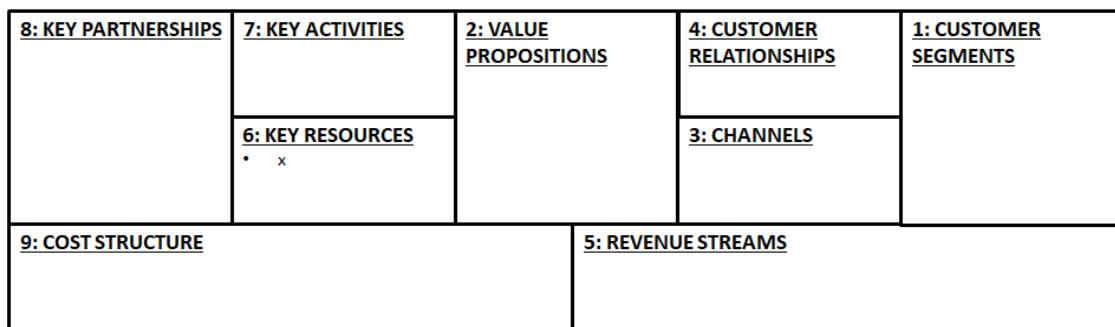


Figure 1: Business Model Canvas (BMC). Modified Osterwalder and Pigneur (2011; 2013)

Ojasalo and Ojasalo (2018) offer a modified business model framework that they call Service Logic Business Model Canvas (Figure 2). They base their views on an interactive research process, where they have addressed each building block of the canvas separately, and the entire canvas. This step-by-step development has offered several revisions during the research process. The authors note that in the beginning of their process they found as the most evident development needs of the BMC: how to highlight the customer’s active role and add the notion of the customer as a value creator and the company supporting that value creation (Grönroos, 2008; Heinonen et al., 2010).

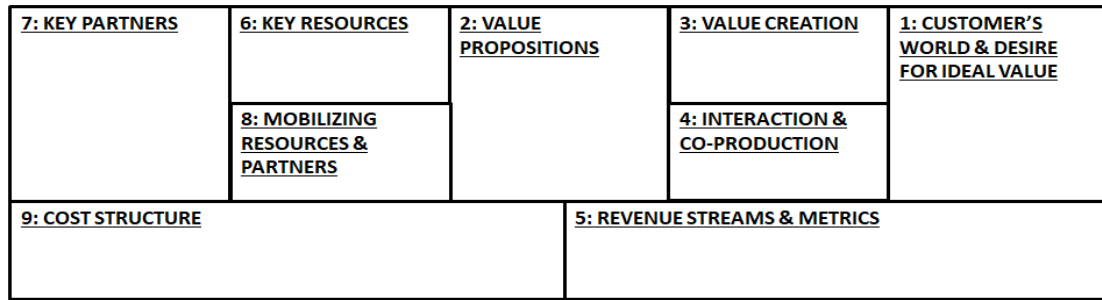


Figure 2: Service Logic Business Model Canvas (SLMC). Modified Ojasalo and Ojasalo (2018)

Like the original BMC (Osterwalder and Pigneur, 2011), this Service Logic Business Model Canvas (SLMC) framework by Ojasalo and Ojasalo (2018) has nine building blocks. The authors have kept to the original structure and redesigned these to be more service logic oriented. This provides an opportunity to compare the original BMC and the modified SLMC to easier understand differences between traditional business thinking and service logic-based thinking.

Sparviero (2019) sees that a most obvious limitation to the BMC instrument is its focus on the organization and being conceptually isolated from its environment, be it industry, society, or natural environments; and suggests two additional building blocks for the treatment of “social and environmental costs and benefits as ‘externalities’: also, for-profit organizations have an indirect social impact (e.g., economic growth, job creation and poverty reduction), which is a by-product of their pursuit of economic value”. (p. 238) in the Social Enterprise Model Canvas (SEMC), which is an instrument that better frames and explains how Social Enterprises (SE) and their intended beneficiaries create value.

Fritscher and Pigneur (2015) note that the BCM can be useful when used by novice, expert, or master user. For the novice user the BMC can provide a simple common language and help with visualization; the expert may use the BMC to create a holistic vision to understand the sustainability of the business model, which requires understanding the methods (e.g., high level links, colours) of the model to connect ideas and follow the interactions. Master users may use the BMC to understand even global strategy, with evolving processes that adapt to their environments. These users will need to “understand that the design of a model has to accompany such a process by supporting concepts of iteration, transformation (mutation) and choosing alternatives (selection)” (p. 89).

3. Method

The data collection method for this study was action research through actively participating in the exploitation workshops activities and reading what materials were produced (Denzin & Lincoln, 1995). The ECHO outcomes are solution-based services, so the modified BMC with an added tenth building block ‘and competition’ (&C) was deemed most appropriate to be used as a framework of analysis.

The ‘business model canvas and competition’ or BMC&C acknowledges that ECHO consortium members that are planning to exploit the ECHO cybersecurity solutions are not alone, but that the project is part of a market where it encounters competition by active direct competitors and by indirect alternative ways to achieve similar results (Figure 3).

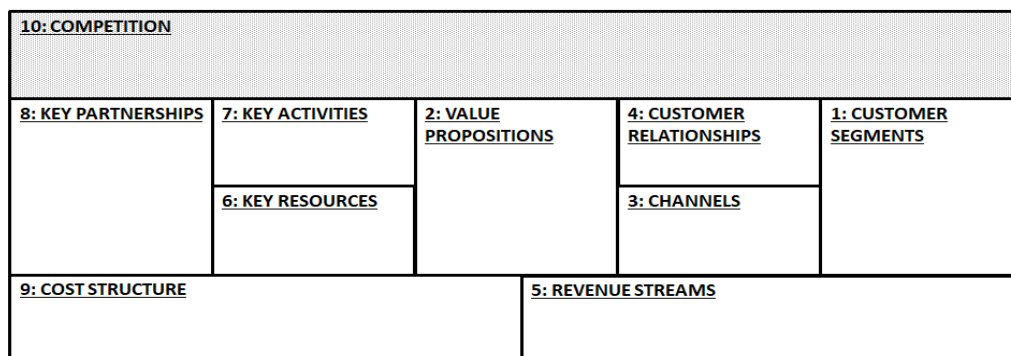


Figure 3: The Business Model Canvas and Competition (BMC&C) as a tool of analysis and co-creation.

This tenth building block ‘and Competition’ (&C) was deemed important to better understand what possible competitive advantages and challenges the analysed ECHO assets may encounter. Thus, the BMC&C was chosen as the framework of analysis for ECHO exploitation workshops. The ECHO project developed six assets and a network of cyber-research and competence centres (Figure 4), which were each assessed in the exploitation workshops.

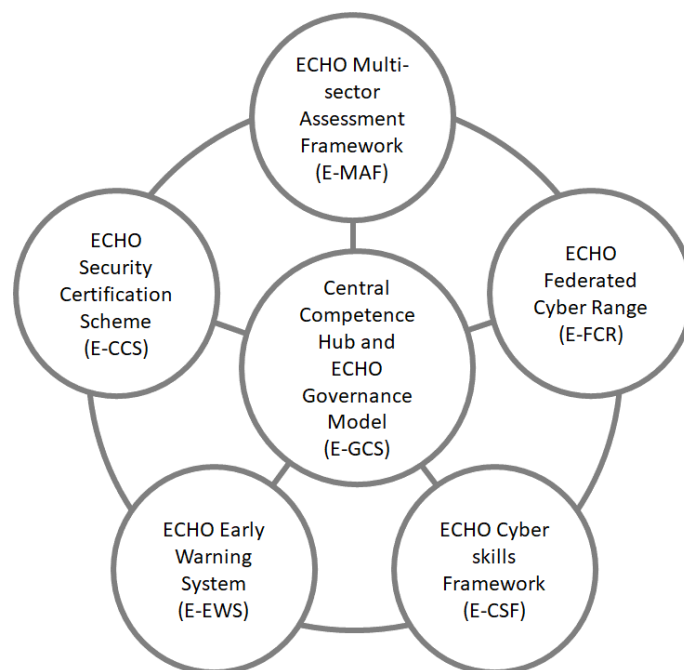


Figure 4: ECHO assets (Ruoslahti & Davis, 2021).

In an effort to address European cyber security gaps, the project has developed an adaptive model for information sharing and collaboration among the wider network of cybersecurity centres within a multiple-sector context, supported by a framework for improved cyber-skills development and technology roadmap delivery, and an early warning system (Ruoslahti & Davis, 2021), which constitute the five operational interconnected ECHO assets that are governed by Central competence hub and governance model (Figure 4).

The ECHO exploitation workshops used the BMC&C to analyse each of the ECHO assets, and the results helped understand how these assets can become exploited after the competition of the project, and to compile the ECHO Exploitation Plan. This study presents the results of the ECHO Early Warning System (E-EWS) BMC&C, which was filled during the E-EWS exploitation workshop.

4. Results

The results of this work show that using the BMC&C can bring clarity to understand the effects of the added element of markets and competition. Figure 4 shows one example of the BMC&C applied to the ECHO asset Early Warning System (E-EWS). Similar BMC&Cs were created for the assets as well.

4.1 E-EWS Example

The ECHO Exploitation workshops addressed each of the ECHO assets. This section looks, as an example, at the E-EWS. The results show how the BMC&C was used to evaluate this asset by filling out the ten building blocks of the canvas. The canvas completed in an interactive ideathon workshop attended by ECHO asset owners and project partner representatives (n = 18).

Possible identified E-EWS customer segments are for one the main European cybersecurity agencies e.g., ENISA, or relevant active projects initiatives. Other major segments are the European Computer Emergency Response Teams (CERT), who are information security experts that are responsible for the protection against, detection of, and response to cybersecurity incidents, or the different sector specific associations and networks. Also, many businesses can benefit from using E-EWS, e.g., international corporations can information between the multiple countries that may have different national legislation and operational cultures (Figure 5).

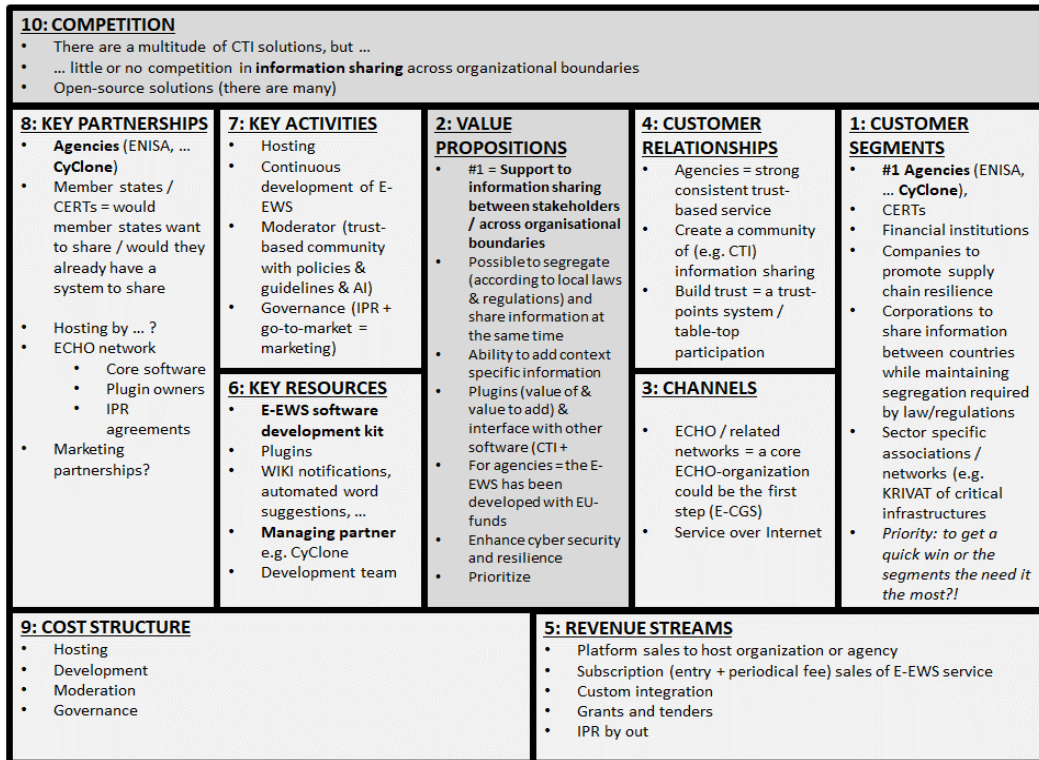


Figure 5: The Business Model Canvas and Competition (BMC&C) example (based on ECHO Exploitation workshops)

The main E-EWS value proposition is to support information sharing between stakeholders and across organisational boundaries. There is a possibility to segregate, according to local laws and regulations, and share information, and at the same time add context specific information through, e.g., E-EWS plugins that add value by interfacing with other software, such as cyber threat intelligence (CTI) to enhance cyber security and resilience.

Relevant channels for the ECHO early warning systems can be related networks, and a core ECHO-organization could be the first step to establish the core competence hub and governance model (E-CGS), with the E-EWS as a service over Internet. Customer relationships can be cybersecurity related agencies, with a strong consistent trust-based service to create communities of e.g., CTI and information sharing. One important focus is to build trust.

Revenue Streams could be from platform sales to host organizations or agencies through sales of subscription, with entry and periodical fee for an E-EWS service custom integration. Also, grants and tenders can provide future revenue streams, as can intellectual property rights (IPR) by-out.

Key resources for E-EWS development are a software development kit, plugins, web-based collaborative platforms (WIKI), notifications, and automated word suggestions. WIKI web sites allow users to add and update content on the site. Future E-EWS development would need a responsible managing partner and an active development team that can manage needed key activities, such as hosting, continuous development, and moderation of the future trust-based community with appropriate policies, guidelines, and artificial intelligence (AI). The ECHO governance (E-CGS) should guide IPR and go-to-market activities.

E-EWS key partnerships can be European agencies, such as ENISA, Member States, relevant CERTs to share what information Member States want to share. Hosting could be by the ECHO network, and partnerships may include core software providers, plugin owners, IPR agreements, and marketing partnerships. The E-EWS cost structure can entail hosting, development, moderation, and governance.

The participants found the BCM&C easy to use. The competition (&C) idea added as the tenth element of the tool. The workshops included co-creative active discussions to shape the outcomes of the BMC&C for this ECHO E-EWS asset.

5. Conclusions

The results of this study indicate that the BMC&C can be a valuable tool to assess how an organisation that is active in a marketplace may need to take their competition into account.

The E-EWS and the other asset BMC&C examples show that users found the BMC&C easy to use. As the &C was added as a tenth element or building block the use of the tool was familiar to anyone who had used a conventional BMC. Those who had no prior experience of the BMC tool received guidance from the experienced, so the workshops included active and co-creative discussions that shaped the outcomes of the BMC&C for each individual ECHO asset.

Including the element of competition and markets highlights that no organization is in a vacuum, but that it is influenced by its competitive environment. This notion helps remind that all business decisions need to consider both its customers and its competitors. It is not only the business that makes value propositions to customers, also its competitors make their respective value propositions to the same customers.

The activities described in this paper assisted ECHO partners in formulating firstly to make sense of the exploitation opportunities for each partner organization, and secondly in developing a relevant exploitation plan for the project. The results of this work can benefit academic scholars in bridging engineering and business on both in theory and in applying theory to practice. Any practitioner organization, be it private or public, that are engaged in providing solutions or services that address cyber security can benefit from this work to identify commercial opportunities by mapping their business model and understanding the competitive environment that they face.

The BMC provides a useful basis to both analyse and present the business concept of a business. By adding the competition as a building block, the BMC&C adds a view to the elements that are outside of the organisation. This viewpoint is needed to understand how the organisation can and needs to adapt to external influences, which is also relevant for impactful exploitation activities by the many cybersecurity initiatives and projects that receive EU funding. Building cybersecurity solutions is not only developing technology, but also building and nurturing customer relationships, and having an eye on one's competition.

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