IT Options Assessment Outcome Report

National Bowel Screening Programme (NBSP)

V 1.0 FINAL IN CONFIDENCE
March 2017

Document Approval

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Contents

1. Introduction

The National Bowel Screening Programme (NBSP) aims to reduce the mortality rate from bowel cancer in the population, by diagnosing and treating bowel cancer at an early curable stage. The identification of an IT solution to support the NBSP is pivotal to the success of the programme. The Ministry of Health (MoH) has gained approval in principle through a programme business case to proceed with the design and delivery of an IT solution for the NBSP and align to the wider population health ecosystem.

The business vision for the NBSP IT solution is that the national bowel cancer screening programme system supports programme operation for bowel cancer screening programme owners, providers, and participants, who intend to reduce the impact of bowel cancer on the population of New Zealand, making it easy to manage the screening pathway, to plan and manage informed participation, to monitor safety and quality, and to evaluate outcomes and identify best practice.

Cabinet approved the NBSP programme business case in August 2016. Developing the business case was a lengthy process, and the environment that the Ministry services is constantly changing. Given the elapsed time there is a need to validate our approach to ensure efficient and future-proofed delivery of the NBSP IT solution.

1.1. Project Overview

The approach and process taken to identify a preferred IT Option has been refined following the Programme business case. Key activities and processes enabled a robust and transparent approach to the identification of the IT Option.

The process to inform the IT options assessment included:

- **Requirement definition and refinement** – based on existing content, and workshops with key MoH resources, capability requirements were identified to inform the Market Sounding pack. These reflected the need for a future-proofed delivery of the NBSP IT solution. The capability requirements identified were not exhaustive and were provided to suppliers during the Market Sounding to induce innovative responses. The requirements were drafted in relation to the NBSP and at a high level would be comparable for other screening programmes .This would enable the identification of a solution capable of supporting the wider population health ecosystem.

- **Desktop Research and analysis** – desktop research was conducted to understand relevant global case studies, and the approaches taken by those programmes to deliver screening.

- **Market Sounding engagement** – following the capability requirements refinement and in parallel to the desktop research the market was invited to share their insight on innovative IT solutions to support the NBSP. The responses from the Market Sounding provided a number of possible IT solution options. These ranged from fully bespoke through to commercial off the shelf (COTS) solutions requiring minimal configuration. The IT Options are described in greater detail in Appendix 5.

- **Hypothesis testing and refinement** – Based on the Desktop Research and the project's hypothesis, three broad solution approaches were identified (Risk-, Campaign-, and Participant-centric). The NBSP market scan requirements, investment objectives, benefits and wider strategic goals associated with public health meant that a risk centric approach

would potentially offer the most value in terms of core screening capability and reuse across other screening programmes.

- **Assessment Criteria refinement** – The assessment criteria used to identify the preferred IT Option was refined to provide a fair comparison of IT Options relative to one another. Changes to the criteria were incorporated following feedback from key stakeholders. These were then socialised and agreed prior to the IT Options Assessment Workshop (the Workshop) and included removal of duplication of criteria and amendments to align criteria to the wider outcomes of the NBSP.
- **Workshop delivery** – socialisation of workshop material was undertaken to ensure the Workshop primarily focused on the identification of a preferred IT Option.

2. The Workshop

The Workshop was designed to facilitate a group of key stakeholders to jointly assess the long list of proposed IT Options, define a shortlist of options (including a 'do minimum' option) and agree a preferred option. As part of their engagement to support the project EY facilitated the Workshop, as an independent on the day, which was held at the Ministry of Health in Wellington on Friday 10th March 2017.

A cross section of stakeholders were engaged to actively contribute to the assessment and provide insights based on their role. The intention of this stakeholder group is to create a thorough assessment which in turn will set the NBSP up for success.

Potential sourcing or procurement requirements related to the options were deemed as out of scope for the purposes of the Workshop. These and other assumptions are detailed in *Section 1.4 Key themes and assumptions*.

2.1   Purpose

The Workshop provided a framework to identify and agree a preferred IT Option for the strategic IT solution for the NBSP programme, and to enable a wider health screening ecosystem.

Specifically, the purpose of the Workshop was to provide:

- Information on the programme's context, proposed IT Options, cost estimations and supporting research (e.g. Market Sounding and desktop research)
- A forum for discussion and challenge of the proposed IT Options
- A robust and transparent process to support the identification of a preferred IT Option
- Confidence to decision makers and governance bodies in the preferred way forward.

2.2   Approach

A structured and collaborative approach was taken to develop and refine the content and supporting artefacts required to coordinate and run a robust workshop. This included approximately ten weeks of research and analysis, content development, engagement with MoH subject matter resources and project board members, engagement with the market through Market Sounding, desktop research and analysis.

An overview of the key activities carried out through this approach are outlined in *Figure 1* below:

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Figure 1: Timeline of key activities

The project team engaged broadly with key stakeholders throughout the content development process. Additional insight regarding the approach and rationale was provided where required. Project collateral and artefacts were socialised across the programme team, The Treasury, GCIO and Counties Manukau DHB representatives. Feedback was addressed and directly shaped the Workshop content, and approvals were provided through the Project Board.

The content socialisation approach aimed to focus the Workshop attendees on the application of the assessment criteria rather than further validation of the proposed options or assessment criteria. *Note: feedback on specific detailed criteria was provided, and agreed, during the Workshop which has subsequently been incorporated (Appendix 7).*

Attendees (see *Appendix 1*) were invited given their respective roles and ability to provide a balance of perspectives from across the health sector (e.g. MoH, Counties Manukau DHB, The Treasury and GCIO). Attendees were encouraged to provide challenge against rationale and feedback on individual perspectives and group discussions. Attendees were provided with finalised versions of the project context information, overview of the proposed options and the assessment criteria prior to attending the Workshop.

The Workshop commenced with an introduction from the facilitator, welcome from the project sponsor, and an overview of the day's approach, specifically:

- A summary discussion of the work undertaken to inform the Workshop content and approach
- An overview of the proposed options to ensure all attendees were familiar with the long-list IT Options and the rationale supporting the assessment criteria.
- An overview of the desktop research and Market Sounding insights
- A discussion on the cost estimation model (Appendix 3) which highlighted relative delivery costs across each proposed option, and also presented a view of the potential under-/ over- spend risk associated with each option.
- An overview of the staged assessment approach to be used on the day, outlined in *Figure 2* below (and in more detail in Appendix 6).

Figure 2: *Assessment approach of IT Options*
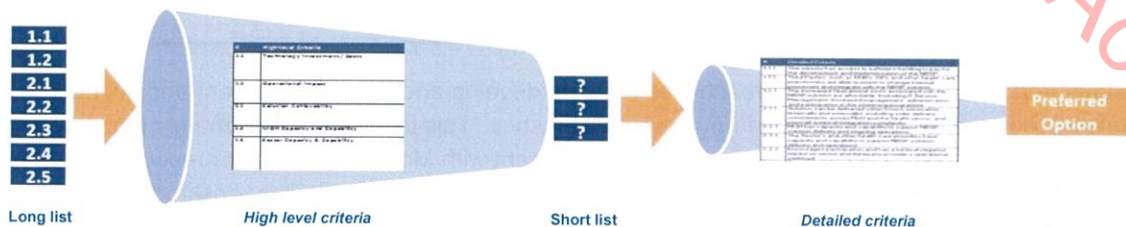
The assessment process, from long list to short list, was co-facilitated by MoH project leadership across four group based on Critical Success Factors (CSFs):

- Group A – Potential affordability (CSF 1) and Potential achievability (CSF 2)
- Group B – Strategic fit & business needs (CSF 3)
- Group C – Potential value for money (CSF 4)
- Group D – Supplier capacity and capability (CSF 5).

EY facilitated the workshop and assessment process, providing rationale and subject matter resource insight where required, but remained independent of group-based decisions relating to the IT Options assessment. Astrid Koorneef (Group Manager, National Screening Unit) was delegated decision making responsibility on the day by the Project Director, Stephanie Chapman should there be any unresolved disagreement. This delegation was not exercised as there was uniform agreement at the conclusion of the Workshop.

2.3   IT Option narrative overview

The longlist and shortlist assessment process elicited narrative related to specific IT Options, outlined below, and themes/ assumptions common across all options (see *Appendix 2*).

The information provided below is presented as a summary of narrative and discussion captured throughout the Workshop and is not a statement from or the opinion of the project, specific team-members, attendees or MoH.

Where an option was shortlisted, the overview provided reflects discussion and challenge from attendees at the detailed, rather than high-level, criteria.

1.1 – Clone BSP+ solution
Long-listed option only

Option 1.1 was not brought through as a short-list option as it failed to meet any of the high-level criteria for strategic fit and business needs.

Discussion centred around concerns at the lack of flexibility offered by this solution option, MoH's ability to roll out consistent change across all DHBs (in line with Ministry on the Move) under this option, and limitations of the solution's architecture. Specifically, the solution was established for the purpose of supporting a pilot rather than a national screening programme or a wider population health ecosystem. The BSP+ is primarily participant focussed, likely does not support a campaign management function, and is not risk-based which is the agreed preferred approach for any potential strategic solution.

Based on discussions, the Ministry's readiness to align to the Ministry on the Move principles is not yet considered sufficiently mature to deliver this option and the time and cost to prepare for this approach would outweigh the requirement for a timely solution. In this option it is assumed that the Ministry would be responsible for maintaining 20 clone solutions. It also assumes that this option does not include enhancements to alter current functionality instead would roll out the existing pilot and functionality to the remaining DHBs.

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1.2 Enhance and extend BSP+ solution (BSP++)

Short-listed option

Option 1.2 was short-listed primarily as a baseline or a do minimum option.

It was noted that the pilot extension would similarly be based on the existing BSP+ architecture/structure and as such would be restricted in its ability to deliver a strategic national solution, and be flexible enough to support a population health ecosystem in future. As a single instance it would help MoH enable and drive towards common processes and way of working across DHBs, however this option would likely require extension and would essentially become 'bespoke'.

Based on discussions, the Ministry's readiness to align to the Ministry on the Move principles is not yet considered sufficiently mature to deliver this option and the time and cost to prepare for this approach would outweigh the requirement for a timely solution.

In order for this option to meet the requirements it is assumed that the Ministry would maintain responsibility for the solution given the existing vendor does not have capacity to meet the requirement.

2.1 – Bespoke solution

Long-listed option only

Option 2.1 was not brought through as a short-list option primarily due its inability to meet the strategic fit and business needs criteria nor does it optimise value for money.

There was strong challenge regarding the bespoke option, and the potential for open-source was discussed. The need for ongoing adaptation would create challenges and additional complexity in this option. This option was considered a complex solution to deliver, within current timelines, and the cost of mitigating potential programme risk was viewed as very high.

The ability for MoH to drive innovation in alignment with the wider Government ICT Strategy and Ministry on the Move principles is reduced due to the nature of the solution, and MoH were viewed as not being sufficiently aligned to the innovative practices and processes. The programme cost attached to a bespoke solution was considered high and would prevent the option from meeting the value for money criteria required.

There is an assumption that MoH would require support from a system integrator to deliver the solution as it does not have the capacity under existing or projected resourcing levels to deliver on this option.

2.2 Best of Breed

Long-listed option only

Option 2.2 was not brought through as a short-list option primarily because it does not optimise value for money nor does it meet the potential affordability or achievability criteria.

A best of breed solution was viewed as enabling partial alignment to the AoG ICT Strategy due to the discrete components being sourced for each primary functional area required for the solution. However, the nature of this option does not fully enable MoH to drive towards alignment with Ministry on the Move.

The operational impact of this option would be significantly higher than others based on the level of change, integration and support required across multiple components to realise the solution in a timely manner. The programme risk profile of this option was described as high due to potential delivery time issues and challenges regarding commercial management arrangements.

It is assumed that there would be significant integration required, but that a system integrator would exist to provide this capability. It is also assumed that the licensing fees attached to this solution would be higher than other options for comparable functionality, negatively impacting whole of life costs.

2.3 COTS framework solution

Short-listed option

Option 2.3 was short-listed primarily because it aligns with the Government ICT Strategy outcomes and Ministry on the Move principles, and it was not sufficiently differentiated from 2.5.

The ability of an extensible COTS framework solution to meet the strategic needs of NBSP in a timely manner was discussed. It was noted that the solution would enable the adoption of agile management and co-design in alignment with Ministry on the Move principles relative to the other options.

Given the nature of the option, there is a risk that it may not be delivered within the timeframes for the NBSP nationally due to heavy customisation and configuration requirements. There was limited confidence from attendees as to how a supplier could effectively meet NBSP needs through a non-screening/ non-health specific COTS solution.

It is assumed that a COTS framework is not screening specific and would not readily support interoperability across the sector (e.g. through SNOMED, HL7 etc) and would require a higher level of customisation/ adaptation in order to do so. It is also assumed that this option would enable a wider population health ecosystem in future.

2.4 – Enhance and extend COTS solution

Short-listed option

Option 2.4 was short-listed primarily based on its ability to meet the greatest amount of critical success factors.

Sourcing a COTS solution that would be health/ screening specific, and customising the non-core components allows the Ministry to retain greater control, for example allows the Ministry to shape the data and insights the solution will be capable of providing.

This option was viewed as enabling the adoption of agile management and co-design relative to the other options. It would also allow MoH to absorb some of the potential operational impacts resulting from the change rather than pushing the change requirements outwardly to practitioners, providers and the wider sector.

It is assumed that changes to the COTS product to meet NBSP requirements will sufficiently align with the vendor's technology roadmap and acceptable levels of maintenance will be required. It is also assumed that this option would enable a wider population health ecosystem in future.

2.5 COTS with configuration

Short-listed option

Option 2.5 was short-listed primarily based on its ability to meet the achievability criteria and deliver a national solution within the required timeframes, and it was not sufficiently differentiated from 2.3.

Sourcing a COTS solution that supports all core NBSP requirements immediately would have constraints on the ability to amend the solution to align with the wider Government ICT Strategy if required. This option shifts the reliance to the vendor's roadmap which increases the risk to MoH.

It is assumed that this option exists within the market, with some reservations, and is the only option which should immediately meet the interoperability across the sector with limited need of customisation/ configuration. It is also assumed that this option would enable a wider population health ecosystem in future.

3. Assessment outcomes

The primary outcome of the Workshop was agreement that 'Option 2.4 – Enhance and extend COTS solution' is the preferred strategic IT Solution Option to meet the needs of the NBSP and support a wider population health ecosystem.

Secondary outcomes included agreement that:

- The Workshop confirmed that the Ministry will not seek to extend or enhance the existing pilot system for the purpose of delivering a strategic solution. Further, a bespoke system (including one that may reflect best of breed components requiring integration) will not be sought from the market. Refer themes below for supporting narrative.
- Option – '1.1 – Clone BSP+ solution' was not considered viable as an approach for the NBSP primarily because it does not meet any of the strategic fit and business needs criteria
- Option – '1.2 – Enhance and extend BSP+ solution (BSP++) was shortlisted as a base line for the purposes of the shortlisting but failed to meet a sufficient number of the strategic fit and business needs criteria.
- Option – '2.1 – Bespoke solution' was not considered viable as an approach for the NBSP as it failed to meet whole of life cost and programme cost within the Potential Value for Money criteria.
- Option – '2.2 – Best of Breed' was not considered viable as an approach for the NBSP as it failed to meet whole of life cost, programme cost and programme risk within the Potential Value for Money criteria. It also failed to meet the support and maintenance within the supplier capacity and capability criteria.
- The Workshop confirmed that the Ministry will not constrain the procurement process to ensure that any response(s) in alignment with Option '2.3 –COTS framework' and Option '2.5 – COTS + config' although not selected as the preferred option will still be considered and assessed fairly.

The primary and secondary outcomes from the Workshop will enable the Programme to shape the approach for sourcing a supplier(s) from the market to deliver the NBSP's strategic IT solution.

4. Next steps

The following IT Option specific activities should be undertaken to maintain the momentum and rhythm of the NBSP programme:

- Review and approve this IT Options Assessment Outcome Report
- Draft the decision memo outlining the preferred IT Option for approval
- Continue developing and refining the artefacts required to support the NBSP programme moving forward, specifically to support procurement activities relating to the preferred IT Option
- Undertake the proposed procurement activity pending approvals/ decisions using the preferred IT Option to inform the approach.
- Commence due diligence activities surrounding the feasibility of safely extending the BSP+ interim solution.

Note: that the approach to procurement should not unnecessarily constrain responses from the market, should enable open engagement and encourage information sharing from the market.

Appendix 1: Workshop attendees and roles

The table below provides a view of the Workshop attendees and their role on the day at the Workshop. A number of the attendees were consulted or supported the development of collateral that was created to support the Workshop.

Attendee	Title	Workshop role
s 9(2)(a)	EY Consultant	Narrative capture
Alastair Kenworthy	Manager Health IT Investment and Standards, MoH	Attendee
Astrid Koorneef	Group Manager National Screening Unit, MoH	Decision maker
Brian Bernon	Programme Manager, NBSP, MoH	Attendee
s 9(2)(a)	EY Consultant	Facilitator
Darren Douglass	Deputy Chief Technology and Digital Services Officer eHealth, MoH	Attendee
Dave Crowley	Senior Procurement Manager, Service Commissioning, MoH	Attendee
Davin Hall	Senior Analyst, New Zealand Treasury	Attendee
s 9(2)(a)	EY Consultant	Facilitator
	EY Consultant	Narrative capture
	EY Consultant	Narrative capture
Jasmin Wilkins	Enterprise Analyst, Technology and Digital Services, MoH	Attendee
Joel Brown	Project Manager, National Infrastructure and Systems, MoH	Attendee
Julia Rondel	IT Business Lead , NBSP, MoH	Attendee
Kathy Pritchard	Programme Manager, Breast Screen, Counties Manukau DHB	Attendee
Leanne Elder	Deputy CIO, Counties Manukau DHB	Attendee
Martin Hunter	Solution Architect, Technology and Digital Services, MoH	Attendee
Megan Papps	HPV Project Manager, National Screening Unit, MoH	Attendee
Shane Robins	Group Manager (AFTP), Technology and Digital Services, MoH	Attendee
Sian Farr	Programme Delivery Manager (Information), National Screening Unit, MoH	Attendee
Stephanie Chapman	Programme Director, NBSP, MoH	Attendee
Sukhin Rai	AoG ICT Strategy and Investment Advisor, Department of Internal Affairs	Attendee
Sylvia Meakin	Business Case Lead, NBSP MoH	Attendee

Appendix 2: Key themes and assumptions

A number of themes were developed through the Workshop narrative. The bullets below highlight the key themes that have emerged based on the notes that were captured:

- **Programme Risk**: Regardless of the IT Option, the project risk as described in "4.3 Programme Risk" will remain with the Ministry irrespective of any commercial agreement with a vendor.
- **Market response:** Specific concern regarding confidence in the existence of solution options proposed in particular existence of option 2.5 within the market
- **Change Management cost:** All attendees recognised there would be cost attached to the change management required for the IT Solution however this was considered necessary for any solution and therefore not included.
- **Stakeholder engagement:** Activities including business readiness will be prioritised.

The following assumptions were raised throughout the course of the workshop and impacted the assessment of the IT Options to varying degrees:

- **Population Health Ecosystem:** The IT solution needs to provide foundational capability for the Population Health Ecosystem where possible.
- **Market response**: The IT Options assessed are reflective of the market responses and are available within the market
- **Rollout and migration:** The existing enhanced Bowel Screening Pilot (BSP+) will be rolled out to a further two DHBs, three in total. The preferred IT Solution will support the national rollout to the remaining DHBs. The approach to delivery needs to address migration from the three DHBs using the Pilot solution to the new IT Solution.
- **Ministry on the Move:** Co-design, agile approach and adherence to Ministry on the Move principles are fundamental in any IT Solution.
- **Timeframes:** The end of Fiscal Year 2019 is the agreed date by which the IT Solution needs to have been implemented across remaining DHBs and have met the Investment Objectives.
- **Requirements**: Sourcing activities will determine if the identified solution meets the capability requirements and would also include feedback from stakeholders. Assessment of the proposed IT Options was on the basis that the strategic IT solution would meet all capability requirements.
- **Customer centricity**: When assessing the options the 'participant' was the primary customer for the programme (noting that DHBs, GPs and other providers were also customers in the broader sense).
- **Support and maintenance**: The Ministry would provide support and maintenance for options 1.1 and 1.2 and any supplier for options 2.1 - 2.5 would be able to provide support and maintenance. The selected vendor would have capacity and have a presence on shore.
- **Scalability:** Option 1.1 – Pilot clones and option 1.2 - Pilot enhancement pilot can be scalable for the purposes of the assessment
- **Cost model:** The model is reflective of the market responses/data provided and relative scoring is applied.
- **Criteria:** All IT Options were assumed to have met the criteria 'Business Benefits: Health Outcomes' 'Business Benefits: Improved Service Delivery' on the basis that the options would not be viable.

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Appendix 3: Comparative cost model

Cost range estimates for each option were been developed based on estimates provided by participants in the Market Sounding and supported by EY's industry experience. These cost estimates are indicative only and were developed solely to support the assessment process. *Table 1* provides a view how programme costs may vary across the options based on key cost areas.

Table 1: Comparative cost model

	1.1 Pilot clones	1.2 Pilot extension	2.1 Bespoke	2.2 Best of breed	2.3 COTS framework	2.4 COTS with build	2.5 COTS with configure
External build	Medium	High	High	Medium	Medium	Medium	Low
Programme delivery	High	High	High	High	Medium	Low	Low
Application integration	High	Medium	High	High	Medium	Low	Low
Rollout	High	Medium	High	High	Medium	Medium	Low
DHB integration	High	High	High	Medium	Low	Low	Medium
Migration	Low	Low	High	High	Medium	Medium	Medium
Hosting	High	Medium	Medium	Medium	Medium	Medium	Medium
Licencing	None	None	Low	High	Medium	High	High
Support and maintenance	High	High	Medium	High	Medium	Low	Low
Upgrades and enhancements	High	High	Medium	High	Medium	Medium	Low

Figure 2 below shows indicative implementation costs for each option (including build, rollout, integration, and migration costs and one year of run costs). It also provides a view of the potential over-/ under-spend risk profile associated with each proposed option.

*Figure 2: Indicative one year cost estimates with risk*
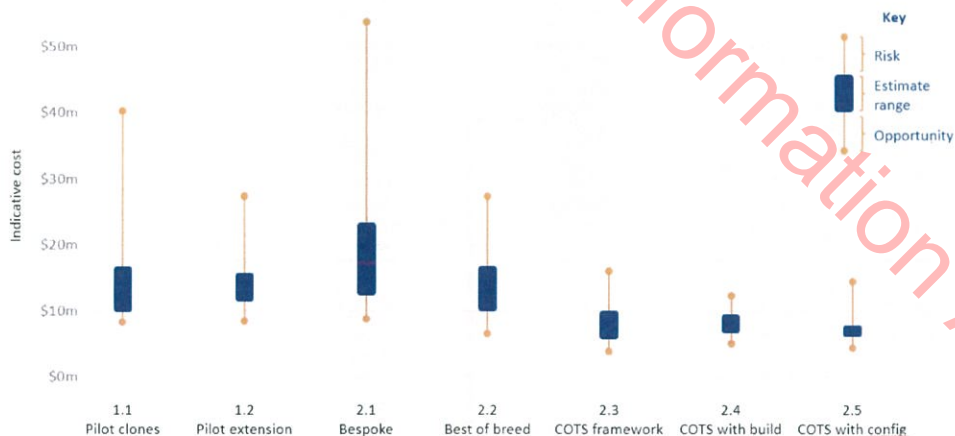
Note: Application integration and programme delivery costs were not included as part of the caluculation as there was not sufficient evidence to estimate these figures

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Appendix 4: IT Options overview

The responses from the Market Sounding provided a number of possible IT solution options ranging from fully bespoke options through to commercial off the shelf (COTS) solutions requiring minimal configuration.

The IT Options overview provided below were developed based on options identified in the previous "Programme Business Case – National Bowel Screening Programme" (1.1 and 1.2), the Market Sounding insights and informed by the International Case Studies (2.1 – 2.5). The "Best of Breed" option was not directly identified through the Market Sounding or Case Studies, however, it does provide a viable option along the spectrum of 'build' versus 'buy'. Insights from the Market Sounding have been used to inform the development of this option.

Figure 2 : *High level IT Options Overview*

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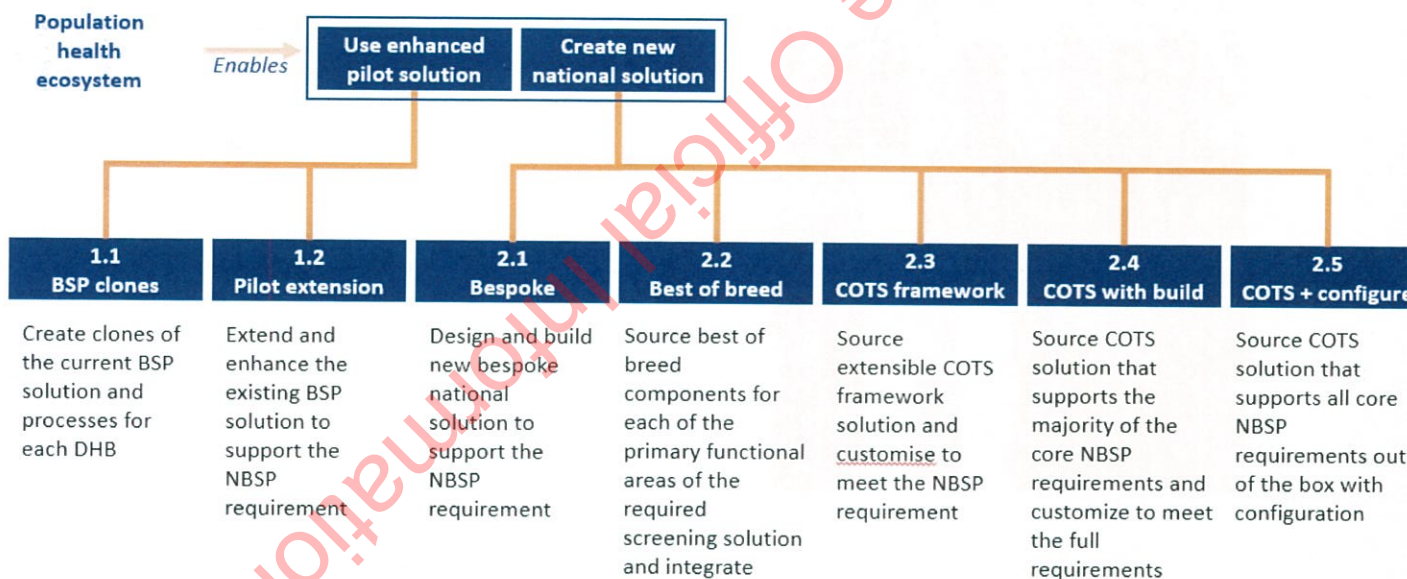
Appendix 5: High level IT Options overview

A high level description of the IT Option, its relative strengths and limitations, the delivery / implementation and sourcing implications attached to the option as well as the risks are described below for each of the IT Options assessed.

Solution option 1.1 – Clone BSP+ solution

Establish clones of the current BSP+ solution and processes for each DHB

Each DHB would be supported by their own instance of the current BSP Pilot Solution, with associated application instances, processes and infrastructure duplicated. A centralised solution would be required to manage and coordinate multiple instances of the same BSP Pilot solution to create a "national viewpoint" of the programme.

Strengths

- Existing awareness and familiarity with the functionality and landscape of the Pilot would support rollout
- Time to production would be reduced given existing relationships and knowledge.

Limitations

- Integration and security will be duplicated and managed discretely across each cloned instance of the solution increasing effort of any changes required (integration is manual, pilot requires extensive manual workarounds)
- Programme Operations functions will be highly complex and costly as they will be required to support each DHB individually
- Each instance of the screening solution will be specific to each DHB, limiting the opportunity for other screening programmes to use the solution
- The opportunity to realise wider MoH and GCIO goals will be significantly constrained
- New functionality and features will be prohibitively expensive to develop and deploy across multiple solution instances, limiting the extensibility of the screening solution
- Cloning the solution for each DHB is counter to how DHB groups have built out their IT – it would be a step backwards for them
- BSP+ solution has been integrated into the Waitemata DHB processes, a similar approach would be required for all other DHBs to onboard for NBSP.

Delivery / Implementation implications

- MoH will be responsible for all delivery, operational and change aspects of the BSP solution instances.
- Change management and governance across multiple instances of the solution will rapidly become cumbersome.

Sourcing

- Limited sourcing and commercial options are available as there is a single software vendor.

High level measures of the option

This solution is primarily focused on programme operations to support the effective and efficient operation of the screening programme. It is transactional, reactive and incorporates both a participant and risk management approach to deliver outcomes.

Risks

- Costs increases will be linear with the number of BSP pilot solution instances being supported
- Operational risk and cost will increase over time as MoH will be required to support multiple instances of the same solution
- Greater DHB involvement increases the risk of inconsistencies of data, access and usage, prohibiting predictive and population health capabilities
- MoH will not have the capacity or funding to support multiple instances of the BSP+ pilot solution
- BSP+ pilot will be deployed as-is and existing issues/ work-arounds not proactively mitigated across instances.

Solution option 1.2 – Enhance and extend BSP+ solution (BSP++)

Enhance and extend the existing BSP+ solution to support NBSP outcomes

All aspects of the exiting BSP+ solution architecture (application, data and technology) will be scaled to meet NBSP functional and non-functional requirements, including availability and disaster recovery.

This will be a single solution instance to meet national requirements. Enhancement will remove dependencies and workarounds acquired through BSP+ development, and deliver a generic instance for all DHBs.

Strengths

- Existing awareness and familiarity with the functionality and landscape of the Pilot would support a scaled rollout
- Increased potential to rapidly identify and deploy Minimum Viable Product (MVP) to support short term bowel screening outcomes
- Time to production would be reduced given existing relationships and knowledge
- A single solution instance will support the entire population and DHBs
- Provides an opportunity to mitigate primary risks from Solution Option 1.1.

Limitations

- Programme Operations functions will continue to be complex and expensive
- The opportunity to fully leverage XaaS opportunities and support wider MoH and GCIO goals will be constrained
- Opportunities to automate will be limited and may require additional solution components to support end-to-end integration, automation and removal of manual processes
- The solution will be specific to bowel screening
- There may be a significant gap between available and required functionality.
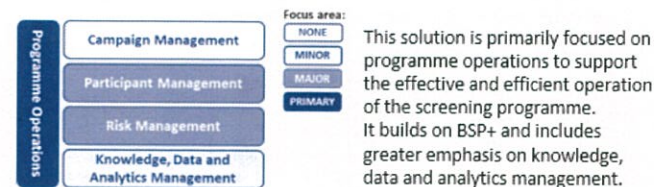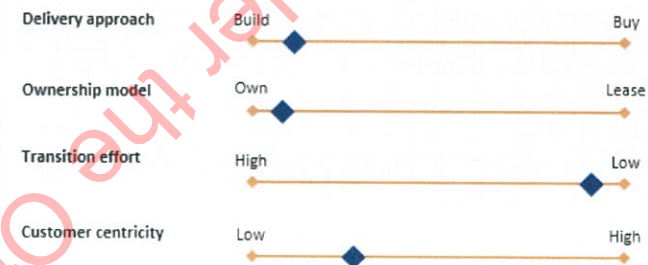
Delivery / Implementation implications

- MoH will remain responsible for all delivery, operational and change aspects of the BSP solution.

Sourcing

- Limited sourcing and commercial options are available as there is a single software vendor, however MoH may have the opportunity to engage a system integrator to support the end-to-end delivery
- MoH would need to continue to invest resources in the bespoke BSP+ solution and opportunities to leverage international best practice over time is limited.

High level measures of the option

This solution is primarily focused on programme operations to support the effective and efficient operation of the screening programme. It builds on BSP+ and includes greater emphasis on knowledge, data and analytics management.

Risks

- The functional suitability and extensibility of the BSP solution is not known
- The solution will not readily accommodate / support other screening programmes, e.g. HPV, without significant additional investment
- Constraints of existing BSP+ Pilot solution will be perpetuated
- May require significant re-engineering to support national requirement
- The cost and time required to enhance and scale the BSP Pilot solution to meet the NBSP outcome is not known.

Solution option 2.1 – Bespoke solution

Design and build a bespoke solution to support the NBSP

A new single-instance end-to-end screening solution will be designed, built and implemented to support NBSP and wider public health outcomes. The solution will be designed and built from the ground up, potentially reusing components of the existing BSP+ solution where it makes sense to do so.

Strengths

- It is likely that the solution would be built using established technology frameworks that are available within the MoH (e.g. JEE, .Net, Spring or Node.js) providing development tools to support build, and also support enterprise grade security and data access functionality
- There is an opportunity to use current architecture patterns to support extensibility and scale (Micro Services, containerisation, APIs etc.), including functionality to support campaign management
- There is an opportunity to align bespoke functionality selection and design to the strategic screening capability, and wider MoH goals (e.g. XaaS)
- Programme operations will be integrated into the end-to-end solution and as a result will require fewer manual processes and workarounds.

Limitations

- Building a bespoke solution may not be aligned to and support the realisation of wider GCIO outcomes
- Opportunities to leverage international best practice over time may be limited
- A high level of cost and effort will be required to design and develop a full bespoke national solution
- The cost of maintenance, support and enhancement will be high due to the on-going effort required to future proof the solution, in order to align with emerging technologies.

Delivery / Implementation implications

- MoH will have the opportunity to engage a system integrator to support the end-to-end delivery
- It is likely that a bespoke solution would follow a traditional waterfall approach for core functionality, potentially increasing the time taken to operationalise
- Migrating Pilot DHBs will need to be factored into implementation strategy and roadmap.

Sourcing

- A wider set of sourcing options is available. These will remain limited to basic insource / outsource models. It is unlikely that a hybrid model would work due to complexity of commercial models and risk.

High level measures of the option
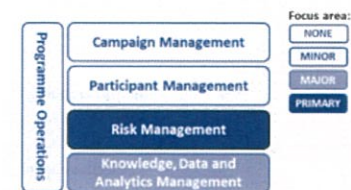
This solution is primarily focused on risk management to actively reduce the risk of bowel cancer across the population. Knowledge, data and analytics are leveraged to support active identification of risk levels based on static criteria and adjust participant pathways accordingly.

Risks

- Planned / committed NBSP delivery dates across the sector will not be met
- The new solution will perpetuate the failings of the old system as it is "what is known"
- A bespoke solution is not sufficient to meet wider public health outcomes and will not support the initiation of other screening programmes without continual investment
- The solution will not be delivered to meet budgetary constraints.

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Solution option 2.2 – Best of breed

Source best of breed solution components for each of the primary functional areas of the required screening solution and integrate

A discrete solution will be sourced for each of the primary functional areas of the required solution, e.g. Campaign Management, Participant Management, Risk Management etc. Solution components will need to be customised and extended to ensure they operate as part of a cohesive / integrated end-to-end solution and to avoid tactical and manual workarounds.

Strengths

- This option enables the delivery of the strategic screening capability
- There is an opportunity to align to the strategic screening capability to support the realisation of wider MoH goals (e.g. XaaS)
- Best of breed components offer continuous improvement opportunities over time due to the functional richness of the solution components out of the box.

Limitations

- Integration complexity (and cost) will be high due to the heterogeneous nature of the selected systems
- Architectural complexity will increases operational costs and risks
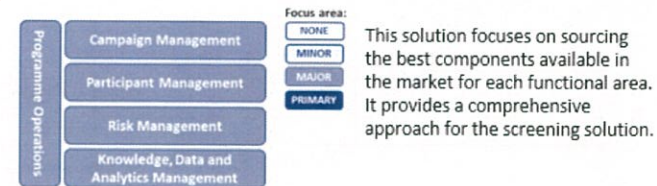- The cost of new functionality and features will be high.

Delivery / Implementation implications

- Migrating Pilot DHBs will need to be factored into implementation strategy and roadmap
- Due to dependencies between disparate components, identifying and implementing Minimum Viable Product (MVP) will be challenging.

Sourcing

- Sourcing model will be complex as each component / cluster of functionality will potentially be sourced separately
- Variations in licensing / commercial models across components may constrain solution capability
- MoH would be required to act as prime or engage a Systems Integrator (SI) to support the delivery of the end-to-end solution.

High level measures of the option

This solution focuses on sourcing the best components available in the market for each functional area. It provides a comprehensive approach for the screening solution.
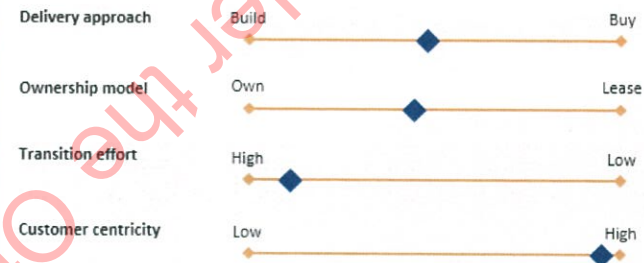
Risks

- Selected best of breed solution components are not compatible, do not readily integrate, resulting in increased end-to-end complexity and integration costs
- Functional fit across each of the selected components is variable requiring significant levels of customization and increasing costs and time to deliver
- Commercial arrangements are too complex for MoH to manage effectively.

Solution option 2.3 – COTS framework solution

Source an extensible COTS framework solution and customize to meet the NBSP requirements

Design and implement solution based on integrated COTS framework using a single technology stack. While the components may be pre-integrated, they will not support the screening requirements out of the box and a significant level of customization and configuration will be required to support the NBSP requirement.

Strengths

- The solution will be highly configurable, extensible and scalable, and well placed to provide foundation capability to support wider public health and screening initiatives
- Depending on the COTS framework used, the solution will be cloud ready (e.g. Microsoft Solutions will be able to be run on Microsoft Azure)
- Homogenous solution components decrease integration complexity and costs.

Limitations

- Significant levels of custom functionality may be required and there may be a need to source other solution components
- Custom functionality may have high long term upgrade and support costs
- Custom functionality is limited to the languages of the underlying framework.

Delivery / Implementation implications

- The solution can be build up in phases enabling an early minimal viable product, e.g. full risk management capability with skinning campaign, participant and knowledge components
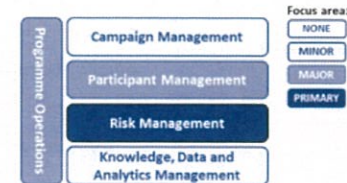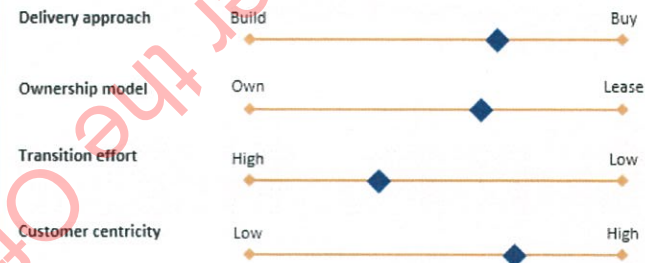- Significant capability is required for both delivery and on-going support. It is likely that external providers will be required to set up the framework, with external framework specialists needed throughout implementation
- Migrating Pilot DHBs will need to be factored into implementation strategy and roadmap.

Sourcing

- Sourcing for software will be based on single software vendor approach with either MoH acting as prime / or engaging a system integration partner to support the implementation and support of the screening solution.

High level measures of the option

Delivery approach	Build		Buy
Ownership model	Own		Lease
Transition effort	High		Low
Customer centricity	Low		High

Focus area: NONE, MINOR, MAJOR, PRIMARY

Programme Operations:
- Campaign Management
- Participant Management
- Risk Management
- Knowledge, Data and Analytics Management

This solution is primarily focused on risk management to actively reduce the risk of bowel cancer across the population. Effective participant management and efficient programme operations are a major focus, supported by knowledge, data and analytics.

Risks

- There may not be specialist skills in the market to support the solution
- The functional gap between what is available out of the box and what is required cannot be determined.
- Implementation time will increase due to the amount of development required
- MoH does not have sufficient in-house capacity and capability to set up and build upon a development framework.

Solution option 2.4 – Enhance and extend COTS solution

Source COTS solution that supports the majority of the core NBSP requirements and customize to meet the full requirements

A COTS solution will be sourced that supports the majority of the core NBSP screening requirements. This will be configured, customized and potentially extended through additional components to meet the full requirements and scope of the NBSP. For example, the COTS solution might have sufficient participant and risk management functionality, but campaign management and knowledge, data and analytics management functionality might be added separately.

Strengths
- This option has relatively low cost and time to implementation
- The COTS solution provides built-in support for all relevant health standards, including health link integration
- Multiple commercial models are potentially available, including participant based licensing which allows MoH to align cost to scale and save costs where a screening Programme is stopped.

Limitations
- Upgrades to the COTS solution are constrained to an extent by the supplier's roadmap
- The COTS solution is likely to have high licensing costs
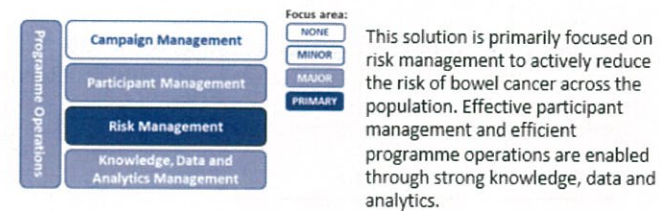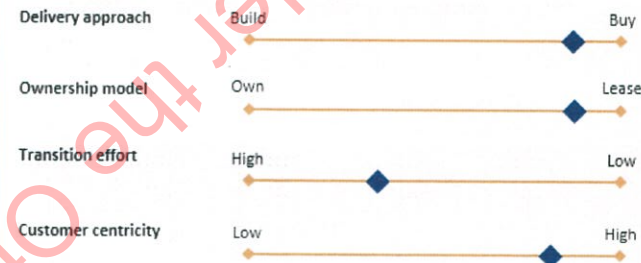- MoH will become dependent on a single supplier.

Delivery / Implementation implications
- The solution can be build up in phases enabling an early minimal viable product, e.g. full risk management capability with skinning campaign, participant and knowledge components
- XaaS options are available
- Migrating Pilot DHBs will need to be factored into implementation strategy and roadmap.

Sourcing
- A single vendor could provide the end-to-end solution and the solution could be offered as SaaS solution, potentially supporting an outcome based commercial model
- MoH could elect to act as prime / SI or outsource this to software vendor
- It may not be necessary to engage a separate system integrator (SI) to support the deign, build and run of the solution.

High level measures of the option

Delivery approach	Build	Buy
Ownership model	Own	Lease
Transition effort	High	Low
Customer centricity	Low	High

Focus area: NONE, MINOR, MAJOR, PRIMARY

Programme Operations
- Campaign Management
- Participant Management
- Risk Management
- Knowledge, Data and Analytics Management

This solution is primarily focused on risk management to actively reduce the risk of bowel cancer across the population. Effective participant management and efficient programme operations are enabled through strong knowledge, data and analytics.

Risks
- There may not be a COTS package available that offers sufficient functionality to justify / warrant this approach
- Changes to the COTS product to meet NBSP requirements may not align with the vendor's technology roadmap and high levels of maintenance may be required (i.e. potential for divergence)
- The available commercial models may not be suitable for MoH (i.e. a participant based licensing or OPEX based approach)
- The solution may be significantly different from the pilot, increasing migration effort and change impact across the sector.

Solution option 2.5 – COTS with configuration

Source a COTS solution that supports all core NBSP requirements out of the box with configuration

A COTS solution will be sourced that supports all the core NBSP screening requirements. The solution will be configurable to support specific NBSP/ population health requirements and will not require any level of customization to support core functionality across all major focus areas.

Strengths

- There is a potential for low cost and time to implement and operationalise screening programme nationally.
- The COTS solution provides built-in support for all relevant health standards, including health link integration.
- Multiple commercial models are potentially available, including participant based licensing allowing MoH to align cost to scale and allow cost savings where a screening Programme is stopped.

Limitations

- Upgrades to the COTS solution are constrained to the supplier's roadmap and this may constrain future innovation and strategic initiatives
- MoH will become dependent on a single supplier

Delivery / Implementation implications

- The solution can be build up in phases enabling an early minimal viable product, e.g. full risk management capability with skinning campaign, participant and knowledge components
- XaaS options are available
- Migrating Pilot DHBs will need to be factored into implementation strategy and roadmap.

Sourcing

- A single vendor could provide the end-to-end solution and the solution could be offered as SaaS solution, potentially supporting an outcome based commercial model
- Where commercial arrangements can be focused on outcome rather than solution, it is unlikely to require third party SI to support delivery
- May not require engagement of separate system integrator (SI) to support the deign, build and run of the solution.

High level measures of the option
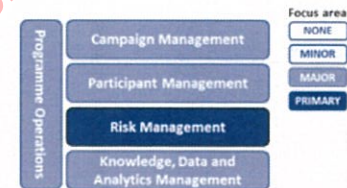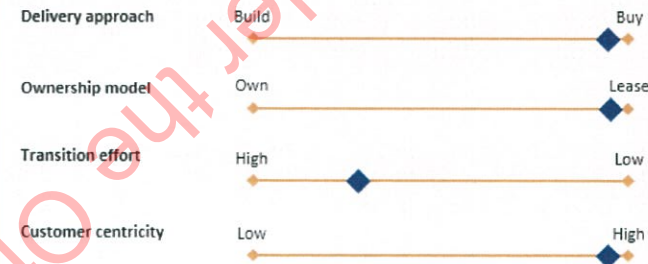
This solution is primarily focused on risk management to actively reduce the risk of bowel cancer across the population. The solution provides functionality across all major focus areas / core requirements.

Risks

- There may not be a COTS package available in the market that meets all of the core NBSP requirements
- The available commercial models may not be suitable for MoH (i.e. a participant based licensing or OPEX based approach)
- The solution may be significantly different from the pilot, increasing migration effort and change impact across the sector
- Significant change will be required to integrate across the Health IT ecosystem.

Appendix 6: Application of the assessment approach

The assessment criteria consists of the Critical Success Factors (CSF) sourced from the NBSP Programme Business Case. Each Critical Success Factor consists of high-level criteria and associated detailed criteria used to describe the attributes of that factor. Critical Success Factors have been taken from the Better Business Case framework. Investment Objectives, as per the NBSP Programme Business Case, form part of the criteria associated with "Strategic Fit & Business Needs".

The approach to the assessment was as follows:

- Each of the seven IT Solution Options were assessed against the high-level criteria (i.e. 1.1, 1.2, etc.), with rationale captured as to whether each option meets or doesn't meet particular high-level criteria. Attendees were assigned a CSF to assess in smaller groups and the output from the smaller working groups was collectively shared to the wider group where attendees were provided the chance to feedback or challenge the scores.

- The list of 7 IT Solution Options were reduced to a short-list of options of 4 following aggregation of the high level criteria scoring. One of the 3 IT Options shortlisted "1.2 – extension of the pilot" was brought forward to act as a base line/minimum for comparison.

- The shortlisted options were assessed against the detailed criteria (1.1.1, 1.1.2, 1.1.3, etc.), with rationale captured as to whether each option meets or doesn't meet particular detailed criteria. The attendees collectively scored each IT option and their ability to meet the CSF using detailed criteria as a group. All scoring was relative across the IT Options.

- Aggregation of the detailed criteria scoring provided strong indication of a preferred option.

Appendix 7: Assessment criteria

To provide a fair comparison of the IT Options against each other a consistent framework for assessing the options is required. The 5 critical success factors detailed below are used to create a robust framework which is broadly in alignment with the Better Business Case (BBC) framework.

Critical Success Factor 1: Potential affordability

How well the option:

- can be met from the likely available funding envelope, and
- matches other funding constraints.

	High-level criteria		Detailed criteria
1.1	**Technology Investment/ Costs** The IT solution (incl. integration costs) is affordable for the MoH and third parties (e.g. primary care providers).	1.1.1	The MoH has access to sufficient funding to pay for the development and implementation of the NBSP solution.
		1.1.2	Third parties, such as DHBs, GPs and other health care practitioners are able to invest to change internal processes and integrate with the NBSP solution.
1.2	**Operational Impact** The increased operational costs associated with the IT solution are affordable.	1.2.1	The increased operational costs associated with the IT solution are affordable, including IT service management, increased management, administration and participation in the screening programme.

Critical Success Factor 2: Potential achievability

How well the option:

- is likely to be delivered given the organisation's ability to respond to the changes required, and
- matches the level of available skills required for successful delivery.

	High-level criteria		Detailed criteria
2.1	**Solution Achievability** Solution can be delivered within known constraints (internally and externally).	2.1.1	Solution can be delivered within known constraints (internally and externally), including wider delivery commitments across MoH and the health sector, and internal / external integration complexity.
2.2	**MoH Capacity & Capability** The MoH has the capacity and capability to support the delivery of the IT solution.	2.2.1	MoH has capacity and capability to support the delivery and ongoing operations of the IT solution.
2.3	**Sector Capacity & Capability** The Sector has the capacity and capability, with available resources, and are actively engaged in delivering the IT solution.	2.3.1	The Sector and other health care providers have capacity and capability to support the IT solution delivery and operations.
		2.3.2	The IT solution encourages participation and has a minimal negative impact on sector and third party provider's operational workload.

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Critical Success Factor 3: Strategic fit & business needs

How well the option meets the agreed investment objectives, related business needs and requirements, and fits with other strategies, programmes and projects.

	High-level criteria		Detailed criteria
3.1	**Solution Alignment with NBSP Investment Objectives** The IT solution enables the programme to fully meet the NBSP Investment Objectives in a timely manner.	3.1.1	To achieve a greater mortality reduction from bowel cancer.
		3.1.2	To promote equity between population groups.
		3.1.3	To deliver bowel screening in a manner that is acceptable and encourages participation.
		3.1.4	To maximise benefits vs harm.
		3.1.5	To deliver a safe, high quality programme which is consistent nationally.
3.2	**Aligns with Government ICT Strategy 2015 Outcomes** The IT solution will be delivered in way that enables wider government outcomes to be achieved.	3.2.1	Customers experience seamless, integrated and trusted public services.
		3.2.2	Information-driven insights are reshaping services and policies, and adding public and private value.
		3.2.3	Adoption of information and technology innovations is accelerated and value is being created.
		3.2.4	Investment in innovative digital services is being prioritised and benefits are being realised.
		3.2.5	Complex problems are being solved and innovative solutions are being adopted.
3.3	**Enables 'Population Health Vision and Scope' Strategic Outcomes** The IT solution is interoperable and provides a foundation for future screening programmes.	3.3.1	Provides a foundation capability that can be used across multiple health screening programmes without excessive change.
		3.3.2	Readily supports interoperability across the sector through the use of defined standards (e.g. HL7 / FIHR, SNOMED etc.).
3.4	**Aligns with Ministry on the Move** The IT solution is sufficiently flexible, responsive and delivered in way that enables Ministry on the Move.	3.4.1	Enables Ministry on the Move through the adoption of agile management, co-design and the ability to efficiently respond to and drive changes in the business environment.

Critical Success Factor 4: Potential value for money

How well the option optimises value for money (i.e. the optimal mix of potential benefits, costs and risks)

	High-level criteria		Detailed criteria
4.1	**Business Benefits: Improved Health Outcomes** *Screening should result in the reduction of bowel cancer mortality (and potentially in incidence) and an improvement in quality and length of life.* The IT solution will enable the delivery of improved health outcomes.	4.1.1	Reduction in bowel cancer mortality.
		4.1.2	Reduction in bowel cancer incidence.
		4.1.3	Benchmarking improvement with international comparisons - variance with OECD average.
		4.1.4	Increase in proportion of people diagnosed with Stage 1 bowel cancer.
		4.1.5	Increase in 5 year survival rate for colorectal cancer.
4.2	**Business Benefits: Improved Service Delivery** *The implementation of a national screening programme will impact on wider service delivery, and should result in improved services including and beyond bowel screening.*	4.2.1	Reduction in the proportion of colorectal cancers first identified through presentation and the Emergency Departments.

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High-level criteria		Detailed criteria	
	The IT solution will enable the delivery of improved service delivery across the Sector.		
4.3	**Programme Risk** The IT solution is designed and delivered in a timely manner, nationally, and actively addresses and mitigates potential programme risk.	4.3.1	Addresses the risk that the NBSP is not available or cannot be integrated by the DHBs nationally.
		4.3.2	Addresses the risk that delivery of the programme is delayed within the given timeframes.
		4.3.3	Addresses the risk that required functionality to support a national programme is not sufficiently delivered.
		4.3.4	Addresses the risk that any required sourcing activities are not completed in time to meet programme delivery milestones.
		4.3.5	Addresses the risk that integration costs are prohibitive to onboarding DHBs and other users to the solution.
4.4	**Programme Cost** The cost of the IT solution is within agreed estimates.	4.4.1	The IT solution can be delivered within agreed cost estimates.
4.5	**Whole of Life Cost** The whole of life cost of the IT solution is within agreed estimates.	4.5.1	The whole of life cost of the IT solution is within estimated cost envelope across the planned 10 year window.

Critical Success Factor 5: Supplier capacity and capability

How well the option:

- matches the ability of potential suppliers to deliver the required services, and

- is likely to result in a sustainable arrangement that optimises value for money over the term of the contract.

High-level criteria		Detailed criteria	
5.1	**Supplier Product** There are products in the market that would support the proposed IT solution.	5.1.1	There are supplier(s) in the market with product(s) that meet the needs of the NBSP.
5.2	**Supplier Capability** There are suppliers in the market with the capability to deliver/ support the IT solution.	5.2.1	There are suppliers in the market with the capabilities required to meet the majority of the NBSP's needs.
5.3	**Supplier Capacity** There are suppliers in the market with the capacity to deliver/ support the IT solution.	5.3.1	There are suppliers in the market with the capacity (locally and/ or internationally) to deliver and support the required NBSP solution.
5.4	**Support & Maintenance** There are suppliers in the market to support/ maintain the IT solution.	5.4.1	There are supplier(s) in the market who are able to provide effective ongoing post-implementation support (or enable it through other mechanisms e.g. training or transfer of IP to MoH).

Appendix 8: Long list options assessment overview

The table below is a representation of the IT Options following the long list assessment. The four options that were shortlisted are highlighted in orange.

#	CSF	High-Level Criteria	Use enhanced pilot solution		Create new national solution				
			1.1 Pilot clones	1.2 Pilot extension	2.1 Bespoke	2.2 Best of breed	2.3 COTS framework	2.4 COTS with build	2.5 COTS with config
1	Potential Affordability	1.1	Partial	Meets	Partial	Partial	Partial	Meets	Meets
		1.2	Does not meet	Meets	Meets	Partial	Meets	Meets	Meets
2	Potential Achievability	2.1	Does not meet	Partial	Partial	Partial	Partial	Meets	Meets
		2.2	Does not meet	Does not meet	Partial	Partial	Partial	Meets	Meets
		2.3	Partial	Meets	Meets	Meets	Meets	Meets	Meets
3	Strategic Fit & Business Needs	3.1	Does not meet	Meets	Partial	Partial	Partial	Partial	Partial
		3.2	Does not meet	Does not meet	Partial	Meets	Meets	Meets	Partial
		3.3	Does not meet	Does not meet	Partial	Meets	Meets	Meets	Partial
		3.4	Does not meet	Partial	Partial	Partial	Meets	Meets	Partial
4	Potential Value for Money	4.1	Meets	Meets	Meets	Meets	Meets	Meets	Meets
		4.2	Meets	Meets	Meets	Meets	Meets	Meets	Meets
		4.3	Does not meet	Partial	Partial	Does not meet	Partial	Meets	Meets
		4.4	Meets	Meets	Does not meet	Does not meet	Meets	Meets	Meets
		4.5	Partial	Meets	Does not meet	Does not meet	Meets	Meets	Meets
5	Supplier Capacity and Capability	5.1	Meets	Meets	Meets	Meets	Meets	Meets	Partial
		5.2	Meets	Meets	Meets	Meets	Meets	Meets	Partial
		5.3	Partial	Partial	Meets	Meets	Meets	Meets	Meets
		5.4	Partial	Partial	Meets	Does not meet	Meets	Meets	Meets

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Appendix 9: Preferred option assessment overview

The table below is a representation of the IT Options following the short-list assessment. The agreed preferred option is highlighted in orange.

#	CSF	#	#	1.2 Pilot extension	2.3 COTS framework	2.4 COTS with build	2.5 COTS with config
1	Potential Affordability	1.1	1.1.1	Meets	Partial	Meets	Meets
			1.1.2	Meets	Partial	Meets	Partial
		1.2	1.2.1	Meets	Meets	Meets	Meets
2	Potential Achievability	2.1	2.1.1	Partial	Partial	Meets	Meets
		2.2	2.2.1	Partial	Partial	Meets	Meets
		2.3	2.3.1	Meets	Meets	Meets	Meets
			2.3.2	Meets	Partial	Meets	Partial
3	Strategic Fit & Business Needs	3.1	3.1.1	Meets	Meets	Meets	Meets
			3.1.2	Meets	Meets	Meets	Meets
			3.1.3	Meets	Meets	Meets	Meets
			3.1.4	Meets	Meets	Meets	Meets
			3.1.5	Meets	Meets	Meets	Meets
		3.2	3.2.1	Partial	Meets	Meets	Partial
			3.2.2	Partial	Meets	Meets	Partial
			3.2.3	Does not meet	Meets	Meets	Partial
			3.2.4	Does not meet	Meets	Meets	Partial
			3.2.5	Does not meet	Meets	Meets	Partial
		3.3	3.3.1	Does not meet	Meets	Meets	Partial
			3.3.2	Does not meet	Does not meet	Meets	Meets
		3.4	3.4.1	Partial	Meets	Meets	Partial
4	Potential Value for Money	4.1	4.1.1	Meets	Meets	Meets	Meets
			4.1.2	Meets	Meets	Meets	Meets
			4.1.3	Meets	Meets	Meets	Meets
			4.1.4	Meets	Meets	Meets	Meets
			4.1.5	Meets	Meets	Meets	Meets
		4.2	4.2.1	Meets	Meets	Meets	Meets
		4.3	4.3.1	Meets	Partial	Meets	Partial
			4.3.2	Meets	Partial	Meets	Meets
			4.3.3	Partial	Partial	Meets	Meets
			4.3.4	Partial	Partial	Partial	Partial
			4.3.5	Partial	Partial	Meets	Partial
		4.4	4.4.1	Meets	Meets	Meets	Meets
		4.5	4.5.1	Meets	Meets	Meets	Meets
5	Supplier Capacity and Capability	5.1	5.1.1	Meets	Meets	Meets	Partial
		5.2	5.2.1	Partial	Partial	Meets	Partial
		5.3	5.3.1	Meets	Meets	Meets	Meets
		5.4	5.4.1	Meets	Meets	Meets	Meets

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