Project CATwalk: Evaluation of Veterinary HealthCare XYZ organizational factors, customer value and return on investment

The following report on Project CATwalk has been prepared by CATalyst Consulting Services on behalf of Veterinary HealthCare XYZ, a division of Organization XYZ.

Brief Overview of Organization XYZ

Organization XYZ is a commercial healthcare organization with four major divisions, including a veterinary companion animal division (Veterinary HealthCare XYZ); a division providing point-of-care diagnostic tests for farm animals; a water testing division; and laboratory and point-of care diagnostic tests for human medicine. These divisions operate almost as separate organizations. Within Veterinary HealthCare XYZ there are further subdivisions including a diagnostic reference laboratory, point-of-care analyzers and rapid-assay tests, telemedicine services, diagnostic imaging, and veterinary software solutions, particularly patient information management systems (PIMS). Veterinary HealthCare XYZ invests significantly into R&D activities developing new diagnostic tests and analyzers. It also has a veterinary software development team creating veterinary software solutions. The organization has undergone significant change and growth (financially, internationally, and in size and complexity) since its inception approximately 30 years ago.

Brief Description of Issue/problem

CATalyst Consulting has been asked to evaluate Project CATwalk, a proposed enhancement to Veterinary HealthCare XYZ's electronic test ordering system for customers in Canada. The electronic test ordering system allows veterinarians to search for and order reference laboratory tests within their PIMS, generate a bar-coded requisition to accompany samples, capture charges for pet owner billing, and receive the results electronically into the patient's records. In this proposed enhancement, the electronic test ordering menu that is integrated into the PIMS could offer the Canadian test menu in French, upon request, for Canadian customers whose primary language is French (e.g., in Quebec). Project CATwalk would accomplish this through the integration of a separate French language version of the test menu API (application programming interface) for integration into the PIMS. The proposal has been brought forward by the regional sales manager serving Quebec based on requests from customers in that region. In this report, CATalyst Consulting shares the findings from an analysis of Veterinary HealthCare XYZ's organizational culture and structure, diverse stakeholder perspectives, sociotechnical interface factors, and opportunities costs and benefits associated with Project CATwalk. Based on these findings, CATalyst Consulting will provide key recommendations around this proposed resolution to a customer dissatisfier.

Organizational Structure and Culture

Historically, innovation has been a key differentiator for this organization in comparison to their primary competitors. The organization holds over 600 patents worldwide and has an additional ~220 patents pending currently. The organization is actively marketing several new diagnostic tests and biomarkers, a new innovative type of in-clinic analyzer, clinical decision support tools, and the development of entirely new veterinary software solutions, while simultaneously expanding availability of existing software into new countries worldwide. Veterinary HealthCare XYZ has development teams with the technical ability to re-design the current health information system. However, the proposed enhancement to an existing patient information system is not currently on Veterinary HealthCare XYZ's strategic roadmap for this year or the next. Taking on Project CATwalk would require coordinated work among multiple development teams and shifting of existing plans for each team. The ability to adapt to changes in the environment- to flex and reprioritize to meet new requirements or needs when appropriate- is one of the hallmarks of an innovative company. A culture of innovation, supported by an innovation climate, is important for success when considering taking on an unanticipated project of this nature.

Organizational culture and organizational climate are closely related terms which have been variably defined. In this report, culture will be used to describe an organization's core values, beliefs and expectations. The climate reflects the employees' current perceptions of the organization and work environment which in turn influences their behavior.[1] There are several factors that are key to developing and maintaining an innovation culture and climate. These include organizational values, goals, leadership style, human resources practices, and organizational structure[2.-3] Organizational values should be focused on a collaborative environment where cooperation, rather than competition, is valued within the organization and learning and professional development opportunities are provided. There should be an expressed focus on innovation where risk-taking is acceptable with freedom to experiment and potentially to fail. Clarity of organizational goals where enterprise goals reflect the priorities and values and are supportive of innovation with a focus on quality, openness to change, and a market orientation are also important. Leadership's role in creating a culture of innovation cannot be understated through their expression and defining of the values and goals, providing vision and direction. A transformative leadership style has been identified as one particularly associated with innovation culture. At a lower level, a participative and collaborative management style has been identified as most conducive to innovation. Even Human Resources has a role to play in creating an environment where innovation can flourish, in part through recruiting and selecting for the types of creative employees who would do well in a less structured work environment and for whom challenging and complex work is appealing. Human Resources can also enable individual goal setting, training, and the development of a rewards system (recognition and financial) for innovation.

Veterinary HealthCare XYZ demonstrates many of these factors which have been previously identified as important for an innovation culture. Organizational support for innovation is clearly outlined on their public website as a key value and central to the organization's identity. Leadership also shares these values and aligned strategic goals frequently and with clarity to its employees. Human resources practices include recruitment language designed to attract the type of employee who would appreciate the opportunity to be part of an innovative company, despite some of the uncertainty and lack of structure that may be seen in such companies. Innovation is recognized and rewarded in the organization, and, in fact, several competitions are held annually to allow employees to highlight their innovative accomplishments or ideas. Individual employees are given a fair degree of autonomy and freedom to experiment (and make mistakes without fear of retribution). Diversity and collaboration are high in the organization. Multidisciplinary cross-functional teams are used across the organization with good collaboration within these teams and with other cross-functional teams. The use of interdisciplinary teams is accompanied by separate innovation units, a functionally designed organization and above average collaboration. Attitudes and responses noted during interviews regarding the proposed enhancement suggest that the innovation culture is strong, with an accompanying innovation climate being observed.

Organizational structure can be a moderating factor in successful organizational innovation.[3-6] Aspects of organizational structure that are conducive to innovation include low specialization, low formalization (in low power cultures), decentralization, high level of integration, multifunctional teams, collaboration among teams, open communication etc.), and the shape of the hierarchy. Smaller organizations may be more effective at innovation due to the flatter structure and decreased complexity allowing for easier communication.[3] However, large organizations which have entered the collaborative stage 5 phase of organizational development may be able to overcome challenges associated with size and may have more resources to dedicate to innovation projects.[6]

The matrix organizational structure combines functional and project (or product) structures creating a multiple command system.[1,6] Projects or products are supported with interdisciplinary cross-functional teams. The matrix structure facilitates coordination between different specialists to address complex problems. Matrix structures have been proposed by some to be ideal for innovation in larger organizations due to the more organic structure with lateral communications, individual discretion, ease of coordination, and participative decision making compared to traditional hierarchical structures.[1,5-6] Cross-departmental communication can

also allow for a more rapid and flexible response to issues and potentially faster decision making.[3-4,7] It should be noted, however, that in a matrixed organization, the lines of authority are not always clear, which could decrease decision making in some cases.[7] Cross-functionality in innovation teams (as commonly seen in matrix structures) have generally been considered an enabling factor for innovation. Organization context appears to play a moderating role in that these teams are more successful in more functionally organized organizations, with a separate innovation unit, and above average organizational connectedness.[8]

Organization XYZ is a highly matrixed organization. Within the Veterinary HealthCare XYZ division, there is extensive horizontal collaboration and structure in addition to a fairly short vertical hierarchy. Interestingly, there is more than one form of matrix structure within this division with these matrices further collaborating with each other via boundary spanning individuals or teams. Development teams working on new biomarkers, analyzers, or software-based solutions are interdisciplinary cross-functional teams based on functionality and *project*. These teams start small and become an increasingly interdisciplinary team as they near initial implementation or prepare for go-to-market. The development teams are variable in their composition and final decision-making authority is often unclear. Once a product or test is "on-market" it is supported by a different interdisciplinary cross-functional team with members based on functionality and *product*. The on-market product teams have a more formal structure with greater specialization and with decision-making more restricted to the product manager.

In summary, Veterinary HealthCare XYZ is an organization with a long history of successful innovation. This has been a key differentiator for the organization and is core to its identity. The organization has gone through significant growth since its founding and has become an increasingly complex and international matrix organization. The organization has continued to maintain a strong innovation culture and climate, with employees across the organization having opportunities to take part in innovation. The efficacy of interdisciplinary cross-functional teams is enhanced by a strong collaborative spirit and open communication. The organization exhibits a readiness for change in terms of capability, culture, climate, and the use of interdisciplinary cross-functional teams.

Despite a strong innovation culture and climate, and evidence of continued ongoing innovation successes, excitement about the proposed test menu enhancement and potential customer benefit has been tempered with some hesitation. For each team, the degree of effort required would be relatively small, requiring no financial resources, and only 1-4 weeks of development time. Although the project sounds straightforward, due to the data integration set up, this proposal would also require translation of results into French as well as the general framework of the PIMS. Multiple development, operational, medical, marketing, data architects, and data integration teams would be required to play a role in this change. There was some lack of clarity as well about which group might take ownership of the project. Because of the complexity of the organization and the splitting of development teams into smaller more specialized development teams, to pursue an unscheduled small enhancement such as this would require significant coordination of work that must be taken into consideration.

Stakeholder Analysis

Stakeholder analysis is a process that allows one to identify and access the knowledge, perspectives and attitudes of individuals or groups that have an interest and or are affected by a set project, change or policy. It is an essential process that aids an organization in its decision-making when bringing upon new changes. Identifying and understanding diverse stakeholder perspectives is a critical step in ensuring a project's success as it allows for developing the right engagement strategies. As consultants, we identified key stakeholders at XYZ to evaluate the factors and challenges involved in developing and implementing a French-Canadian test menu API (application programming interface) for integration into the veterinarian personal information management systems (PIMS) as well as to understand the perspectives of teams working directly with customers in the region. The stakeholder interviews aided CATalyst Consulting in understanding organizational

factors, challenges, risks, benefits and competing priorities that are involved in his project's decision making. We used one-on-one interviews to illicit stakeholder perspectives. An interview question guide (see Appendix A) was developed with open-ended questions to allow for emergence of a full spectrum of relevant themes and to encourage open and honest communication.

Eight interviews were conducted via video conference. Interviews were further transcribed and analyzed. Interviewees held the following organizational roles: French medical consultant, medical consulting manager, PIMS manager, data architect responsible for integrations, product manager for the ordering system, development technical lead, Canada marketing manager and the corporate accounts manager.

The French medical consulting team strongly reported that Quebec culture is intrinsically tied to the French language. The medical consultant who has trained, lived, and practiced as a veterinarian in Quebec noted "there's a lot of language protectionism and some people, it offends them to not have it available in French" regarding the test menu. Moreover, multiple interviewees reported the language laws in Quebec have been strengthened since 2022, when modernization of the Charter of the French Language Act passed stipulating that French is the now the only national language in Quebec. Websites and software were previously exempt from this law, however, in March 2024, further updates were made requiring all online transactional websites and software to offer the ability to switch to French if desired. Interviewees felt that this served as a huge impetus in favor of this project. Although most veterinarians are bilingual in Quebec, the technicians who are directly involved in ordering and processing the test samples, more often, are not bilingual and therefore having the procedures and protocols of the test menu available in their primary language is necessary. The medical consultant still maintains her ties in Quebec (which is a great advantage for her organization) and recently attended a regional veterinary conference there and interacted with the sales representatives in the field who further confirmed that lack of a test menu in French is a detriment. The consulting manager more importantly notes the underuse of corporate services by Quebec accounts. French clinics are currently selecting tests from a shorter PDF translation, which only consists of 200 tests out of the approximately 5000 available. One corporate account that has both French-speaking and English-speaking clinics across Canada does not allow the English-speaking clinics to utilize any resources that are available in English only. This limits their veterinarians to non-electronic directories and blocks access to more advanced services such as digital cytology and clinical decision support that are only available via the English portal. The fact that their customers are not able to fully utilize all the diagnostic services offered by the organization translates into significant revenue loss.

XYZ's corporate account manager and the Canadian marketing manager report on the overall needs for their Quebec accounts, which make up about 13% of their total Canadian revenue. Quebec customers comprise about 15% of their Canadian customers. The organization is acutely aware of their competitor who has acquired local labs in Quebec which already provide such services in French. The manager was in favor of understanding Quebec's needs better and offering a superior product to that of the competitor. The potential to create special corporate test codes was discussed to further differentiate the organization's test offerings. A risk that the corporate manager identified which might impact Project CATwalk is the difficulty in identifying a resource to accurately translate the entire directory with medical terminology into Quebecois French. Once translated, additional staff would be needed to maintain the directory in real time with live updates etc.

Another risk to the project encountered upon interviewing the technical lead, electronic system product manager and the PIMS manager was that the quickest solution to creating the French test menu API would, due to the linkage of language to country and ordering to results, require translation of the platform and results, as well as the ordering test menu. This change would delay work on a more detailed technological solution to addressing potential future demands from multilingual countries currently in early discovery phases for customers in Europe. The long-term, permanent solution of creating multiple language options for a given country will need time-consuming development work which will be in the pipelines in the upcoming several years. Conducting these interviews enabled our team to unearth crucial factors that contribute to the risk-benefit ratio of making final recommendations to the organization.

When looking at guidelines on stakeholder analysis, a popular source seems to be "Strategic Management: A stakeholder approach" published in 1984.[9] These guidelines were more recently summarized by the author in an article where he also discusses the book's weaknesses.[10] Freeman notes the importance of understanding stakeholders' behaviors, values, context as well as inter-relationships however, the weaknesses of his book are due to "far too much process- speak and far too much consultant speak, both of which have served as a barrier to understanding the basic idea".[10] He acknowledges limits in stakeholder maps and models in predicting stakeholder behavior and notes that certain parts of the book created a "tension" between "managerial thinking" and "academic thinking" and that this tension served neither party well.[10] Further work is required to pin down the details of conducting a stakeholder analysis better.

Jepsen et al. further discuss the challenges of actual applicability of these stakeholder analysis guidelines in real world scenarios in their article.[11] The authors conducted a usability study in applying current guidelines to four different renewal projects in Danish hospitals. They highlight that these guidelines fail to provide the project manager with practical techniques to identify stakeholders or their influences and only provide limited advice at best on how to characterize stakeholders based on power, legitimacy, urgency, and commitment. They also acknowledge that both internal and external stakeholders often expect a reward in return for their support and little advice was given on this matter. The suggested communication matrix is also noted to be subpar as project managers had a hard time explicitly labeling stakeholders in a negative light in fear of making the situation more hostile. The study concludes that current guidelines are too general and offer a "good conceptual framework" rather than a "detailed outline" on how to carry out a stakeholder analysis.[11]

Jepsen et al may find the RISA tool (Reporting Items for Stakeholder Analysis) developed by Franco- Trigo et al. useful in addressing the concerns they had with the current guidelines.[11-12] The RISA tool is structured into three main domains to detail the steps to be taken in stakeholder analysis – this consists of reasons for analysis, system boundaries, individuals involved, analytical data collecting methods, identification of stakeholders, their interests, prioritization, and relationships between them to name a few.[12] RISA tool is expected to enhance the quality and transparency of the process of stakeholder analysis given its ever increasing role in healthcare innovation planning processes. This tool aims to counteract the current literature lacking this transparency due to the need for privacy or confidentiality required by most studies.[12] Healthcare innovation processes are dynamic and complex which often leads to new stakeholders being identified as projects enter new stages and to evolving relationships in-between stakeholders. Stakeholder analysis, when done correctly, is an iterative process that has the potential to largely benefit an organization during the adoption of new changes. Refining the existing guidelines and investing in further developments such as the RISA tool can help us harness this potential.

Sociotechnical Interface

Sociotechnical theory asserts that optimal system performance is achieved by jointly optimizing social and technical subsystems within an organization.[13] Sociotechnical systems (STS) theory emphasizes their interdependence and advocates for integrated design to enhance system effectiveness.[14] Distributed cognition theory expands on sociotechnical theory by positing that cognitive processes extend beyond individuals to include interactions with tools, representations, and other people.[15] This theory is crucial for understanding complex sociotechnical systems, such as the current context. It shifts focus from isolated cognitive activities to a broader perspective involving interactions with external representations and social networks, using cognitive concepts to describe information processing across various mediums and agents, both human and technological. Distributed cognition aids in identifying user requirements and design needs during planning stages and in evaluating system performance and user interaction during implementation stages. Cognitive ergonomics is a subfield of human factors engineering that focuses on the mental processes of humans including perception, memory, reasoning, and how they interact with other elements of a system including people and machines.[16] The goal of cognitive ergonomic design is to optimize human well-being and overall system performance. Practical applications of STS theory, distributed cognition and cognitive ergonomics

include identifying determinants like communication flows and tool usability that influence how individuals are interacting with technology and other humans within the system and then adapting them in ways that optimize sociotechnical system performance which includes the wellbeing of the humans within the system.

Methods typically used to evaluate the optimization of the sociotechnical interface include usability testing, interviews, ethnography, document analysis, and cognitive task analysis.[17] Usability testing assesses how easily veterinary healthcare providers can use and understand a VIS system. Tools like the System Usability Scale (SUS) gather feedback on user experience to identify areas for improvement.[18] Semi-structured interviews provide qualitative insights into perceptions of how information systems support or hinder workflows, helping identify specific pain points, user needs and attitudes. Analyzing implementation and usage documents such as project reports and user feedback, provides valuable information on the system's impact over time.[19] Ethnography within veterinary settings helps understand how veterinary information systems (VIS) are used in practice, capturing the nuances of provider interactions and contextual factors influencing system use.[20] Cognitive task analysis examines mental processes involved by breaking down tasks performed with VIS systems to help identify steps that make errors or inefficiencies more likely, thus helping to design interfaces that support optimized cognitive workflows.[21] Implementing health IT-supported feedback systems that provide timely and relevant information enhances decision-making and care quality.[22]

When viewed through the lens of sociotechnical principles, we can better assess the value proposition of proceeding with Project CATwalk to provide a French language version of the test menu API.

Improving Cognitive ergonomics

Offering the test menu in the customer's native language would clearly improve the cognitive ergonomics of the system. Without it, customers must spend time and cognitive energy trying to decipher a menu that is not in their first language or to spend valuable time calling Veterinary HealthCare XYZ's Customer Support or Medical Consulting to identify the correct test. The proposed change will greatly improve the cognitive ergonomics of the interface and will provide increased efficiency for both the customer (most important) and the customer-facing teams at XYZ as it will mean fewer calls for support.

Improved Client and Employee Satisfaction with Compliance

Sociotechnical theory emphasizes the need for systems to be user-centric and compliant with social and regulatory standards. The primary dissatisfaction arises from French-speaking veterinarians who are legally required to provide services in French. As one interviewee noted, "There is a law that all services - paperwork, etc., in Canada must be available in both French and English." Additionally, although Veterinary HealthCare XYZ has been in legal compliance prior to March due to a loophole for software, customers have perceived XYZ as not in compliance. This principle is directly applied in the case study, as ensuring the test menu is available in French will not only satisfy customer requirements but also ensure compliance with local laws, which is crucial for maintaining Veterinary HealthCare XYZ's market position in Quebec. Further, from the XYZ employee perspective it is important to company morale that the organization is perceived as law abiding.

Sociotechnical principles also are useful to identify key strategies which can be employed during Project CATwalk to optimize implementation of a French test menu API.

Interdisciplinary Collaboration

Sociotechnical systems theory highlights the importance of interdisciplinary collaboration for optimizing system performance. Successful implementation of the French-Canadian test menu API will require collaboration across various teams within Veterinary HealthCare XYZ, including multiple software development, operational, medical, marketing, data architects, and data integration teams. Based on this insight revealed by application of sociotechnical systems theory, convening an interdisciplinary committee with all relevant expertise included is among our recommendations.

Continuous Evaluation and improvement

Methods for evaluating and refining sociotechnical interfaces, such as usability testing, document analysis ethnography, stakeholder interviews and feedback systems, are crucial for continuous improvement of the sociotechnical interface. To ensure the usability and with it the cognitive ergonomics of the test menu API are optimized we recommend performing iterative evaluations using these methods during its implementation. Incorporating this interval feedback will be essential to ensure optimization of French-Canadian test menu sociotechnical interface.

Opportunity Cost and ROI

When determining the feasibility and potential for success of any proposed project, opportunity costs and return on investments are good measures that can allow an entity to predict future outcomes. Opportunity cost refers to the value or benefits that are lost when a business or investor opts for another option.[23] For instance, when an investor is presented with two stock options and told to pick only one, the one that they did not pick may have benefits that their pick may not provide. This is an opportunity cost since there is a missed benefit. A return on investment (ROI) refers to a ratio that measures the profitability and efficiency of a project depending on its gains and losses compared to the costs of the project.[24] When it comes to evaluating a product for decision making, it is important to take these two measures into consideration because they each provide a unique insight on the potential outcomes and tradeoffs involved in a potential investment or project.

Opportunity Costs

Assessing the risks and benefits are vital towards determining whether a project or investment could provide extra benefits which should be weighed when making a decision. Especially since the opportunity cost looks at the benefits offered by the option not selected, there are a variety of ways to measure it. From a simple explanation of it being a return on a not selected profitable choice minus a return on the selected choice, conceptually, it makes sense that an opportunity cost represents the missed returns that result from not selecting another option. What makes the concept hard to physically measure is via the different scenarios that it can be placed in which requires a different way to calculate the measure while keeping the individual components the same. For instance, when trying to measure the opportunity cost of implementing a health care intervention into current hospitals, it would be beneficial to compare it to the health benefits such as lives saved or quality of life years (QALY) that were gained of the next best intervention.[25] In this case, the metric to calculate the opportunity cost of implementing this healthcare intervention would be to quantify and group the benefits of each intervention together. This could be shown as the number of lives saved added to the QALY for both interventions and then subtracted from one another. The interpretation that comes from this measure could then affect the decision-making process of the investment/project proposal.

With opportunity costs, it is important to understand the different perspectives that the proposed investment or project will involve. For example, there could be a societal, patient, business, etc. perspective that affects the way the benefits are measured.[26] Whereas an individual may place more value on monetary increases, businesses may instead place more value on the tax breaks that could help them in the long term. In this case, it is important to understand the scope of the proposal to determine what benefits would come into play when calculating the opportunity cost.

Considering the feasibility of a decision by focusing on both risks and benefits, and specifically examining opportunity cost, is vital for making informed investment or project choices. Opportunity cost provides a clear view of the benefits given up by not selecting an alternative. Although the concept is relatively easy to understand, the measurement of this metric can be complex due to varying scenarios and perspectives. By focusing on tangible outcomes that are measurable such as financial gains or QALY gains, decision-makers can quantify and evaluate the true impact of their choices. It remains important to acknowledge the diverse viewpoints of stakeholders to ensure all benefits are accounted for. Understanding the different perspectives

and benefits while calculating the opportunity cost is important for making informed decisions to maximize the success of the project/investment.

When evaluating opportunity costs associated with developing the French test menu, it is important to note that in our interviews, members of the technical implementation teams expressed concerns over other projects that they are currently working on, one of which involves the exploration of a new way to handle different language within the test menu. Implementing new languages within the current test menu system would be a doable effort involving small time commitments across many different teams as part of a full project team's coordinated effort. Because of current system constraints, both the ordering and resulting systems would need to be translated (although the technical teams preferred this to a partial solution with translation of only the test menu). This work could be added in while continuing development on the new future system being developed. The future system would provide a simpler method for customers to select multiple other languages but will require several years of development. In this case, opting to stick to the existing method and incorporating different languages one by one would require efforts and collaborations across many teams with a relatively small workload whereas opting to develop the new system and offer it for Canada would add on a significant project to the development team's current workload and would not be feasible within the desired timeframe.

Return on Investments (ROIs)

ROI serves as a measure of project/investment performance. It compares the cost and time that an entity puts into an investment or project against the outputs. Similar to the opportunity cost which has a more conceptual calculation, an ROI can be calculated by dividing the net return on investment or project by the cost of the investment or project.[24] What makes the calculation of this measure complex is defining what would be considered as a cost and an output. For instance, conventional examples of a cost could be money and time but there could be other aspects involved with it as well such as environmental and societal impacts.[27] It is important to recognize that there are more than individual and business costs when it comes to product development or investment.

With ROI, although the basic formula is simple, there are many adjustments and methodologies that can go towards applying it to certain contexts. For instance, there is the adjusted ROI which allows for adjustments to be made that accounts for the time value of money, risks, intangible benefits, etc.[28] Since in many cases, the basic ROI is not enough to cover more complex situations, the textbook, *Corporate Finance*, includes some other measures such as net present value (NPV), internal rate of return (IRR), risk-adjusted returns. Net present value (NPV) accounts for the time value of money by discounting future cash flows to their present value. This accounts for features such as inflation and other measures where the same amount of cash in the future may not be worth the same in the current day. Internal rate of return (IRR) refers to the discount rate that makes the NPV of an investment zero. It represents the expected annual rate of return without concerns about inflation and other features in the future. Risk-adjusted returns refer to the usage of risk-adjusted discount rates to account for uncertainty in expected terms. In instances where a project would have higher risks, the discount is adjusted higher to reflect the higher risk, reducing the current value of predicted cash flow.

While the basic ROI is a useful tool that can be used to measure project/investment performance, it works better as a starting point in which adjusted ROI metrics such as NPV, IRR, and risk-adjusted returns would better provide a more accurate evaluation of the project and investment proposals. Using this tool in the evaluation of a project's feasibility and/or investment, stakeholders can more accurately and strategically look at the true value and potential risks of pursuing the project/investment.

When analyzing the return on investments associated with Project CATwalk, there are a few costs and time variables that should be considered. One variable that involves these two measures includes the time and effort it requires to translate the current test menu to French. There currently is no team or infrastructure available to translate between the two languages. As a result, a prerequisite to the project would be to first prepare the

translated content. Additionally, there would be a need to identify a resource who could maintain the translated menu when changes occur. Another factor that adds to the time component includes the cross collaboration between different teams to get the project completed. The scope of this project expands beyond that of simply translating and uploading the test menu to have a French option to working with the integration teams and third-party suppliers who also must be able to retrieve the results and data seamlessly.

In terms of the potential returns, current revenue coming out of Canada places Quebec in second place in terms of revenue generation. Since it only takes up 13% of the total revenue coming out of Canada and 15% of the company's Canadian customers, creating a French test menu could expand the number of accounts and customers within the Quebec region. Especially since only 60% of the Quebec sales territory is based off corporate accounts, developing the French test menu with added support systems could allow for XYZ to convince individual practices to adopt their system.

Conclusions and Key Recommendations

When the original electronic test menu was implemented for Canada, the market environment was much different. At that time, Quebec was considered a dual language nation, and the language laws were more flexible. The landscape in Canada was less competitive, with fewer corporate accounts and little meaningful competition. Tightening language laws have been accompanied by increased customer dissatisfaction with an English only electronic test ordering system. There was general agreement among stakeholders that having a French option would be a valuable service to XYZ's customers, helping them more efficiently and confidently practice best medicine. There was also agreement that solving this language gap in the information systems fits within Veterinary HealthCare's values and abilities. Given the changes in the language laws, only two options were considered viable. One would be to wait until the newer multi-language system can be developed. The disadvantage to this would be that this system is still in the early visioning stages. The other would be to pursue Project CATwalk, recognizing that this would involve translation of both ordering and resulting (originally identified as out of scope) and would require coordination of multiple development teams.

CATalyst Consulting Services recommends the approval of Project CATwalk.

Given the clear customer demand and technical feasibility it is recommended that XYZ Laboratories proceed with Project CATwalk now using current system capabilities, rather than waiting for future development work which is several years down on the strategic roadmap. Integrating a French-Canadian test menu API for XYZ Reference Laboratories aligns with sociotechnical principles by optimizing both social and technical subsystems. It addresses customer dissatisfaction, ensures regulatory compliance, and leverages interdisciplinary collaboration. Organization XYZ's legal team is still investigating the ramifications of the most recent March 2024 updates to the Quebec language laws. However, even if XYZ is technically still in compliance with the law due to a grandfather clause, the perception of customers or employees of XYZ in Quebec is that they are not in compliance and are disrespectful of Quebec's culture. Organization XYZ values its reputation as both an innovative and an ethical organization. By pursuing this enhancement, Veterinary HealthCare XYZ will demonstrate that it continues to be an innovative company that cares about its customers' diverse needs. Having the electronic information system offered in both French and English will also provide a competitive edge by addressing a particularly sensitive topic for Quebec customers. This is an opportunity to capture more of the corporate market in Quebec, many of which also own practices in English-speaking regions in Canada. Although some hesitation had been expressed about the slight delay in the longer-term solution, the work to translate the French test menu and results will also be repurposed when the final solution is developed. Most importantly, the improved customer experience aligns with Veterinary HealthCare XYZ's goals of making medicine easier through software solutions that bring clarity and protect XYZ's reputation as a company known for its innovation.

Additional Recommendations for Implementation

When engaging in Project CATwalk, the following specific recommendations are provided to enable a successful implementation that supports clinical workflows, improves employee and customer satisfaction, and supports market growth:

1. **Enhance Interdisciplinary Collaboration:** Because of the number of different teams that will need to coordinate work to make this project successful, a cross-functional interdisciplinary project team with a project manager should be established. This team should include members from the various software development teams (reference laboratory information system, XYZ-owned PIMS, ordering and resulting APIs, and integrations), customer support, medical, marketing, sales, and regulatory compliance to oversee the project. This team should also work closely with third-party PIMS providers to ensure seamless integration and functionality.

2. **Implement Real-time Feedback Systems:** Develop and integrate feedback systems within the PIMS to gather real-time data on the performance and usability of the French-Canadian test menu. This will enable continuous improvement and prompt resolution of any issues that may arise.

3. **Conduct Usability Testing:** Prior to the full rollout, conduct extensive user-acceptance testing with French-speaking veterinarians to identify any potential issues and gather feedback. It is recommended to initially offer the French test menu to a small group of beta tester clinics to gather input about any translation issues or functionality.

4. **Internal and External Training:** Educate customer-facing teams including the sales team, medical consultants, customer support, and technical support about the availability of the new test menu. Provide instructions on how to change customer settings to start receiving the French language option. Many French-speaking Canadians have not previously used the electronic ordering system to its full capacity or even at all. Ensure all training materials are available in French for easier onboarding and training.

5. **Monitor and Evaluate Impact:** After implementation, continuously monitor the system's performance and gather feedback from users. Evaluate the impact on customer satisfaction, regulatory compliance, and market share in French-speaking regions. Use this data to make further refinements and improvements.

References

1. Robbins SP, Judge TA. Organizational behavior. 17th ed. Boston: Pearson Education; 2017.

2. Newman A, Round H, Wang S, Mount M. Innovation climate: A systematic review of the literature and agenda for future research. Journal of Occupational and Organizational Psychology. 2020 Mar;93(1):73-109.

3. Arad S, Hanson MA, Schneider RJ. A framework for the study of relationships between organizational characteristics and organizational innovation. The journal of creative behavior. 1997 Mar;31(1):42-58.

4. Mäkimattila M, Saunila M, Salminen J. Interaction and innovation-reframing innovation activities for a matrix organization. Interdisciplinary Journal of Information, Knowledge, and Management. 2014;9:131.

5. Gaspary E, Moura GL, Wegner D. How does the organisational structure influence a work environment for innovation? International Journal of Entrepreneurship and Innovation Management. 2020;24(2-3):132-53.

6. Lorenzi NM, Riley RT, Lorenzi NM, Riley RT. Understanding and analyzing organizational structures. Managing Technological Change: Organizational Aspects of Health Informatics. 2004:76-95.

7. Goś K. The key advantages and disadvantages of matrix organizational structures. Studia i Materiały. 2015(2/2015 (19)):66-83.

8. Blindenbach-Driessen F. The (in) effectiveness of cross-functional innovation teams: The moderating role of organizational context. IEEE Transactions on Engineering Management. 2014 Oct 29;62(1):29-38.

9. Freeman RE. Strategic Management: A Stakeholder Approach. Boston: Pitman; 1984.

10. Freeman RE. The stakeholder approach revisited. Wirtschafts-und unternehmensethik. 2020:657-71.

11. Jepsen AL, Eskerod P. Stakeholder analysis in projects: Challenges in using current guidelines in the real world. International journal of project management. 2009 May 1;27(4):335-43.

12. Franco-Trigo L, Fernandez-Llimos F, Martínez-Martínez F, Benrimoj SI, Sabater-Hernández D. Stakeholder analysis in health innovation planning processes: a systematic scoping review. Health Policy. 2020 Oct 1;124(10):1083-99.

13. Cucciniello M, Lapsley I, Nasi G, Pagliari C. Understanding key factors affecting electronic medical record implementation: a sociotechnical approach. BMC Health Serv Res. 2015 Jul 17;15:268.

14. Carayon P. Sociotechnical systems approach to healthcare quality and patient safety. Work. 2012;41 Suppl 1(0 1):3850–4.

15. Furniss D, Garfield S, Husson F, Blandford A, Franklin BD. Distributed Cognition: Understanding Complex Sociotechnical Informatics. Stud Health Technol Inform. 2019 Jul 30;263:75–86.

16. Li-Wang J, Townsley A, Katta R. Cognitive Ergonomics: A Review of Interventions for Outpatient Practice. Cureus. 2023 Aug 28;15(8):e44258. doi: 10.7759/cureus.44258. PMID: 37772235; PMCID: PMC10526922.

17. Imanghaliyeva AA. A Systematic Review of Sociotechnical System Methods Between 1951 and 2019. In: Intelligent Human Systems Integration 2020. Springer International Publishing; 2020. p. 580–7.

18. Peres SC, Pham T, Phillips R. Validation of the System Usability Scale (SUS): SUS in the Wild. Proc Hum Fact Ergon Soc Annu Meet. 2013 Sep 1;57(1):192–6.

19. Dalglish SL, Khalid H, McMahon SA. Document analysis in health policy research: the READ approach. Health Policy Plan. 2021 Feb 16;35(10):1424–31.

20. Leslie M, Paradis E, Gropper MA, Reeves S, Kitto S. Applying ethnography to the study of context in healthcare quality and safety. BMJ Qual Saf. 2014 Feb;23(2):99–105.

21. Schraagen JM, Chipman SF, Shalin VL. Cognitive Task Analysis. Psychology Press; 2000. 547 p.

22. Cifra CL, Sittig DF, Singh H. Bridging the feedback gap: a sociotechnical approach to informing clinicians of patients' subsequent clinical course and outcomes. BMJ Qual Saf. 2021 Jul;30(7):591–7.

23. Fernando J. Investopedia. [cited 2024 May 30]. Opportunity Cost: Definition, Formula, and Examples. Available from: https://www.investopedia.com/terms/o/opportunitycost.asp

24. Beattie A. Investopedia. [cited 2024 May 30]. How to Calculate Return on Investment (ROI). Available from: https://www.investopedia.com/articles/basics/10/guide-to-calculating-roi.asp

25. Palmer S, Raftery J. Opportunity cost. BMJ. 1999 Jun 5;318(7197):1551–2.

26. Byford S, Raftery J. Economics notes: Perspectives in economic evaluation. BMJ : British Medical Journal. 1998 May 5;316(7143):1529.

27. Bichard E. Sustainable return on investment: towards a method of valuing social and environmental change in the built environment. Proceedings of the 2nd Annual International Conference on Social Sciences [Internet]. 2016 Jan 1 [cited 2024 May 30];2. Available from: https://salford-repository.worktribe.com/output/1402270

28. Ross S, Westerfield R, Jaffe J, Jordan B. Corporate Finance [Internet]. 2021 [cited 2024 May 31]. Available from: https://www.mheducation.com/highered/product/corporate-finance-jordan-jaffe/M9781260772388.html

Appendix A: Interview Guide

What are the potential risks and benefits of having a French test menu?

Can you discuss any specific cases where the lack of a French menu has hindered testing processes or outcomes?

If the test menu were able to be translated into French with no added cost or effort, what would your thoughts be as to how best to provide it to French Canadian customers?

How will this test menu look to the end users, and do you anticipate any demand for further tools to be translated to French?

Big picture questions:

Will the French test menu help retain customers and or acquire new clients?

How might this project influence XYZ's competitive positioning in the Montreal region?

How would this project fit in with other work that is being done, and where would this fall within other priorities?

Are there other factors that might impact the timing of a change like this?

What concerns do you have about the project scope?

What are the estimated costs your team anticipates in integrating a French-Canadian test menu into existing XYZ PIMS?

Technical questions:

What are some concerns regarding the work involved in developing the test menu and its integration into the current system?

Could you explain the technical challenges associated with creating a bilingual interface for the Canadian test menu?

How would the integration impact current workflows and data management with the LIMS to MDOS data flow?

How do you assess the feasibility and level of effort of these changes?

Can you outline the anticipated effort and potential challenges involved in translating and maintaining over 2000 test descriptions in French?

Besides a translation expert, what other external resources would you need to complete this task?