SBRI Challenge Fund Application

1. Applicant organisation / department name and address	
Organisation Name & Department	Business Services Organisation Operations Directorate
Address	Franklin Street, Belfast.
Postcode	BT2 8DQ

Contact name in the organisation	
Name	▮▮▮▮▮▮▮▮▮
Position	SBRI Executive
Tel. Number	▮▮▮▮▮▮▮
E-mail	▮▮▮▮▮▮▮▮▮▮

2. Challenge Title:
See examples of current & past challenges https://sbri.innovateuk.org/competitions

> <u>Project 'GEM'</u> - <u>G</u>estational, Type 1 and Type 2 Diabetes <u>E</u>mpowering <u>M</u>others through Mobile Technologies (GEM)

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

There has been an unprecedented growth in the number of women experiencing diabetic pregnancy over the last 10-15 years; 12-fold increase in the number of women with GDM since 2000/01. Diabetic pregnancy or diabetes in pregnancy refers to women experiencing diabetes during pregnancy as a result of:
- Pre-existing type 1 diabetes
- Pre-existing type 2 diabetes
- Gestational diabetes mellitus (GDM), which is generally diagnosed around 26-28 weeks gestation following a glucose tolerance test.

This challenge is the rising demand for specialist diabetes maternity services and through SBRI seeks innovative solutions that achieve both quality and efficiency improvements.

The long term chronic affect associated with diabetes, as well as the high risk nature of diabetic pregnancy for maternal child health is well documented and efforts to address diabetes are essential.

The increase in diabetic pregnancy is particularly due to an escalation in the incidence of GDM. 15-years ago diabetic pregnancy was an uncommon event, affecting few women with limited consequent demands on health services. However, the increase in the incidence of GDM, primarily as a result of:

- Increased obesity in women of childbearing age
- Increasing maternal age as a result of women delaying pregnancy
- Changes in screening criteria and diagnostic thresholds.

Type 2 diabetes is also becoming more common in women of child bearing age with the prevalence of both obesity and diabetes continuing to increase, so too will the prevalence of diabetes in pregnancy

The challenge of diabetic pregnancy extends beyond health risks to mother and child to health care services and the economy, all of which are underpinning the need for the GEM.

There is a higher risk of adverse pregnancy outcomes. The risks to the mother include:

- miscarriage
- still birth
- obstructed labour
- pre-eclampsia
- pre-term labour
- worsening retinopathy in women with pre-existing diabetes
- increased hospital admission
- increased rates of caesarian section (60.1% according to UK figures, compared to 26.2% across the general UK population)
- development of type 2 diabetes in later life in women with GDM (approximately half of women with a history of GDM go on to develop type 2 diabetes within five to ten years after delivery, yet many feel unsupported after pregnancy).

The additional risks for the infant include:

- congenital malformations
- birth injury as a result of macrosomia (birth weight >4.5Kgs)
- higher perinatal mortality rate
- post-natal adaptation issues e.g. hypoglycaemia
- a higher prevalence of overweight and obesity
- higher risk of developing type 2 diabetes later in life.

Diabetic pregnancy shifts the focus from a woman-led and empowered experience, to a medically managed pregnancy, requiring:

- regular attendance at specialist clinics – necessitating additional time off work/ child care & travel
- invasive/ finger prick monitoring of blood glucose levels 7-8 times/ day during pregnancy
- making lifestyle changes e.g. diet/ exercise
- Taking regular medication (oral and/or insulin injections).

For newly diagnosed with GDM, this can signify a profound change in their approach to pregnancy and cause considerable amounts of stress.

Despite this evidence, the International Diabetes Federation reports that GDM remains a neglected maternal health issue among policy makers.

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation
(250 words max)

Impact/ Outcomes

SBRI provides a unique opportunity to develop cutting edge, innovative solutions targeted at the improved management of diabetic pregnancy. GEM seeks to drive the development of innovative ICT based solutions that empower women experiencing diabetic pregnancy to better manage their disease in the community. By focusing upon this critical patient group, GEMS will:

- enable women experiencing diabetic pregnancy to take control of their disease, better adhere to their treatment and contribute to increased effectiveness of interventions
- reduce pressure on under-strain health care services, including maternity, neonatal and endocrinology services
- support a continuum of care for diabetes services
- improve the lives and health outcomes of these women during pregnancy, as well as their infants
- enable women to lead as normal a life as possible, manage work and care responsibilities and reduce need for travel to specialist clinics.

These solutions have the potential to:
- transform the delivery of services for women experiencing diabetic pregnancy
- empower women to better manage their condition
- create economic benefits
- whilst at the same time posing no risk to either maternal or child health.

By considering these issues and addressing the deficits through the GEMS the development of solutions to revolutionise care for women experiencing diabetic pregnancy – improving their personal experience, as well as changing the way diabetic pregnancy services are delivered and run, thereby delivering both a quality and financial impact. Involvement of pregnant women and clinicians in the development of the technologies will be critical at all phases of the SBRI.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

Preliminary analysis of the state-of-the-art identified a range of solutions but with major shortcomings when compared to needs:

- Solutions are for general population diabetics not during pregnancy
- Current diabetic pregnancy solutions focus upon educating and empowering women but few actively reduce service demands
- Many monitoring solutions require women to monitor their blood glucose levels invasively (finger prick).
- Lack of outcome evidence, which will lead to changes practice.
- Piecemeal technology provision is lacking a coherent cohesive approach
- Many of the technologies make unqualified assumptions about network coverage
- R&D providers cannot assume digital literacy
- R&D providers cannot assume availability of latest technology, i.e. access to the most up-to-date smart phone.
- Habitualisation to alerts from patients' technology monitoring devices leading to a lack of response
- Data collected outside of the system by the public does not feed into patient records.
- Inconsistency in the quality of data received from multiple devices.

- Device approval process

6. Please provide an estimate of the amount of funding you require?

To operate the Phase 1 – direct SBRI cost of innovation would be to appoint up to 6 companies with awards of up to £80,000 for a contract period of 6-months against a total budget of £400,000

In order to support the direct service delivery of the SBRI by the DHSSPSNI, the Business Services Organisation (BSO) will be engaged to execute the procurement of innovation, project manage and interface with the contractors at a cost of £27k . **Therefore, the total cost of the Phase 1 SBRI for GEM is £427,000.**

However, there may be an additional charged levied by InnovateUK for the evaluation of SBRI application forms. To date InnovateUK have not charged regional authorities for the direct costs of the evaluation of applications nor the hosting of the SBRI call but we recognise a risk of a cost pressure and duly request £40,000 is set aside by way of a contingency. However, it is also recognised that the situation may have been clarified by date of the review of this application to the Challenge Fund and we request that DETI advise the review panel and DFP accordingly.

7. Have you identified any potential partners or funders you are considering working with? If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

There is an opportunity to partner with the HSE in the RO Ireland and Cork University Maternity Hospital. Both were able to offer staff time and funds for the Horizon 2020 pm-12 proposal. If the project is not funded through Horizon 2020 the DHSS would pursue the SBRI, rather than PCP proposal, and would be able to deliver the project within N Ireland alone or in partnership with ROI.

8. Please indicate the confidence of completing Phase 1 by 31st March 2017, including any work that may have taken place already which may help accelerate the timetable?

Engagement with the five Trust lead endocrinologists specialising in care of the diabetic patient within pregnancy have resulted in the drafting the narrative to describe the service difficulties, understand the complexity of the issues to be addressed and clear articulation of the problem in preparation of the call contract suite. Moreover, the individual experiences of pregnant woman with diabetes have been captured to bring to life the patient centric understanding of the 'issue to be addressed through SBRI. Moreover, the Directorate Legal Service BSO have already prepared SBRI suite templates and the completion of a set of tender documents specifically designed for SBRI GEM would be undertaken promptly. Therefore, following approval to proceed the SBRI call could go out to the market within 4-6-weeks.
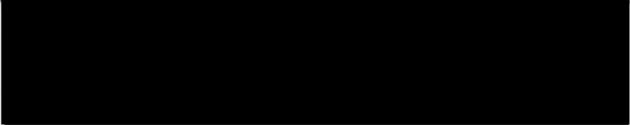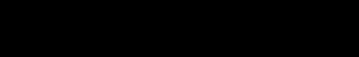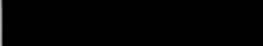
It is anticipated that the call will be open for an 8-week period between adjudication by InnovateUK. The contract start dates will be set as soon as possible but no later than 1st September to ensure a full 6-month Phase 1 SBRI will be undertaken.

During month-5, in addition to monthly monitoring, the successful suppliers will be expected to make a formal presentation to the SBRI project Board. This will enable decision making vis-à-vis the need or otherwise to seek a Phase 2 project.

In summary, the effort being focused towards this project at present will ensure the execution of a full SBRI Phase 1 during the financial year.

Applications must be signed by:

  (i)   the Lead Applicant
  (ii) and, endorsed by a Director or equivalent senior representative from the applicant organisation

Signed	███████████████████
Date	23:02:16
Lead Applicant Name	███████████
Position in Organisation	SBRI Executive
Endorsed by	██████
Position in Organisation	Director Operations

Submission of Applications

Applications must be submitted via email only and by 26th February 2016. Please ensure that you use the words 'SBRI Challenge Fund Application' in the email subject box. Email applications must be sent to sbri@detini.gov.uk

SBRI Challenge Fund Expression of Interest

1. organisation / department name and address

Organisation Name & Department	CCEA Department of Education
Address	29 Clarendon Road, Clarendon Dock, Belfast
Postcode	BT1 3BG

Contact name in the organisation

Name	███████████
Position	Director of Finance and Corporate Services
Tel. Number	███████████
E-mail	███████████

2. Challenge Title:
See examples of current & past challenges ~~https://www.gov.uk/government/collections/sbri-the-small-business-research-initiative#sbri-funding-competitions~~

Artificial Intelligence (AI) Language Assessment.

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

Every year thousands of people undertake spoken English Language assessment as part of either tier compulsory education or as part of adult learning programmes. These assessment, which often lead towards formal qualifications, are extensible conducted by teachers as examiners or external people as examiners.

CCEA are challenged to provide a modern examination process within a limited resource. Sourcing external examiners in a limited pool continues to be a challenge. The financial constraint on the

education system is well documented and the development of more efficient technologies will reduce the cost of human intervention whilst improving the consistency and accuracy of assessment and evaluation. Automation of the process will add to the integrity of the system by providing greater independent marking.

The development of digital assistants (Alexa, Siri, Cortana, etc.) provides new opportunity, which could form the basis of a digital assessment assistant for English language and, potentially, other foreign languages. Such a tool would reduce costs, reduce error and provide opportunity for on-demand assessment. This tool would have global applications and significant market opportunity.

Currently there is no commercial provider of this technology. Whilst research has been conducted into the viability of the technology for assessment purposes, more activity is required by commercial vendors to mature this technology into a viable intellectual property. Small vendors can benefit from large global platform suppliers, by configuring Application Programming Interface's (API's) to the take of digital assessment.

CCEA, as one of the UKs five providers of GCSE / GCE qualifications is suitably qualified as a public sector partner for this development opportunity. CCEA would benefit from using this technology to achieve public sector digital transformation. Currently, CCEA undertakes thousands of English language (and other language) spoken examinations each year. With the introduction of this technology, CCEA would be able to realise tangible cost savings and benefits.

CCEA has considerable historical data sets on English spoken language and examination outcomes. In the correct format, this data can provide a 'training set' for AI engines. This in turn would add valuable intellectual property to the AI API's that cannot be achieved through any other partnership.

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4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation (250 words max)

A proof of concept artificial English Language assessment tool, using adaptive artificial intelligence and personal assistant API technology, in the form of a hardware / software component that can be used to assess learners speaking English at Level 2 or equivalency. The tool would be trialled in simulated examinations conditions with learners from across Northern Ireland, building on training data simultaneously.

CCEA are looking to develop an innovative computer programme, which will integrate with voice activated technology to record speech under examination conditions. The application will mark the competency of the recording based on a range of Assessment Indicators as laid out in the Examination Specification. The recording will produce a marked transcript which can be independently moderated by human intervention.

The technology will interface with CCEAs online marking solution and ultimately interface with the main database for grading according to CCEAs grade boundaries.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

There are no commercially available solutions for our proposal. Whilst investigations have been made in a research environment, most of these have been to develop formative feedback rather than summative 'state' examinations or qualifications. (see https://www.forbes.com/sites/chynes/2016/08/30/the-app-using-artificial-intelligence-to-improve-english-speaking-skills/#5e93b9d91c82)

Formative tools do not support high-stakes graded or standardised outcomes and are used for informal learning or supportive learning settings. The commercial value of qualifications / high-stakes technology solution would be considerable.

6. Please provide an estimate of the amount of funding you require?

We anticipate £30,000 for vendor supply of proof of concept technology and trialling in a simulated environment. (Phase 1) This will comprise of a small module which could be applied to GSCE in the first instance. The exact cost will need to be explored in partnership with the eventual supplier.

Phase 2 of the programme is yet to be costed but will be procurement of a full solution across all modern languages in GCSE and or A Level. Further opportunity will be open for vendors to offer commercially for other Awarding Bodies both nationally and internationally.

There may be other markets which technology could be applied.

7. Have you identified any potential partners or funders you are considering working with?
If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

We have identified Microsoft as an interested partner in this project. Microsoft already have Azure Cloud and Cortana API technology which might be adapted, through a suitable third-party and local vendor, to suit our purposes of proposal. Establishing a partnership with Microsoft will allow ease of exploiting world-wide opportunities in this technology area.

Other potential partners include Amazon and Google, however Microsoft have already shown an interest in the application of this technology in the education space.

8. Please indicate the confidence of completing all agreed phases by 31st March 2019, including any work that may have taken place already which may help accelerate the timetable.
9. If the proposal is a Phase 2 project which will require funding support beyond 31 March 2019 please confirm organisational commitment to meet that resource and complete the project.

This is extremely new technology in a highly regulated industry and there is a high risk of project becoming non-viable. However the scale of the project will be kept at a small level to mitigate against losses through failure.

CCEA will rely on Department of Education as sponsoring Department to facilitate future funding.

Expressions of Interest must be signed by:	
(i) the Lead Applicant (ii) and, endorsed by a Director or equivalent senior representative from the applicant organisation	
Signed	
Date	24.01.2018
Lead Applicant Name	
Position in Organisation	Director of Finance and Corporate Services
Endorsed by	
Position in Organisation	Chief Executive

Submission of Expressions of Interest

Applications must be submitted via email only and by 29 January 2018. Please ensure that you use the words 'SBRI Challenge Fund Expression of Interest' in the email subject box. Email applications must be sent to sbri@economy-ni.gov.uk

SBRI Challenge Fund Application 2018/19

1. Applicant organisation / department name and address

Organisation Name & Department	Business Services Organisation Operations Directorate
Address	Franklin Street, Belfast.
Postcode	BT2 8DQ

Contact name in the organisation

Name	▮▮▮▮▮▮▮▮▮▮▮
Position	SBRI Executive
Tel. Number	▮▮▮▮▮▮▮▮
E-mail	▮▮▮▮▮▮▮▮▮▮▮▮

Trust Contact

Name	▮▮▮▮▮▮
Position	Clinical Lead for Prison Dentistry/Quality Improvement Fellow/South Eastern Trust
Tel. Number	Telephone: 02892633594, Mobile: ▮▮▮▮▮▮
E-mail	▮▮▮▮▮▮▮

2. Challenge Title:

Innovating the Prescribing Pathway in Prison Healthcare

Project 'acronym' - **PPIP**

PHASE 1

3. Briefly describe the public sector challenge that you would like to overcome? (inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

Since 2008 the South Eastern Health and Social Care Trust (SEHSCT) has been responsible for providing healthcare to people in custody in Northern Ireland. This group has a high prevalence of disease, comorbidities and polypharmacy (Marshall et al 2001). Studies indicate that people in custody are heavy users of healthcare while incarcerated which can result in long waiting lists and pressure on services. By addressing the health needs of the prison population can help address health inequalities in society (PHE 2014). The reduction in health inequalities has been highlighted as a Health & Social Care priority (DoH 2017).

The committal process has been scrutinized in the past by Regulation and Quality Improvement Authority (RQIA) Inspection Reports, Ombudsman reports. The committal process is the gateway to a person entering custody receiving medical and psychological support whilst in prison. It is a complex process involving many organisations with differing operational aims, processes and cultures. The Prison Reform Programme reflected urgency for change.

SEHSCT is engaged in the committal process in Her Majesty's Prison Service (HMP) Maghaberry (for men aged over 21) and Hydebank Wood College (for men aged 18-21 and all women.) The Number of people entering HMP Maghaberry was 3066 in 2016 (Northern Ireland Prison Service (NIPS)); for Hydebank, number are in 2016: 367 males, 351 females; 2017 - 347 males & 360 females. Baseline data shows 87% first dose medications were missed in the first 24 hours of entry to prison. Omitted medication results in poor patient well-being, increased anxiety levels, reduced sleep and low mood. A high number of complaints and incidents on prison landings are related to delays in medication.

The current challenge for the medication pathway is the complex flow of the patients and information sharing when people enter custody from home, police cell and court. People arriving from court are kept to the end of the day and are then transported to Prison between 5-7pm when medical and pharmacy services are closed. Verification of current medication is done using the Electronic Care Record (ECR), but by the time people arrive into prison the GP surgeries are closed for consultation. Operationally it is only when people arrive in Prison that a consent form is signed and ECR is accessed to start the prescribing process. 13% of medications are prescribed on the first night by the committal nursing team.

What matters most to the people entering custody is that medication is administered on time and that communication is clear and respectful. The current committal process is not focused on quality outcomes. It has very limited performance indicators, all of which are retrospective, quarterly and measure focus on process not outcomes. Data systems are foundational to operational quality control.

The SEHSCT invites SBRI to propose a solution which can interface across the NI Prison Service, court service, police and Forensic Medical services which will improve the ability to administer medicines to persons in custody at the right time. The desired outcome is to improve the flow and recording of information, using technology designed to increase the timeliness and quality of care, medication prescribing and reduce highlighted risks to vulnerable patients.

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation
(250 words max)

1) To improve the flow of medication for people entering custody i.e. to streamline the medication pathway to remove non-value adding processes, reduce delays, targeting a reduction in omitted medication dose by 60%, improving the health and safety of people as they enter prison.

2) To innovate communication in the committal process through the use of real-time information sharing across stakeholder organisations – NIPS, PSNI, Court Service, SEHSCT and Service Users.

3) To reduce incidents on prison landings related to delayed medication.

Operational process measures must be integrated into the flow of the service, including real time performance data analysis, to introduce sustainability into the system.

The project's outcome will be to improve the efficiency of the prison prescribing pathway, enhancing the patient experience and their well-being. The design will maintain confidentiality, data protection and the innovative technology must be compatible with the secure systems of NIPS, PSNI, Court Service and SEHSCT.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

Contact has been made with research colleagues at the Five Nations Health & Justice forum (England, Scotland, Wales, Northern Ireland and Southern Ireland) and World Health Organisation (WHO) to identify any existing innovative practices or technologies but to date none have been found. There is no similar project reported in peer review literature.

6. Please provide an estimate of the amount of funding you require?

*(Small digital SBRI)*To operate the Phase 1 – direct SBRI cost of innovation would be to appoint up to 2 companies with awards of up to £60,000 for a contract period of 6-months against a total budget of £120,000 along with additional support costs of £20,000

The total cost of the Phase 1 SBRI for PPIP is £140,000.

7. **Have you identified any potential partners or funders you are considering working with?**
If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

None for this SBRI proposal

8. **Please indicate the confidence of completing Phase 1 by 31st March 2019, including any work that may have taken place already which may help accelerate the timetable?**
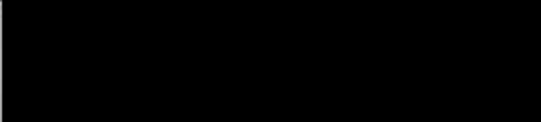9. **If the proposal is a Phase 2 project which will require funding support beyond 31 March 2019 please confirm organisational commitment to meet that resource and complete the project .**

The Call for Tender (CfT) narrative will be created by a team of experts, and through stakeholder engagement workshops by March 2018. The BSO is the custodian of a tested SBRI Methodology and contract suite and so the CfT material will be ready for issued as soon as instructed. It is anticipated that contracts can be issued within two-months of CfT being published.

This is a Phase 1 SBRI and will be completed by 31:03:19 and so there will not be a revenue requirement for financial year 2019/20

Applications must be signed by:	
(i) the Lead Applicant (ii) and, endorsed by a Director or equivalent senior representative from the applicant organisation	
Signed	██████████████████████
Date	17:01:18
Lead Applicant Name	████████████
Position in Organisation	SBRI Executive
Endorsed by	████████
Position in Organisation	Director Operations

Submission of Expressions of Interest

Applications must be submitted via email only and by 29 January 2018. Please ensure that you use the words **'SBRI Challenge Fund Expression of Interest'** in the email subject box. Email applications must be sent to sbri@economy-ni.gov.uk

SBRI Challenge Fund Expression of Interest

1. organisation / department name and address

Organisation Name & Department	Education Authority Transport
Address	3 Charlemont Place, The Mall, Armagh
Postcode	BT61 9AX

Contact name in the organisation

Name	█████████████
Position	Assistant Director for Transport
Tel. Number	02837512535
E-mail	████████████████

2. Challenge Title:
See examples of current & past challenges

Developing EA Smart School Transport

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

The EA has stimulated the development of innovative solutions to enable delivery of safer and more efficient home-to-school transport in Northern Ireland through Phase 1.

The three solutions developed should address some or all of the following challenges.
- **Convenience for pupils / journey data capture**

- **Understanding usage patterns**
  It is envisaged that 'smart' solutions developed will facilitate data capture on each individual trip made by each pupil; recording for example:
  - pupil ID;
  - trip origin and destination locations; and
  - trip pick-up and set-down times.
  Data captured should be transferred securely for onward processing with minimal latency, subject to any constraints in mobile communications availability in some areas.

- **Improving fleet logistics**

  It is envisaged that 'smart' solutions developed may capture data on routes used and vehicle telematics and analyse such data appropriately to provide additional business intelligence to the EA.

  It is NOT a requirement of this competition to develop routing optimisation solutions. However, it would be desirable to understand how solutions developed could integrate with such in future.

- **Pupil safety & security**

  To enhance safety and security, 'smart' solutions may include (but not limited to):
  - messaging facility for pupils, parents, schools and staff as appropriate (e.g. to advise pupils/parents when a bus is not running to schedule);
  - alerts to appropriate persons if a pupil fails to board a service when expected to do so; and
  - other safety and security features that suppliers wish to propose.

  Vehicle telematics could also be analysed to enhance information of relevant aspects of pupil and staff safety while in transit.

- **Links to other providers**

- **Innovative solutions proposed should take account of the following:**
  - in addition to urban areas, proposed solutions sought will be required to perform in rural and relatively remote communities that presently experience variable access to mobile communications services. This will be important both to ensure equality and equity of service to all pupils irrespective of where they live – and to ensure that the benefits to the EA are not restricted to urban services only;
  - proposed solutions must comply with all data protection regulations, including new General Data Protection Regulations (GDPR). This is particularly the case where personal data in collected, transferred, processed and stored;
  - proposed solutions should demonstrate value-for-money and affordability to the authority (and to parents/pupils for solutions that rely on privately-owned devices);
  - proposed solutions should be suitable for use by pupils within the 4-18 school age range (including those with additional needs); and
  - proposed solutions should be operationally feasible (for example, not add significantly to vehicle dwell time at stops increasing average embark/dis-embark times).

EA would like to progress to Phase 2, following completion of Phase 1.

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4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation (250 words max)

- Capture patronage data, identify travel patterns and uptake of pupils across different age groups in order to help the EA provide efficient travel solutions that meet the needs of pupils and maximise the financial resources used for school transport.

- Benefit pupils by improving customer service and increase convenience/security (for example, by potentially removing the need for physical paper-based passes and be flexible to support future transport services designed to meet the evolving needs of pupils.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

We are not aware of any commercially available solution which would address all the challenges highlighted at 3.

6. Please provide an estimate of the amount of funding you require?

£400k - £450 k
Timescale possibly 18 months

7. Have you identified any potential partners or funders you are considering working with?
If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

From the three companies selected at Phase 1, it is currently anticipated that two would be considered suitable for Phase 2. However, this will be confirmed at the completion of Phase 1.

8. Please indicate the confidence of completing all agreed phases by 31st March 2019, including any work that may have taken place already which may help accelerate the timetable.
9. If the proposal is a Phase 2 project which will require funding support beyond 31 March 2019 please confirm organisational commitment to meet that resource and complete the project.

It is possible that Phase 2 may require a duration of 18 months which could be confirmed upon completion of Phase 1.

Expressions of Interest must be signed by:

(i)   the Lead Applicant
(ii) and, endorsed by a Director or equivalent senior representative from the applicant organisation

Signed	██████████████████
Date	29 January 2018
Lead Applicant Name	█████████
Position in Organisation	Assistant Director for Transport
Signed	████████████
Endorsed by	████████████
Position in Organisation	Director of Operations & Estates
Signed	
Endorsed by Sponsoring Department	
Position in Sponsoring Department	

Submission of Expressions of Interest

Applications must be submitted via email only and by 29 January 2018. Please ensure that you use the words 'SBRI Challenge Fund Expression of Interest' in the email subject box. Email applications must be sent to sbri@economy-ni.gov.uk

SBRI Government challenges.
Ideas from business.
Innovative solutions.

DfE
Department
for the Economy
www.economy-ni.gov.uk

SBRI Challenge Fund Expression of Interest – 2019/20

1. **Name**

   ▮▮▮▮▮▮▮▮▮▮

2. **Department/Arm's length body name & address**

   Education Authority, 40 Academy Street, Belfast BT1 2NQ

3. **Contact details**

   ▮▮▮▮▮▮▮▮▮▮▮▮▮▮

4. **Challenge title**

   School Bus Digital Travel Pass – Smart School Transport Project

5. **Briefly describe the challenge you would like to overcome**
   (Include policy context, technical and operational issues which you are seeking to address)

   The EA is a non-departmental body sponsored by the Department of Education, and in April 2015 replaced the five former Education and Library Boards.

   The EA is responsible for ensuring that efficient and effective primary and secondary education services are available to meet the needs of children and young people, and support the provision of efficient and effective youth services.

   Although parents are ultimately responsible for ensuring their children attend school, the EA has responsibility for providing assistance with home to school transport where a child meet certain eligibility criteria i.e. Living beyond a certain distance from school, or where they have special needs or where the walking route is deemed unsafe.

The EA currently provides about 80,000 (approximately a third of the school population) with transport assistance – either a place on the EA's own fleet, a Translink service or on a vehicle operated by a private contractor.

Currently, the EA operates a large fleet of more than 800 vehicles across Northern Ireland.

For the past 2 years the EA has been undergoing a process of transformation in its home to school transport services including:

- creating a GIS digital network of all EA bus routes, stop and journey information and making this available to parents online;
- a new digital channel offering parents the ability to apply for home to school transport assistance on line;
- unifying its transport data base, providing one single unified data base for the management and maintenance of the EA school bus fleet; and
- undertaking the SBRI Smart school bus project which utilises RfID, NFC and Biometric means to monitor pupils' boarding and alighting, ensuring the EA can monitor school bus service performance, loadings, and improve pupil safety.

The first phase was a short 3 month sprint, that demonstrated the potential of the prototype to be used on bus and by pupils. Three companies undertook the first Phase and two (Kinsetsu and Analytics Engines) successful moved to Phase II to allow for on bus and with pupil testing of the applications/operations.

Due to the limitations on time, the requirements of obtaining parental permissions and technical issues field testing during Phase II was limited to small geographic areas and a limited number of bus routes, and for a duration of only 2 weeks during November/December.

The EA would like to be in a position to move to procurement of a smart school bus solution in 2020/2021, however the technology requires additional field testing at scale to ensure that issues of:

- reliability (in a wide range of geographic and operating environments over a prolonged period of time)
- maintenance costs (on a range of fleet vehicles)
- acceptability (to maintenance staff, drivers, and pupils/parents and schools)
- cost (capital and operating)

can be established, and to enable the use of the technology to identify the potential for savings e.g. from fuel, improved vehicle utilisation etc can be assessed to build a business case to move to procurement. .

6. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through the adoption of innovative new approaches

A successful outcome from Phase III would be testing at a scale that provides the EA with the confidence that the solution(s) developed could be financially and operationally feasible to apply to the entire fleet, and would be acceptable and beneficial to pupils, parents, schools and EA transport staff in terms of improving the quality of service and safety of users.

7. Describe how the project aligns with the PfG (including the Industrial Strategy or Public Sector Reform)

This project aligns well with the EA's strategic priorities for the next 10 years, and with the Programme for Government, specifically:
- High quality public services – usage of on line channels to access public services
- Connecting people and opportunities through infrastructure including reducing average journey times

8. List potential partners or funders you plan to work with during the challenge and indicate if they have been contacted or involved in the submission. Indicate if they are willing to be involved in the project – if so, how

Potential partners include a number of primary, special and secondary schools across Northern Ireland. Several schools including St Catherine's, Armagh, Cookstown, Dungannon, Castle Tower, Rossmor, St Malachy's and others have already participated and indicated that they are willing to participate in the further and more extended trials.

9. Provide an estimate of the amount of funding you require for the entire project. Separate your estimates for what you for what you generally expect to provide during phase 1 prototyping and phase 2/3 development stages. Also, indicate the estimated length of each phase

A total of £150,000 excluding VAT is sought for Phase III for a period of 9 months (i.e. May 2019 to February 2020).

Expressions of Interest must be:
- (i) signed by the lead applicant;
- (ii) endorsed by a Director or equivalent senior representative from the applicant organisation; and,
- (iii) endorsed by parent department if applicant is an arm's length body

Lead applicant name █████████████████████████

Signed █████████████████████████

Position in organisation TRANSPORT MANAGER

Date 2603 19

Endorsed by █████████████████████

Position in organisation (at least SCS level) Acting Director QBS + Estates

If relevant, endorsed by Parent Department (SCS level) █████████████████████

DE Head of Home to School
Transport
Team.

Applications must be submitted via email to sbri@economy-ni.gov.uk Please ensure that you use the words 'SBRI Challenge Fund Expression of Interest' in the email subject box. The deadline for applications is 4pm on 5 April 2019.

On behalf of
█████████████████████████
█████████████████████████
█████████████████████████

SBRI Government challenges.
Ideas from business.
Innovative solutions.

DfE
Department
for the Economy
www.economy-ni.gov.uk

SBRI Challenge Fund Expression of Interest – 2019/20

1. **Name**

   Innovative solutions using *intelligent* crowd sourcing of question items to improve educational outcomes of pupils in Northern Ireland

2. **Department/Arm's length body name & address**

   CCEA

3. **Contact details**

   ▉▉▉▉▉▉▉▉▉▉
   CCEA Council for the Curriculum, Examinations and Assessment
   29 Clarendon Road, Clarendon Dock, Belfast. BT1 3BG.
   T.   +44 (0) 28 90 261230
   E.   ▉▉▉▉▉▉▉▉▉▉▉▉▉▉
   W.   www.ccea.org.uk

4. **Challenge title**

   Intelligent Crowd sourcing question items for post-primary examinations and assessment

5. **Briefly describe the challenge you would like to overcome**
   (Include policy context, technical and operational issues which you are seeking to address)

   There are currently more than 300,000 pupils in Northern Ireland's schools and further education colleges. Each summer CCEA marks over half a million GCSE and GCE examination scripts across a range of subjects (see http://ccea.org.uk/qualifications).

   As Northern Ireland's leading awarding body, CCEA offers a diverse range of

qualifications, including GCSEs, GCEs (AS and A levels), Entry Level Qualifications and Vocational Qualifications. Schools and colleges have a wide choice of qualification providers, but currently about 9 in 10 of the GCSEs taken in Northern Ireland are CCEA qualifications and its share of GCE entries has grown. CCEA is keen that this continues.

Educational questions for testing and examinations are currently developed by teachers, either in their own school or as part of assessment teams commissioned by CCEA.

Although this has been a long established and effective way of working, CCEA is seeking to expand the offer of valid and reliable question banks to teachers and schools/colleges, while maintaining standards and reducing the cost of the service.

There are informal online engines to support teachers, but CCEA requires a tool that provides the **level of security, workflow and control suitable** for state public examinations. However, it is thought that technology provides an opportunity to develop questions in a 'crowd-sourced' manner.

This would increase available question items for examinations and assessment, potentially increase the quality of questioning in schools and reduce cost. Such tool(s) would be expected to have wide/global market interest, particularly in subjects that are common across National Curricula.

6. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through the adoption of innovative new approaches

Initially, CCEA sought a crowd sourcing solution only with the focus of the challenge being to increase the supply of question items for examinations and assessment, using the power of crowd sourcing to generate a wider pool of potential educational authors and items.

However, in response to the invitation to tender other solutions were proposed, including using AI (Artificial Intelligence) to improve the quality assurance of examination questions. The concept for both solutions was therefore tested at Phases I and II.

Phases I and II showed that the concept of a crowd sourcing platform is feasible to source examination questions. However, there is a need, through further testing, to explore the acceptability and user experience (including arrangements for payment) with potential question authors.

Phases I and II have also demonstrated the concept of an AI tool that can automate the process of identifying 'good' and 'bad' exam questions. This could potentially reduce the time involved in checking questions and also improve the standard of questions (including grammar, spelling, syntax, balance and consistency) and remove bias in examination papers. To date, this has been

tested with only one subject (Biology).

A further phase of extended testing is required. This will include:

- reducing the time to create examination papers by preparing the first draft;
- enabling focus of 'human' time to be on the most creative element of the process;
- leveraging the best available questions;
- assembling an appropriate range of questions;
- positioning the questions in order of 'difficulty' & 'cognitive level';
- achieving balance of specification & question type; and
- critically for CCEA, the need to have detailed quality assurance processes to ensure question validity and reliability.

In addition, a third phase is required to enable automatic evaluation of question items benchmarking against human performance to ascertain the level of reliability, and to demonstrate the ability to provide effective feedback to examiners during the question creation and refinement process using data analysis on performance to identify and support future training needs.

This would be the third phase of an existing SBRI that has shown considerable promise, but has not yet reached the point where the contractors would be able to self-fund the remaining work to reach the stage of commercialisation.

The AI element of the work, enabling evaluation and analysis of questions submitted to the crowd sourcing platform, has emerged as an area of considerable innovation. This is an area where further development and CCEA input will be crucial to train the AI systems for a wider range of subjects.

7. Describe how the project aligns with the PfG (including the Industrial Strategy or Public Sector Reform)

The relevant key indicator is:

- PfG - Give our young people and children the best start in life.
- Supporting public sector Digital Transformation of Education sector.
- Upskilling the educational workforce, supporting improvements to education service to our learners.
- Developing private sector partners to support the needs of the education sector, while growing their businesses.
- Reducing costs while improving quality.

8. List potential partners or funders you plan to work with during the challenge and indicate if they have been contacted or involved in the submission. Indicate if they are willing to be involved in the project – if so, how

Partners

School partners and C2K setting for user testing

CCEA Examiners as key users of the service

Other awarding bodies who may wish to commission use of the service

All partners have been involved in phase I and II and continue to have interest in this project developing.

9. Provide an estimate of the amount of funding you require for the entire project. Separate your estimates for what you for what you generally expect to provide during phase 1 prototyping and phase 2/3 development stages. Also, indicate the estimated length of each phase

- Phase III would require a period of comprehensive testing and evaluation of the AI engine and user testing of crowd sourcing application with examiners leading to final development of and integration with each application.

- Duration would be from April 2019 – March 2020.

- An estimate of the required cost is £150,000.00 (excluding VAT).

Expressions of Interest must be:
- (i)   signed by the lead applicant;
- (ii)   endorsed by a Director or equivalent senior representative from the applicant organisation; and,
- (iii)   endorsed by parent department if applicant is an arm's length body

Lead applicant name

Signed

Position in organisation   Business Manager

Date   22.03.19

Endorsed █████████████████████████

Position in organisation (at least SCS level) *Chief Executive.*

If relevant, endorsed by Parent Department (SCS level)

Applications must be submitted via email to sbri@economy-ni.gov.uk Please ensure that you use the words 'SBRI Challenge Fund Expression of Interest' in the email subject box. The deadline for applications is **4pm on 5 April 2019.**

SBRI Challenge Fund Application 2017/18

1. Applicant organisation / department name and address

Organisation Name & Department	Business Services Organisation Operations Directorate
Address	Franklin Street, Belfast.
Postcode	BT2 8DQ

Contact name in the organisation

Name	███████████████
Position	SBRI Executive
Tel. Number	███████████
E-mail	████████████████████

2. Challenge Title:

See examples of current & past challenges https://sbri.innovateuk.org/competitions

Project 'GEMS' - Gestational, Type 1 and Type 2 Diabetes Empowering Mothers through Mobile TechnologieS (GEMS)

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

There has been an unprecedented growth in the number of women experiencing diabetic pregnancy over the last 10-15 years; 12-fold increase in the number of women with GDM since 2000/01. Diabetic pregnancy or diabetes in pregnancy refers to women experiencing diabetes during pregnancy as a result of:
- Pre-existing type 1 diabetes
- Pre-existing type 2 diabetes
- Gestational diabetes mellitus (GDM), which is generally diagnosed around 26-28 weeks gestation following a glucose tolerance test.

This challenge is the rising demand for specialist diabetes maternity services and through SBRI seeks innovative solutions that achieve both quality and efficiency improvements.

The long term chronic affect associated with diabetes, as well as the high risk nature of diabetic pregnancy for maternal child health is well documented and efforts to address diabetes are essential.

The increase in diabetic pregnancy is particularly due to an escalation in the incidence of GDM. 15-years ago diabetic pregnancy was an uncommon event, affecting few women with limited consequent demands on health services. However, the increase in the incidence of GDM, primarily as a result of:

- Increased obesity in women of childbearing age
- Increasing maternal age as a result of women delaying pregnancy
- Changes in screening criteria and diagnostic thresholds.

Type 2 diabetes is also becoming more common in women of child bearing age with the prevalence of both obesity and diabetes continuing to increase, so too will the prevalence of diabetes in pregnancy

The challenge of diabetic pregnancy extends beyond health risks to mother and child to health care services and the economy, all of which are underpinning the need for the GEM.

There is a higher risk of adverse pregnancy outcomes. The risks to the mother include:

- miscarriage
- still birth
- obstructed labour
- pre-eclampsia
- pre-term labour
- worsening retinopathy in women with pre-existing diabetes
- increased hospital admission
- increased rates of caesarian section (60.1% according to UK figures, compared to 26.2% across the general UK population)
- development of type 2 diabetes in later life in women with GDM (approximately half of women with a history of GDM go on to develop type 2 diabetes within five to ten years after delivery, yet many feel unsupported after pregnancy).

The additional risks for the infant include:

- congenital malformations
- birth injury as a result of macrosomia (birth weight >4.5Kgs)
- higher perinatal mortality rate
- post-natal adaptation issues e.g. hypoglycaemia
- a higher prevalence of overweight and obesity
- higher risk of developing type 2 diabetes later in life.

Diabetic pregnancy shifts the focus from a woman-led and empowered experience, to a medically managed pregnancy, requiring:

- regular attendance at specialist clinics – necessitating additional time off work/ child care & travel
- invasive/ finger prick monitoring of blood glucose levels 7-8 times/ day during pregnancy
- making lifestyle changes e.g. diet/ exercise
- Taking regular medication (oral and/or insulin injections).

For newly diagnosed with GDM, this can signify a profound change in their approach to pregnancy and cause considerable amounts of stress.

Despite this evidence, the International Diabetes Federation reports that GDM remains a neglected maternal health issue among policy makers.

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation (250 words max)

Impact/ Outcomes

SBRI provides a unique opportunity to develop cutting edge, innovative solutions targeted at the improved management of diabetic pregnancy. GEM seeks to drive the development of innovative ICT based solutions that empower women experiencing diabetic pregnancy to better manage their disease in the community. By focusing upon this critical patient group, GEMS will:

- enable women experiencing diabetic pregnancy to take control of their disease, better adhere to their treatment and contribute to increased effectiveness of interventions
- reduce pressure on under-strain health care services, including maternity, neonatal and endocrinology services
- support a continuum of care for diabetes services
- improve the lives and health outcomes of these women during pregnancy, as well as their infants
- enable women to lead as normal a life as possible, manage work and care responsibilities and reduce need for travel to specialist clinics.

These solutions have the potential to:

- transform the delivery of services for women experiencing diabetic pregnancy
- empower women to better manage their condition
- create economic benefits
- whilst at the same time posing no risk to either maternal or child health.

By considering these issues and addressing the deficits through the GEMS the development of solutions to revolutionise care for women experiencing diabetic pregnancy – improving their personal experience, as well as changing the way diabetic pregnancy services are delivered and run, thereby delivering both a quality and financial impact. Involvement of pregnant women and clinicians in the development of the technologies will be critical at all phases of the SBRI.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

Preliminary analysis of the state-of-the-art identified a range of solutions but with major shortcomings when compared to needs:

- Solutions are for general population diabetics not during pregnancy
- Current diabetic pregnancy solutions focus upon educating and empowering women but few actively reduce service demands
- Many monitoring solutions require women to monitor their blood glucose levels invasively (finger prick).
- Lack of outcome evidence, which will lead to changes practice.
- Piecemeal technology provision is lacking a coherent cohesive approach
- Many of the technologies make unqualified assumptions about network coverage
- R&D providers cannot assume digital literacy
- R&D providers cannot assume availability of latest technology, i.e. access to the most up-to-date smart phone.
- Habitualisation to alerts from patients' technology monitoring devices leading to a lack of response
- Data collected outside of the system by the public does not feed into patient records.
- Inconsistency in the quality of data received from multiple devices.
- Device approval process

6. Please provide an estimate of the amount of funding you require?

PLEASE NOTE:

This Proposal was approved for funding in the 2016/17 SBRI Challenge Fund Scheme but did not proceed as it was hoped that it would be awarded funds through the EC's 2016 Horizon 2020 Programme. However, whilst the proposal was evaluated favourably by international assessors and recommended for funding it could not proceed under the international Pre-Commercial Procurement scheme as there were insufficient funds within the Horizon 2020 programme. Therefore, given the existing commendations and continued Consultant Physician support, GEMS is being proposed again for a Phase 1 SBRI.

To operate the Phase 1 – direct SBRI cost of innovation would be to appoint up to 5 companies with awards of up to £60,000 for a contract period of 6-months against a total budget of £300,000

The total cost of the Phase 1 SBRI for GEM is £300,000.

OVERALL CONTRACT VALUE

PROPOSAL	PHASE	Number of Suppliers	Max Contract Value per supplier	Max Invoice Value 2017 per supplier	Max Invoice Value 2018 per supplier
GEMS	1	5	£ 60,000.00	£ 60,000.00	£ -

OVERALL SBRI FUND REQUIRED
FOR SUPPLIERS

PROPOSAL	PHASE	Number of Suppliers	Total SBRI Fund Required	SBRI Fund 2017/18	SBRI Fund 2018/19
GEMS	1	5	£ 300,000.00	£ 300,000.00	£ -

7. Have you identified any potential partners or funders you are considering working with? If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

It is proposed that GEMS is the first cross-border SBRI and has received much support. The clinical partner will be Professor Fidelma Dunn based in Galway University Hospital and it is anticipated that Enterprise Ireland will be the co-funder. Up to 23:05:17 it is understood that Enterprise Ireland have approved the funding in principle and have sought permission from their Department to proceed.

Professor Fidelma Dunne Galway University Hospitals	Clinical lead working closely with Dr David McCance RVH Maternity and the NI Diabetes in Pregnancy Clinical Network.	Republic of Ireland	fidelma.dunne@nuigalway.ie

█████████ Enterprise Ireland, would be supportive and has given a verbal undertaking to co-fund the call for the HSE. In turn this should enable a shared call, issued by BSO, to have 'go to' clinicians from across the island of Ireland participate.

8. Please indicate the confidence of completing Phase 1 by 31st March 2018, including any work that may have taken place already which may help accelerate the timetable?

9. If the proposal is a Phase 2 project which will require funding support beyond 31 March 18 please confirm organisational commitment to meet that resource and complete the project .

Engagement with the five Trust lead endocrinologists specialising in care of the diabetic patient within pregnancy have resulted in the drafting the narrative to describe the service difficulties, understand the complexity of the issues to be addressed and clear articulation of the problem in preparation of the call contract suite. Moreover, the individual experiences of pregnant woman with diabetes have been captured to bring to life the patient centric understanding of the 'issue to be addressed through SBRI. The Directorate Legal Service BSO have already prepared SBRI suite templates and the completion of a set of tender documents specifically designed for SBRI GEM would be undertaken promptly. Therefore, following approval to proceed the SBRI call could go out to the market within 4-6-weeks.

It is anticipated that the call will be open for an 8-week period followed by local adjudication. The contract start dates will be set as soon as possible but no later than 1st November to ensure a full Phase 1 SBRI will be undertaken with 95% of funds paid to suppliers in 2017/18 and 5% accrued to end of 6th-month. However, if it is possible to start on 1st October then 100% of funds will be paid to
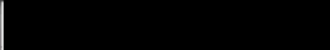
suppliers in 2017/18.

During month-5, in addition to monthly monitoring, the successful suppliers will be expected to make a formal presentation to the SBRI project Board. This will enable decision making vis-à-vis the need or otherwise to seek a Phase 2 project.

In summary, the effort being focused towards this project at present will ensure the execution of a full SBRI Phase 1 during the financial year.

Applications must be signed by:

(i)   **the Lead Applicant**
(ii)   **and, endorsed by a Director or equivalent senior representative from the applicant organisation**

Signed	███████████████████
Date	25:05:16
Lead Applicant Name	████████████
Position in Organisation	SBRI Executive
Endorsed by	██████
Position in Organisation	Director Operations

Submission of Applications

Applications must be submitted via email only and by 7 June 2017. Please ensure that you use the words 'SBRI Challenge Fund Application' in the email subject box. Email applications must be sent to sbri@economy-ni.gov.uk

SBRI Challenge Fund Application 2018/19

1. Applicant organisation / department name and address

Organisation Name & Department	Business Services Organisation Operations Directorate
Address	Franklin Street, Belfast.
Postcode	BT2 8DQ

Contact name in the organisation

Name	████████████████
Position	SBRI Executive
Tel. Number	████████████████
E-mail	████████████████

2. Challenge Title:
See examples of current & past challenges https://sbri.innovateuk.org/competitions

Project '**GEMS**' - **G**estational, Type 1 and Type 2 Diabetes **E**mpowering **M**others through Mobile Technologie**S** (GEMS)

3. Briefly describe the public sector challenge that you would like to overcome? (inc. Policy context, technical and/or operational issues which you are seeking to address)
(500 words max)

There has been an unprecedented growth in the number of women experiencing diabetic pregnancy over the last 10-15 years; 12-fold increase in the number of women with GDM since 2000/01. Diabetic pregnancy or diabetes in pregnancy refers to women experiencing diabetes during pregnancy as a result of:

- Pre-existing type 1 diabetes
- Pre-existing type 2 diabetes
- Gestational diabetes mellitus (GDM), which is generally diagnosed around 26-28 weeks gestation following a glucose tolerance test.

This challenge is the rising demand for specialist diabetes maternity services and through SBRI seeks innovative solutions that achieve both quality and efficiency improvements.

The long term chronic affect associated with diabetes, as well as the high risk nature of diabetic pregnancy for maternal child health is well documented and efforts to address diabetes are essential.

The increase in diabetic pregnancy is particularly due to an escalation in the incidence of GDM. 15-years ago diabetic pregnancy was an uncommon event, affecting few women with limited consequent demands on health services. However, the increase in the incidence of GDM, primarily as a result of:

- Increased obesity in women of childbearing age
- Increasing maternal age as a result of women delaying pregnancy
- Changes in screening criteria and diagnostic thresholds.

Type 2 diabetes is also becoming more common in women of child bearing age with the prevalence of both obesity and diabetes continuing to increase, so too will the prevalence of diabetes in pregnancy

The challenge of diabetic pregnancy extends beyond health risks to mother and child to health care services and the economy, all of which are underpinning the need for the GEM.

There is a higher risk of adverse pregnancy outcomes. The risks to the mother include:
- miscarriage
- still birth
- obstructed labour
- pre-eclampsia
- pre-term labour
- worsening retinopathy in women with pre-existing diabetes
- increased hospital admission
- increased rates of caesarian section (60.1% according to UK figures, compared to 26.2% across the general UK population)
- development of type 2 diabetes in later life in women with GDM (approximately half of women with a history of GDM go on to develop type 2 diabetes within five to ten years after delivery, yet many feel unsupported after pregnancy).

The additional risks for the infant include:
- congenital malformations
- birth injury as a result of macrosomia (birth weight >4.5Kgs)
- higher perinatal mortality rate
- post-natal adaptation issues e.g. hypoglycaemia
- a higher prevalence of overweight and obesity
- higher risk of developing type 2 diabetes later in life.

Diabetic pregnancy shifts the focus from a woman-led and empowered experience, to a medically managed pregnancy, requiring:
- regular attendance at specialist clinics – necessitating additional time off work/ child care & travel
- invasive/ finger prick monitoring of blood glucose levels 7-8 times/ day during pregnancy
- making lifestyle changes e.g. diet/ exercise
- Taking regular medication (oral and/or insulin injections).

For newly diagnosed with GDM, this can signify a profound change in their approach to pregnancy and cause considerable amounts of stress.

Despite this evidence, the International Diabetes Federation reports that GDM remains a neglected maternal health issue among policy makers.

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4. **Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation**
   (250 words max)

Impact/ Outcomes

SBRI provides a unique opportunity to develop cutting edge, innovative solutions targeted at the improved management of diabetic pregnancy. GEM seeks to drive the development of

innovative ICT based solutions that empower women experiencing diabetic pregnancy to better manage their disease in the community. By focusing upon this critical patient group, GEMS will:

- enable women experiencing diabetic pregnancy to take control of their disease, better adhere to their treatment and contribute to increased effectiveness of interventions
- reduce pressure on under-strain health care services, including maternity, neonatal and endocrinology services
- support a continuum of care for diabetes services
- improve the lives and health outcomes of these women during pregnancy, as well as their infants
- enable women to lead as normal a life as possible, manage work and care responsibilities and reduce need for travel to specialist clinics.

These solutions have the potential to:
- transform the delivery of services for women experiencing diabetic pregnancy
- empower women to better manage their condition
- create economic benefits
- whilst at the same time posing no risk to either maternal or child health.

By considering these issues and addressing the deficits through the GEMS the development of solutions to revolutionise care for women experiencing diabetic pregnancy – improving their personal experience, as well as changing the way diabetic pregnancy services are delivered and run, thereby delivering both a quality and financial impact. Involvement of pregnant women and clinicians in the development of the technologies will be critical at all phases of the SBRI.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

Preliminary analysis of the state-of-the-art identified a range of solutions but with major shortcomings when compared to needs:
- Solutions are for general population diabetics not during pregnancy
- Current diabetic pregnancy solutions focus upon educating and empowering women but few actively reduce service demands
- Many monitoring solutions require women to monitor their blood glucose levels invasively (finger prick).
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- R&D providers cannot assume availability of latest technology, i.e. access to the most up-to-date smart phone.
- Habitualisation to alerts from patients' technology monitoring devices leading to a lack of response
- Data collected outside of the system by the public does not feed into patient records.
- Inconsistency in the quality of data received from multiple devices.
- Device approval process

6. Please provide an estimate of the amount of funding you require?

PLEASE NOTE:
This Proposal was approved for funding in the 2017/18 SBRI Challenge Fund Scheme and has been evaluated to have been very successful with much Consultant Medical Staff support and enthusiasm from the wider clinical teams. Therefore, it is proposed that GEMS Phase 2 Commence early in 2018/19 and run for 18-months,
The total cost of the Phase 2 SBRI for GEM is £500,000.
OVERALL CONTRACT VALUE

PROPOSAL	PHASE	Number of Suppliers	Max Contract Value per supplier	Max Invoice Value 2018/19 per supplier	Max Invoice Value 2019/20 per supplier
GEMS	2	2	£ 250,000	£ 200,000.00	£ - 50,000

7. Have you identified any potential partners or funders you are considering working with?
If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

Not for Phase 2

8. Please indicate the confidence of completing Phase 1 by 31st March 2018, including any work that may have taken place already which may help accelerate the timetable?
9. If the proposal is a Phase 2 project which will require funding support beyond 31 March 19 please confirm organisational commitment to meet that resource and complete the project .

The Call for Tender (CfT) narrative was originally created for Phase 1 which will complete by 31:03:18. Therefore, all the CfT material has been prepared and can be issued as soon as instructed. As Phase 2 will be a closed tender limited to the successful three Phase 1 Suppliers, the procurement process will be executed within a very short timeframe and it is anticipated that contracts can be issued within two-months.

In order to cover additional hardware and research governance field trial costs each of the two suppliers will receive £200,000 of their bid price in 2018/19 with the residual contract value to be paid in 2019/20. As this is a Phase 2 project with the complexity of a field trial in a clinical environment all necessary ethical/ research governance approvals and controls must

be in place and so 18-month Phase 2 will be essential to enable utility to be tested. This leaves a maximum revenue requirement in 2019/20 of £100,000 (i.e. up to £50,000 per supplier) for GEMS and the Department of Health is committed to funding this revenue tail.

Applications must be signed by:
- (i) the Lead Applicant
- (ii) and, endorsed by a Director or equivalent senior representative from the applicant organisation

Signed	████████████████████
Date	11:01:18
Lead Applicant Name	████████████
Position in Organisation	SBRI Executive
Endorsed by	██████████
Position in Organisation	Director Operations

Submission of Applications

Applications must be submitted via email only and by 29 January 2018. Please ensure that you use the words 'SBRI Challenge Fund Expression of Interest' in the email subject box. Email applications must be sent to sbri@economy-ni.gov.uk

SBRI Challenge Fund Application 2017/18

1. Applicant organisation / department name and address	
Organisation Name & Department	Business Services Organisation Operations Directorate
Address	Franklin Street, Belfast.
Postcode	BT2 8DQ

Contact name in the organisation	
Name	███████████████
Position	SBRI Executive
Tel. Number	███████████
E-mail	████████████████████

2. Challenge Title:

See examples of current & past challenges https://sbri.innovateuk.org/competitions

Project 'FAST' - Automated Staff Deployment

PHASE 2

To develop an automated solution for the deployment of pharmacy staff at ward level consistent with patient medicines optimisation.

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

Medicines are the most common medical interventions used in the health service with an annual expenditure in Northern Ireland of the order £550 million. However evidence has demonstrated that there is significant variance in best practice relating to the appropriate safe and effective use of medicines, with many people not taking their medicines as prescribed with resultant sub-optimal health outcomes.

To this end medicines optimisation being defined by National Institute for Health and Care Excellence (NICE) as "a person centred approach to safe and effective medicines use to ensure that people obtain the best possible outcomes from their medicine" is a key policy imperative for DoH.

In relation to secondary care there has been significant work undertaken with regard to the re-engineering of pharmacy services over the last fifteen years. This change has led to significant improvements in patient care for example reduced length of stay, reduced admission rates, improved medicines appropriateness, faster discharge, reduced medicines administration error rate and reduced risk adjusted mortality index.

This has been achieved by the increased presence of both pharmacists and pharmacy technicians at ward level, that is patient facing services.

The importance of this service provision has been highlighted in the Carter Report (February 2016) emphasising the need to ensure that such an optimised system be in place.

However, one of the key difficulties has been the quantification of this service in terms of the metrics that would robustly define this service but also the need to base the staffing requirements on a patient centred basis. In addition, there is a need to ensure optimal skill-mix to deliver the requisite patient services with both optimised inputs and outcomes for patients and resource utilisation.

In this regard, the Carter Report highlighted the importance of e-rostering as a tool, and whilst this is widely available with regards to nursing, this is not the case with regard to pharmacy services. This is due to the fact that the basic information necessary to achieve the optimal medicines system has not been available. Thus, the purpose of the proposal is to develop a staff deployment system for patient facing clinical pharmacy services.

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation (250 words max)

The outcome of the availability of such a tool would be to optimise the inputs in terms of pharmacy staffing that is both pharmacists and pharmacy technicians. This would therefore enable a seven-day week service to be provided by ensuring that the requisite number of staff with the requisite skill sets would be available to meet both patient and other healthcare professional's needs at the appropriate time.

This will therefore lead to improved productivity with regard to the process of clinical pharmacy service provision whilst maintaining the requisite outcomes in respect of optimising medicines use by patients. This will therefore improve overall health care resource utilisation associated with sub-optimal medicine use such as more adverse effects and greater length of stay, higher readmission rate and higher medicines costs.

Three suppliers were awarded Phase 1 contracts in 2016/17. The five Health & Social Care Trusts enabled meaningful technology development within the 'real-world' environment rather than the suppliers developing the solutions in isolation; with 2 Trusts acting as host organisations. Co-creation enabled three very different data analytics tools to be developed, all of which have the potential to solve critical staff deployment and acute hospital patient flow issues. The SBRI has been very carefully monitored and assessed and is deemed a success by officers from the Trusts, BSO, DoH,

InvestNI and DfE and there is a consensus that the data analytics tools developed require further testing through 'live' data field trials; shows promise vis-à-vis revolutionising data utilisation, staff deployment and patient management.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

Prior to issuing the Small-Digital SBRI Call for Tender with FAST Phase 1 it was known that some e-rostering technologies were available to address particular dimensions of the problem but no technology was commercially available to address the issues articulated. Through Phase 1, three suppliers developed novel data mining technologies through to prototype and conducted early proof of concept testing. Each of the three suppliers worked with designated 'go to' Pharmacists based in one of two Trusts; three very different solutions emerged. All technologies are promising and the Trusts are certainly keen to enable field trial testing to ensure the most effective solutions are created and taken to a market ready stage.

6. Please provide an estimate of the amount of funding you require?

The Small Digital SBRI Fund for Phase 1 was £141,000 to appoint up to 3 companies with awards of up to £47,000 for a contract period of 6-months.

In Phase 1 FAST, there was a residual 'tail' of £7,000 to be paid in June 2018 on completion of FAST Phase 1.

The Phase 2 project will require £200,000 to enable up to two suppliers awards of up to £100,000 each for the 12-month Field Trial.

The total cost of the Phase 2 SBRI for FAST is £200,000

OVERALL CONTRACT VALUE

PROPOSAL	PHASE	Number of Suppliers	Max Contract Value per supplier	Max Invoice Value 2017 per supplier	Max Invoice Value 2018 per supplier
FAST	2	2	£ 100,000.00	£ 50,000.00	£ 50,000.00

OVERALL SBRI FUND REQUIRED FOR SUPPLIERS

PROPOSAL	PHASE	Number of Suppliers	Total SBRI Fund Required	SBRI Fund 2017/18	SBRI Fund 2018/19
FAST	2	2	£ 200,000.00	£ 100,000.00	£ 100,000.00

7. Have you identified any potential partners or funders you are considering working with? If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

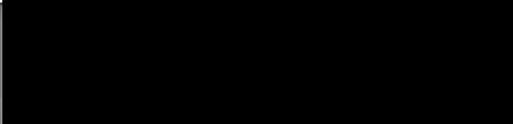None for this SBRI proposal

8. Please indicate the confidence of completing all agreed phases by 31st March 2018, including any work that may have taken place already which may help accelerate the timetable.

9. If the proposal is a Phase 2 project which will require funding support beyond 31 March 18 please confirm organisational commitment to meet that resource and complete the project.

The FAST Phase 1, Call for Tender (CfT) narrative was originally created through exploratory work led by Professor Mike Scott, MOIC, Northern Health & Social Care Trust. Therefore, all the CfT Phase 2 material has been prepared and can be issued as instructed at the beginning of August 2017. As Phase 2 will be a closed tender limited to the successful three Phase 1 Suppliers, the procurement process will be executed within a very short timeframe and it is anticipated that contracts can be issued within two-months.

In order to cover additional hardware and research governance field trial costs each of the two suppliers will receive £50,000 of their bid price in 2017/18 with the residual contract value to be paid in 2018/19. As this is a Phase 2 project with the complexity of a field trial in a clinical environment all necessary ethical and data governance approvals and controls must be in place and so 18-month Phase 2 will be essential to enable utility to be tested. This leaves a maximum revenue requirement in 2018/19 of £100,000 for FAST and the Department of Health is committed to funding this revenue tail.

Applications must be signed by:	
(i) **the Lead Applicant** (ii) **and, endorsed by a Director or equivalent senior representative from the applicant organisation**	
Signed	███████████████████████
Date	25:05:17
Lead Applicant Name	████████████
Position in Organisation	SBRI Executive
Endorsed by	██████████
Position in Organisation	Director Operations

Submission of Applications

Applications must be submitted via email only and by 7 June 2017. Please ensure that you use the words **'SBRI Challenge Fund Application'** in the email subject box. Email applications must be sent to sbri@economy-ni.gov.uk

SBRI Challenge Fund Application 2018/19

1. Applicant organisation / department name and address	
Organisation Name & Department	Business Services Organisation Operations Directorate
Address	Franklin Street, Belfast.
Postcode	BT2 8DQ

Contact name in the organisation	
Name	█████████████████
Position	SBRI Executive
Tel. Number	██████████████
E-mail	███████████████████

2. Challenge Title:
See examples of current & past challenges https://sbri.innovateuk.org/competitions

Project 'FAST' - **Automated Staff Deployment**

PHASE 2

To develop an automated solution for the deployment of pharmacy staff at ward level consistent with patient medicines optimisation.

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

Medicines are the most common medical interventions used in the health service with an annual expenditure in Northern Ireland of the order £550 million. However evidence has demonstrated that there is significant variance in best practice relating to the appropriate safe and effective use of medicines, with many people not taking their medicines as prescribed with resultant sub-optimal health outcomes.

To this end medicines optimisation being defined by National Institute for Health and Care Excellence (NICE) as "a person centred approach to safe and effective medicines use to ensure that people obtain the best possible outcomes from their medicine" is a key policy imperative for DoH.

In relation to secondary care there has been significant work undertaken with regard to the re-engineering of pharmacy services over the last fifteen years. This change has led to significant improvements in patient care for example reduced length of stay, reduced admission rates, improved medicines appropriateness, faster discharge, reduced medicines administration error rate and reduced risk adjusted mortality index.

This has been achieved by the increased presence of both pharmacists and pharmacy technicians at ward level, that is patient facing services.

The importance of this service provision has been highlighted in the Carter Report (February 2016) emphasising the need to ensure that such an optimised system be in place.

However, one of the key difficulties has been the quantification of this service in terms of the metrics that would robustly define this service but also the need to base the staffing requirements on a patient centred basis. In addition, there is a need to ensure optimal skill-mix to deliver the requisite patient services with both optimised inputs and outcomes for patients and resource utilisation.

In this regard, the Carter Report highlighted the importance of e-rostering as a tool, and whilst this is widely available with regards to nursing, this is not the case with regard to pharmacy services. This is due to the fact that the basic information necessary to achieve the optimal medicines system has not been available. Thus, the purpose of the proposal is to develop a staff deployment system for patient facing clinical pharmacy services.

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation (250 words max)

The outcome of the availability of such a tool would be to optimise the inputs in terms of pharmacy staffing that is both pharmacists and pharmacy technicians. This would therefore enable a seven-day week service to be provided by ensuring that the requisite number of staff with the requisite skill sets would be available to meet both patient and other healthcare professional's needs at the appropriate time.

This will therefore lead to improved productivity with regard to the process of clinical pharmacy service provision whilst maintaining the requisite outcomes in respect of optimising medicines use by patients. This will therefore improve overall health care resource utilisation associated with sub-optimal medicine use such as more adverse effects and greater length of stay, higher readmission rate and higher medicines costs.

Three suppliers were awarded Phase 1 contracts in 2016/17. The five Health & Social Care Trusts enabled meaningful technology development within the 'real-world' environment rather than the suppliers developing the solutions in isolation; with 2 Trusts acting as host organisations. Co-creation enabled three very different data analytics tools to be developed, all of which have the potential to solve critical staff deployment and acute hospital patient flow issues. The SBRI has been very carefully monitored and assessed and is deemed a success by officers from the Trusts, BSO, DoH,

InvestNI and DfE and there is a consensus that the data analytics tools developed require further testing through 'live' data field trials; shows promise vis-à-vis revolutionising data utilisation, staff deployment and patient management.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

Prior to issuing the Small-Digital SBRI Call for Tender with FAST Phase 1 it was known that some e-rostering technologies were available to address particular dimensions of the problem but no technology was commercially available to address the issues articulated. Through Phase 1, three suppliers developed novel data mining technologies through to prototype and conducted early proof of concept testing. Each of the three suppliers worked with designated 'go to' Pharmacists based in one of two Trusts; three very different solutions emerged. All technologies are promising and the Trusts are certainly keen to enable field trial testing to ensure the most effective solutions are created and taken to a market ready stage.

6. Please provide an estimate of the amount of funding you require?

The funding history for Phases 1 & 2 FAST is as follows:

The Small Digital SBRI Fund for Phase 1 was £141,000 to appoint up to 3 companies with awards of up to £47,000 for a contract period of 6-months.

In Phase 1 FAST, there was a residual 'tail' of £7,000 to be paid in June 2018 on completion of FAST Phase 1.

The Phase 2 project will require £200,000 to enable up to two suppliers awards of up to £100,000 each for the 12-month Field Trial.

The total cost of the Phase 2 SBRI for FAST is £200,000

OVERALL CONTRACT VALUE

PROPOSAL	PHASE	Number of Suppliers	Max Contract Value per supplier	Max Invoice Value 2017 per supplier	Max Invoice Value 2018 per supplier
			£	£	£
FAST	2	2	100,000.00	50,000.00	50,000.00

OVERALL SBRI FUND REQUIRED FOR SUPPLIERS

PROPOSAL	PHASE	Number of Suppliers	Total SBRI Fund Required	SBRI Fund 2017/18	SBRI Fund 2018/19

			£	£	£
FAST	2	2	200,000.00	100,000.00	100,000.00

The funding required for Phases 2 FAST on 2018/19 is as follows:

PROPOSAL	PHASE	Number of Suppliers	Total SBRI contract value/ supplier for 2018/19		SBRI Fund 2018/19
FAST	2 (2nd financial year)	2	£ 50,000.00		£ 100,000.00

7. **Have you identified any potential partners or funders you are considering working with?** If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

None for this SBRI proposal

8. Please indicate the confidence of completing all agreed phases by 31st March 2018, including any work that may have taken place already which may help accelerate the timetable.
9. If the proposal is a Phase 2 project which will require funding support beyond 31 March 18 please confirm organisational commitment to meet that resource and complete the project .

The 2018/19 resource requirement to complete the Phase 2 FAST SBRI Project is £100,000.

This is a Phase 2 SBRI and will be completed by 31:03:19 and so there will not be a revenue requirement for financial year 2019/20

Applications must be signed by:	
(i) the Lead Applicant	
(ii) and, endorsed by a Director or equivalent senior representative from the applicant organisation	

Signed	███████████████
Date	17:01:18
Lead Applicant Name	████████████
Position in Organisation	SBRI Executive
Endorsed by	████████
Position in Organisation	Director Operations

Submission of Applications

Applications must be submitted via email only and by 29 January 2018. Please ensure that you use the words 'SBRI Challenge Fund Expression of Interest' in the email subject box. Email applications must be sent to sbri@economy-ni.gov.uk

SBRI Challenge Fund Application

1. Applicant organisation / department name and address

Organisation Name & Department	Business Services Organisation Operations Directorate
Address	Franklin Street, Belfast.
Postcode	BT2 8DQ

Contact name in the organisation

Name	███████████████
Position	SBRI Executive
Tel. Number	███████████████
E-mail	███████████████

2. Challenge Title:
See examples of current & past challenges https://sbri.innovateuk.org/competitions

Project 'HOME' - Home Medication Management for the Elderly to Support Domiciliary Care Services

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

The DHSSPS currently has identified a number of key strategic priorities to be taken forward by a strategic leadership group chaired by the permanent secretary. One of the objectives set for this group is to, "Consider progress on HSCB Domiciliary Care Review and the Departmental Review of Adult Social Care and assess sustainability of current domiciliary care, maximising potential of SDS and agree and implement any necessary strategic actions."

Transforming Your Care Section 8 sets out the growing demand for domiciliary care in the context of

demographic challenge and citizen expectation to be able to receive care and support whenever possible at home. The Department of Health, Social Care & Public Safety is undertaking a process to reform Adult Social Care; domiciliary care will constitute a work stream within this process and the HSCB have published a review of domiciliary care. There are several local policy developments that indicate the emphasis upon Domiciliary Care and future of Adult Social Care; including *Transforming Your Care*, (DHSSPS, 2011), a consultative document (DHSSPS, 2012a) and, most recently, a post consultation report. (HSCB, 2013) A separate brief discussion paper *Who cares? The Future of Adult Care and Support in Northern Ireland* was published in 2012 (DHSSPS, 2012b).

There is substantive agreement across jurisdictions on a number of the main problems with current adult social care provision: entitlement to care and support; safeguarding and risk; the role of unpaid carers; issues regarding the social care workforce and the need for workforce development, although the Northern Ireland documents do not say much about the social care workforce apart from social work; lack of integration between health and social care; and funding arrangements, including the commissioning of domiciliary care.

Within the Domiciliary Care Services there are direct service issues relating to:
Service Delivery Context
Regional demographics and morbidity rates:
- Shortage of available Care Workers to deliver the overall level of service
- A growing frail elderly population.

15-minute calls have been identified as causing difficulty for service users, care workers and service providers and are often the focus of poor media attention.
- Such calls demonstrate the inefficient use of Care Worker Time – overall worker time could be meaningfully consolidated into fewer visits of longer duration
- Costly to deliver with little financial incentive for Providers
- Often for simple practical tasks in-between main visit times e.g. to prompt administration of medication.

Actual Issues to be addressed by SBRI
The prompting and administering of medication by Care Workers has associated difficulties: –
- Care Worker training, skills and remuneration for responsibility versus the deployment of nurses
- Medication error and lack of safety systems to reduce harm; there is no 'Pharmacist in your pocket'
- Recording of medications administered
- Care Works feeling the stress and anxiety when undertaking such vital but short medication visits
- Significant Clinical and Social Care Governance issues identified

Equally, a solution designed through SBRI would function throughout the day; relieving Care Workers of routine medication prompting during longer care visits.

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation
(250 words max)

Impact/ Outcomes
As described, the domiciliary care service across N Ireland is not able to meet the growing demand. This is not only a difficulty of demographics with a burgeoning older population but is symptomatic of a reduced availability of care staff. There are also significant cost constraints in a system reliant upon large numbers of lower skilled workers. This SBRI strives to impact upon the area of care delivery to enable safer working practice but to create efficiency within the system. A successful solution to the difficulties associated with the management of medicines within the domiciliary care environment has

the potential to have significant impact upon the deployment of staff to ensure a greater need is met for the wider community than at present. Furthermore, it would help to obviate the potentially serious clinical risks to service users through medicines error or non-compliance by empowering those within the domiciliary care system through the introduction of novel technologies. Such solutions will give those within the system greater confidence and service users enhanced safety.

To improve the safety.

To enable effective multi-professional working & communication (Social Workers, Nurses, Pharmacists, Doctors, Care Managers & Care Workers)

To enable effective deployment of Care Workers to reduce the deficit in care availability.

Categories of outcome measurements will include:
• service user satisfaction;
• medicines safety incident reporting;
• cost effective use of medicines;
• impact on acute health services (increased availability of Care Worker to enable discharge);
• achievement of expected therapeutic outcomes.

4. **Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?**
   If yes, please provide details and explain why these solutions are unsuitable? (150 words)

There were a number of applications to current Medicines Optimisation SBRI which included technologies which had some promise for this area of work. However, they are not commercially available nor would they tackle the complexity of issues presented within the service.

There are various medication compliance technologies available such as reminder systems, monitored dosage systems, blister packs, medicines cabinets and smart pillboxes. The solutions have some merit, however they often do not address care provider's needs to consistently monitor and manage large volumes of service users simply and without error.

Issues emerging from the various technical attempts include mobility of the solutions, managing changes to medication prescriptions, recording who provided the medication and dispensing multiple medications. Replenishment of medicines into the solutions can also create opportunity for errors and can be very time consuming.

5. **Please provide an estimate of the amount of funding you require?**

To operate the Phase 1 – direct SBRI cost of innovation would be to appoint up to 6 companies with awards of up to £80,000 for a contract period of 6-months against a total budget of £400,000

In order to support the direct service delivery of the SBRI by the DHSSPSNI, the Business Services Organisation (BSO) will be engaged to execute the procurement of innovation, project

manage and interface with the contractors at a cost of £27k . **Therefore, the total cost of the Phase 1 SBRI for Domiciliary Care is £427,000.**

However, there may be an additional charged levied by InnovateUK for the evaluation of SBRI application forms. To date InnovateUK have not charged regional authorities for the direct costs of the evaluation of applications nor the hosting of the SBRI call but we recognise a risk of a cost pressure and duly request £40,000 is set aside by way of a contingency. However, it is also recognised that the situation may have been clarified by date of the review of this application to the Challenge Fund and we request that DETI advise the review panel and DFP accordingly.

6. **Have you identified any potential partners or funders you are considering working with?**
   If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

None for this SBRI proposal

7. **Please indicate the confidence of completing Phase 1 by 31st March 2017, including any work that may have taken place already which may help accelerate the timetable?**

In order to prepare the 'call' narrative two workshops are planned in March 2016. Service Users, Carers, Independent Sector Domiciliary Care Providers, representative bodies, the Unions, Commissioners and Trusts will be invited attend to one of two meetings. These will be hosted by the University of Ulster, in Magee and Jordanstown, and the 'engage' to will be utilised to garner both support for the SBRI but also to articulate from first-hand information the breadth and depth of the issues being faced by Care Workers, Provider Organisations and Service Users.

The synthesised report will inform the creation of the actual SBRI call narrative so that in April 2016 the suite of SBRI contract documents will be ready to go to publication.
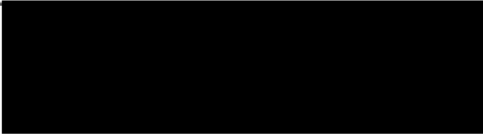
It is anticipated that the call will be open for an 8-week period between April and June with adjudication by InnovateUK shortly after so that contracts should be in place by July. The contract start dates will be set as soon as possible but no later than 1st September to ensure a full 6-month Phase 1 SBRI will be undertaken.

During month-5, in addition to monthly monitoring, the successful suppliers will be expected to make a formal presentation to the SBRI project Board. This will enable decision making vis-à-vis the need or otherwise to seek a Phase 2 project.

In summary, the effort being focused towards this project at present will ensure the execution of a full SBRI Phase 1 during the financial year 2016/17.

Applications must be signed by: (i) the Lead Applicant (ii) and, endorsed by a Director or equivalent senior representative from the applicant organisation	
Signed	████████████████████
Date	23:02:16
Lead Applicant Name	████████████
Position in Organisation	SBRI Executive
Endorsed by	██████
Position in Organisation	Director Operations

Submission of Applications

Applications must be submitted via email only and by 26th February 2016. Please ensure that you use the words 'SBRI Challenge Fund Application' in the email subject box. Email applications must be sent to sbri@detini.gov.uk

1. Applicant organisation / department name and address

Organisation Name & Department	Business Services Organisation Operations Directorate
Address	Franklin Street, Belfast.
Postcode	BT2 8DQ

Contact name in the organisation

Name	███████████████
Position	SBRI Executive
Tel. Number	███████████████
E-mail	███████████████████

2. Challenge Title:

See examples of current & past challenges https://sbri.innovateuk.org/competitions

Project 'HOME' - Home Medication Management for the Elderly to Support Domiciliary Care Services

PHASE 2

3. Briefly describe the public sector challenge that you would like to overcome? (inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

In 2015/16 the DOH identified a number of key strategic priorities, one of the objectives set was to consider progress on HSCB Domiciliary Care Review and the Departmental Review of Adult Social Care and assess sustainability of current domiciliary care. In addition Transforming Your Care Section 8 set out the growing demand for domiciliary care in the context of demographic challenge and citizen expectation to be able to receive care and support whenever possible at home. The Department of Health, Social Care & Public Safety is

undertaking a process to reform Adult Social Care; domiciliary care constitutes a work stream within this process and the HSCB published a review of domiciliary care. There were several local policy developments that indicated the emphasis upon Domiciliary Care and future of Adult Social Care; including *Transforming Your Care*, (DOH, 2011), a consultative document (DOH, 2012a) and, most recently, a post consultation report. (HSCB, 2013) A separate brief discussion paper *Who cares? The Future of Adult Care and Support in Northern Ireland* was published in 2012 (DOH, 2012b).

There remains substantive agreement across jurisdictions on a number of the main problems with current adult social care provision: entitlement to care and support; safeguarding and risk; the role of unpaid carers; issues regarding the social care workforce and the need for workforce development, although the Northern Ireland documents do not say much about the social care workforce apart from social work; lack of integration between health and social care; and funding arrangements, including the commissioning of domiciliary care.

Within the Domiciliary Care Services there are direct service issues relating to:
Service Delivery Context
    Regional demographics and morbidity rates:
        • Shortage of available Care Workers to deliver the overall level of service
        • A growing frail elderly population.
15-minute calls have been identified as causing difficulty for service users, care workers and service providers and are often the focus of poor media attention.
        • Such calls demonstrate the inefficient use of Care Worker Time – overall worker time could be meaningfully consolidated into fewer visits of longer duration
        • Costly to deliver with little financial incentive for Providers
        • Often for simple practical tasks in-between main visit times e.g. to prompt administration of medication.
Actual Issues to be addressed by SBRI Phase 2
The prompting and administering of medication by Care Workers has associated difficulties: –
        • Care Worker training, skills and remuneration for responsibility versus the deployment of nurses
        • Medication error and lack of safety systems to reduce harm; there is no 'Pharmacist in your pocket'
        • Recording of medications administered
        • Care Works feeling the stress and anxiety when undertaking such vital but short medication visits
        • Significant Clinical and Social Care Governance issues identified
Equally, a solution designed through SBRI would function throughout the day; relieving Care Workers of routine medication prompting during longer care visits.

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation (250 words max)

Impact/ Outcomes
The domiciliary care services are not able to meet the growing demand. This is not only a difficulty of demographics with a burgeoning older population but is symptomatic of a reduced availability of care staff. There are also significant cost constraints in a system reliant upon large numbers of lower skilled workers. This SBRI Phase 2 strives to impact upon the area of care delivery to enable safer working practice but to create efficiency within the system. A

successful solution to the difficulties associated with the management of medicines within the domiciliary care environment has the potential to have significant impact upon the deployment of staff to ensure a greater need is met for the wider community than at present. Furthermore, it would help to obviate the potentially serious clinical risks to service users through medicines error or non-compliance by empowering those within the domiciliary care system through the introduction of novel technologies. Such solutions will give those within the system greater confidence and service users enhanced safety.

To improve the safety.

To enable effective multi-professional working & communication (Social Workers, Nurses, Pharmacists, Doctors, Care Managers & Care Workers)

To enable effective deployment of Care Workers to reduce the deficit in care availability.

Categories of outcome measurements will include:
• service user satisfaction;
• medicines safety incident reporting;
• cost effective use of medicines;
• impact on acute health services (increased availability of Care Worker to enable discharge);
• achievement of expected therapeutic outcomes.

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5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

Prior to issuing the Call for Tender with HOME Phase 1 it was known that some technologies were available to address particular dimensions but no technology was commercially available to address the issues articulated. Through Phase 1 five suppliers developed novel technologies through to prototype and conducted early proof of concept testing. Each of the five suppliers worked with one of the five Trusts and five very different solutions emerged. All technologies are promising and the Trusts are certainly keen to enable field trial testing to ensure the most effective solutions are created and taken to a market ready stage.

The technology prototypes developed that showed great promise and the potential improvement of service user safety, service efficiency and wealth creation was believed, by the cross organisational and departmental group, to be evident and it was recommended that the opportunity to take project HOME to Phase 2 should be pursued.

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6. Please provide an estimate of the amount of funding you require?

The Challenge Fund Phase 1 award was £400,000 to appoint up to 6 companies with awards of up to £80,000 for a contract period of 6-months. In fact, 5 suppliers were successful and delivered to the Phase 1 SBRI contracts.

In Phase 1 HOME, and across a range of projects, the direct service delivery cost of £30k supported the overall SBRI programme in health and was passed by DoH to the Business

Services Organisation (BSO)

The Phase 2 project will again require the support costs but also a fund to enable up to two suppliers £250k for the 18-month Field trial. In 2017/18 the supplier costs are anticipated to be higher given the requirement to manufacture the solution in order to deploy in field trial and due to research governance requirements.

The total cost of the Phase 2 SBRI for HOME Domiciliary Care is £500,000

OVERALL CONTRACT VALUE

PROPO SAL	PH AS E	Number of Suppliers		Max Contract Value per supplier	Max Invoice Value 2017 per supplier	Max Invoice Value 2018 per supplier
HOME	2		2	£ 250,000.00	£ 200,000.00	£ 50,000.00
		2017/18 expenditure is expected to be higher than in 2018/19 to permit technology production and research governance costs associated with field trial.				

OVERALL SBRI FUND REQUIRED FOR SUPPLIERS

PROPO SAL	PH AS E	Number of Suppliers		Total SBRI Fund Required	SBRI Fund 2017/18	SBRI Fund 2018/19
HOME	2		2	£ 500,000.00	£ 400,000.00	£ 100,000.00

7. **Have you identified any potential partners or funders you are considering working with?**
   If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

None for this SBRI proposal

8. Please indicate the confidence of completing all agreed phases by 31st March 2018, including any work that may have taken place already which may help accelerate the timetable.
9. If the proposal is a Phase 2 project which will require funding support beyond 31 March 18 please confirm organisational commitment to meet that resource and complete the project.

The Call for Tender (CfT) narrative was originally created through stakeholder engagement workshops undertaken in March 2016. Therefore, all the CfT material has been prepared and

can be issued as soon as instructed. As Phase 2 will be a closed tender limited to the successful five Phase 1 Suppliers, the procurement process will be executed within a very short timeframe and it is anticipated that contracts can be issued within two-months.

In order to cover additional hardware and research governance field trial costs each of the two suppliers will receive £200,000 of their bid price in 2017/18 with the residual contract value to be paid in 2018/19. As this is a Phase 2 project with the complexity of a field trial in a clinical environment all necessary ethical/ research governance approvals and controls must be in place and so 18-month Phase 2 will be essential to enable utility to be tested. This leaves a maximum revenue requirement in 2018/19 of £100,000 (i.e. up to £50,000 per supplier) for HOME and the Department of Health is committed to funding this revenue tail.

Applications must be signed by:

   (i)   **the Lead Applicant**
   (ii)   **and, endorsed by a Director or equivalent senior representative from the applicant organisation**

Signed	███████████████████
Date	25:05:17
Lead Applicant Name	██████████████
Position in Organisation	SBRI Executive
Endorsed by	███████████
Position in Organisation	Director Operations

Submission of Applications

Applications must be submitted via email only and by 7 June 2017. Please ensure that you use the words 'SBRI Challenge Fund Application' in the email subject box. Email applications must be sent to sbri@economy-ni.gov.uk

SBRI Challenge Fund Application 2018/19

1. Applicant organisation / department name and address

Organisation Name & Department	Business Services Organisation Operations Directorate
Address	Franklin Street, Belfast.
Postcode	BT2 8DQ

Contact name in the organisation

Name	▮▮▮▮▮▮▮▮▮▮▮▮▮
Position	SBRI Executive
Tel. Number	▮▮▮▮▮▮▮▮▮▮
E-mail	▮▮▮▮▮▮▮▮▮▮▮

2. Challenge Title:

See examples of current & past challenges https://sbri.innovateuk.org/competitions

Project '**HOME**' - Home Medication Management for the Elderly to Support Domiciliary Care Services

PHASE 2

3. Briefly describe the public sector challenge that you would like to overcome? (inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

In 2015/16 the DOH identified a number of key strategic priorities, one of the objectives set was to consider progress on HSCB Domiciliary Care Review and the Departmental Review of Adult Social Care and assess sustainability of current domiciliary care. In addition Transforming Your Care Section 8 set out the growing demand for domiciliary care in the context of demographic challenge and citizen expectation to be able to receive care and support whenever possible at home. The Department of Health, Social Care & Public Safety is

undertaking a process to reform Adult Social Care; domiciliary care constitutes a work stream within this process and the HSCB published a review of domiciliary care. There were several local policy developments that indicated the emphasis upon Domiciliary Care and future of Adult Social Care; including *Transforming Your Care*, (DOH, 2011), a consultative document (DOH, 2012a) and, most recently, a post consultation report. (HSCB, 2013) A separate brief discussion paper *Who cares? The Future of Adult Care and Support in Northern Ireland* was published in 2012 (DOH, 2012b).

There remains substantive agreement across jurisdictions on a number of the main problems with current adult social care provision: entitlement to care and support; safeguarding and risk; the role of unpaid carers; issues regarding the social care workforce and the need for workforce development, although the Northern Ireland documents do not say much about the social care workforce apart from social work; lack of integration between health and social care; and funding arrangements, including the commissioning of domiciliary care.

Within the Domiciliary Care Services there are direct service issues relating to:
<u>Service Delivery Context</u>
    Regional demographics and morbidity rates:
        • Shortage of available Care Workers to deliver the overall level of service
        • A growing frail elderly population.
    15-minute calls have been identified as causing difficulty for service users, care workers and service providers and are often the focus of poor media attention.
        • Such calls demonstrate the inefficient use of Care Worker Time – overall worker time could be meaningfully consolidated into fewer visits of longer duration
        • Costly to deliver with little financial incentive for Providers
        • Often for simple practical tasks in-between main visit times e.g. to prompt administration of medication.
<u>Actual Issues to be addressed by SBRI Phase 2</u>
    The prompting and administering of medication by Care Workers has associated difficulties: –
        • Care Worker training, skills and remuneration for responsibility versus the deployment of nurses
        • Medication error and lack of safety systems to reduce harm; there is no 'Pharmacist in your pocket'
        • Recording of medications administered
        • Care Works feeling the stress and anxiety when undertaking such vital but short medication visits
        • Significant Clinical and Social Care Governance issues identified
    Equally, a solution designed through SBRI would function throughout the day; relieving Care Workers of routine medication prompting during longer care visits.

4. **Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation** (250 words max)

Impact/ Outcomes
The domiciliary care services are not able to meet the growing demand. This is not only a difficulty of demographics with a burgeoning older population but is symptomatic of a reduced availability of care staff. There are also significant cost constraints in a system reliant upon large numbers of lower skilled workers. This SBRI Phase 2 strives to impact upon the area of care delivery to enable safer working practice but to create efficiency within the system. A

successful solution to the difficulties associated with the management of medicines within the domiciliary care environment has the potential to have significant impact upon the deployment of staff to ensure a greater need is met for the wider community than at present. Furthermore, it would help to obviate the potentially serious clinical risks to service users through medicines error or non-compliance by empowering those within the domiciliary care system through the introduction of novel technologies. Such solutions will give those within the system greater confidence and service users enhanced safety.

To improve the safety.

To enable effective multi-professional working & communication (Social Workers, Nurses, Pharmacists, Doctors, Care Managers & Care Workers)

To enable effective deployment of Care Workers to reduce the deficit in care availability.

Categories of outcome measurements will include:
• service user satisfaction;
• medicines safety incident reporting;
• cost effective use of medicines;
• impact on acute health services (increased availability of Care Worker to enable discharge);
• achievement of expected therapeutic outcomes.

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5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

Prior to issuing the Call for Tender with HOME Phase 1 it was known that some technologies were available to address particular dimensions but no technology was commercially available to address the issues articulated. Through Phase 1 five suppliers developed novel technologies through to prototype and conducted early proof of concept testing. Each of the five suppliers worked with one of the five Trusts and five very different solutions emerged. All technologies are promising and the Trusts are certainly keen to enable field trial testing to ensure the most effective solutions are created and taken to a market ready stage.

The technology prototypes developed that showed great promise and the potential improvement of service user safety, service efficiency and wealth creation was believed, by the cross organisational and departmental group, to be evident and it was recommended that the opportunity to take project HOME to Phase 2 should be pursued.

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6. Please provide an estimate of the amount of funding you require?

The funding history for Phases 1 & 2 HOME is as follows:

The Challenge Fund Phase 1 award was £400,000 to appoint up to 6 companies with awards of up to £80,000 for a contract period of 6-months. In fact, 5 suppliers were successful and delivered to the Phase 1 SBRI contracts.

In Phase 1 HOME, and across a range of projects, the direct service delivery cost of £30k supported the overall SBRI programme in health and was passed by DoH to the Business Services Organisation (BSO)

The Phase 2 project will again require the support costs but also a fund to enable up to two suppliers £250k for the 18-month Field trial. In 2017/18 the supplier costs are anticipated to be higher given the requirement to manufacture the solution in order to deploy in field trial and due to research governance requirements.

The total cost of the Phase 2 SBRI for HOME Domiciliary Care is £500,000

<u>OVERALL CONTRACT VALUE</u>

PROPOSAL	PHASE	Number of Suppliers	Max Contract Value per supplier	Max Invoice Value 2017 per supplier	Max Invoice Value 2018 per supplier
HOME	2	2	£ 250,000.00	£ 200,000.00	£ 50,000.00
		2017/18 expenditure is expected to be higher than in 2018/19 to permit technology production and research governance costs associated with field trial.			

The funding required for Phase 2 HOME in 2018/19 is as follows:

<u>OVERALL SBRI FUND REQUIRED FOR SUPPLIERS</u>

PROPOSAL	PHASE	Number of Suppliers	Total SBRI Fund Required in 2018/19 per supplier	Total SBRI Fund Required in 2018/19	
HOME	2	2	£ 75,000.00	£ 150,000.00	

7. **Have you identified any potential partners or funders you are considering working with?**
   If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

None for this SBRI proposal

8. Please indicate the confidence of completing all agreed phases by 31st March 2018, including any work that may have taken place already which may help accelerate the timetable.
9. If the proposal is a Phase 2 project which will require funding support beyond

31 March 18 please confirm organisational commitment to meet that resource and complete the project .

The 2018/19 resource requirement to complete the Phase 2 HOME SBRI Project is £150,000.

This is a Phase 2 SBRI and will be completed by 31:03:19 and so there will not be a revenue requirement for financial year 2019/20

Applications must be signed by:

(i)   the Lead Applicant
(ii)   and, endorsed by a Director or equivalent senior representative from the applicant organisation

Signed	███████████████
Date	17:01:18
Lead Applicant Name	████████████
Position in Organisation	SBRI Executive
Endorsed by	██████
Position in Organisation	Director Operations

Submission of Applications

Applications must be submitted via email only and by 29 January 2018. Please ensure that you use the words 'SBRI Challenge Fund Expression of Interest' in the email subject box. Email applications must be sent to sbri@economy-ni.gov.uk

SBRI Challenge Fund Application

1. Applicant organisation / department name and address

Organisation Name & Department	Medicines Optimisation Innovation Centre Northern Health & Social Care Trust
Address	Bretten Hall, Antrim Area Hospital, 45 Bush Road, Antrim
Postcode	BT41 2RL

Contact name in the organisation

Name	███████████████
Position	Director Medicines Optimisation Innovation Centre
Tel. Number	02894 424948
E-mail	████████████████████████

2. Challenge Title:
See examples of current & past challenges https://sbri.innovateuk.org/competitions

To develop an automated solution for the deployment of pharmacy staff at ward level consistent with patient medicines optimisation

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

Medicines are the most common medical interventions used in the health service with an annual expenditure in Northern Ireland of the order £550 million. However evidence has demonstrated that there is significant variance in best practice relating to the appropriate safe and effective use of medicines, with many people not taking their medicines as prescribed with resultant sub-optimal health outcomes.

To this end medicines optimisation being defined by National Institute for Health and Care Excellence (NICE) as "a person centred approach to safe and effective medicines use to ensure that people

obtain the best possible outcomes from their medicine" is a key policy imperative for DHSSPS.

In relation to secondary care there has been significant work undertaken with regard to the re-engineering of pharmacy services over the last fifteen years. This change has led to significant improvements in patient care for example reduced length of stay, reduced admission rates, improved medicines appropriateness, faster discharge, reduced medicines administration error rate and reduced risk adjusted mortality index.

This has been achieved by the increased presence of both pharmacists and pharmacy technicians at ward level, that is patient facing services.

The importance of this service provision has been highlighted in the Carter Report (February 2016) emphasising the need to ensure that such an optimised system be in place.

However one of the key difficulties has been the quantification of this service in terms of the metrics that would robustly define this service but also the need to base the staffing requirements on a patient centred basis. In addition there is a need to ensure optimal skill-mix to deliver the requisite patient services with both optimised inputs and outcomes for patients and resource utilisation.

In relation to hospital pharmacy services, the big obstacle has been the absence of the requisite patient centred data to enable optimised pharmacy team input with the right skill-mix.

In this regard the Carter Report highlighted the importance of utilising staff resources (which is our single biggest expenditure) as cost-effectively as possible to meet patient needs.

The development of such an automated tool will therefore be of significant benefit to medicines optimisation for all.

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation (250 words max)

The outcome of the availability of such a tool would be to optimise the inputs in terms of pharmacy staffing that is both pharmacists and pharmacy technicians. This would therefore enable a seven-day week service to be provided by ensuring that the requisite number of staff with the requisite skill sets would be available to meet both patient and other healthcare professional's needs at the appropriate time.

This will therefore lead to improved productivity with regard to the process of clinical pharmacy service provision whilst maintaining the requisite outcomes in respect of optimising medicines use by patients. This will therefore improve overall health care resource utilisation associated with sub-optimal medicine use such as more adverse effects and greater length of stay, higher readmission rate and higher medicines costs.

For the first time within Health & Social care the key objective will see raw data being turned into information with the novel technology then guiding service delivery with regard to targeting staff

resource effectively. Essentially, an objective decision making tool is required so that a hard 'brain' rather than a 'wet organic' brain will optimise staff resource which has utility across the professions.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

There are no suitable commercially available solutions in respect of pharmacy services / staff due to the significant difficulty in identifying and quantifying both the patient and time of day requirements as stipulated in the challenge.

6. Please provide an estimate of the amount of funding you require?

To operate the Phase 1 – direct SBRI cost of innovation would be to appoint up to 3 companies with awards of up to £25,000 for a contract period of 6-months against a total budget of £75,000

In order to support the direct service delivery of the SBRI by the DHSSPSNI, the Business Services Organisation (BSO) will be engaged to execute the procurement of innovation, project manage and interface with the contractors at a cost of £3,000 . **Therefore, the total cost of the Phase 1 SBRI for PB SBRI is £78,000.**

However, there may be an additional charged levied by InnovateUK for the evaluation of SBRI application forms. To date InnovateUK have not charged regional authorities for the direct costs of the evaluation of applications nor the hosting of the SBRI call but we recognise a risk of a cost pressure and duly request a resource is set aside by way of a contingency. However, it is also recognised that the situation may have been clarified by date of the review of this application to the Challenge Fund and we request that DETI advise the review panel and DFP accordingly.

7. Have you identified any potential partners or funders you are considering working with?
If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

No this is a stand-alone solution within Health and Social Care

8. Please indicate the confidence of completing Phase 1 by 31st March 2017, including any work that may have taken place already which may help accelerate the timetable?

A lot of work in completing the data necessary to enable the provision of such a solution has

already been complete.

A workshop will be planned for Late March with key stakeholders to help 'shape' the call. Following a one-month phase zero the call will be open for an 8-week period between adjudication by InnovateUK or BSO PALs as agreed appropriate during planning phase. The contract start dates will be set as soon as possible but no later than 1st September to ensure a full 6-month Phase 1 SBRI will be undertaken.

During month-5, in addition to monthly monitoring, the successful suppliers will be expected to make a formal presentation to the SBRI project Board. This will enable decision making vis-à-vis the need or otherwise to seek a Phase 2 project. However, it is expected with a small Digital SBRI there may well be a fully functioning solution available to commission at the close of month 6, negating the need to enter a Phase 2.

In summary, the effort being focused towards this project at present will ensure the execution of a full SBRI Phase 1 during the financial year.

Applications must be signed by:

(i)   the Lead Applicant
(ii)   and, endorsed by a Director or equivalent senior representative from the applicant organisation

Signed	██████████████████
Date	24/02/16.
Lead Applicant Name	██████████████
Position in Organisation	Head of Pharmacy & Medicines Management
Endorsed by	██████████████
Position in Organisation	██████████████

Submission of Applications

Applications must be submitted via email only and by 26th February 2016. Please ensure that you use the words 'SBRI Challenge Fund Application' in the email subject box. Email applications must be sent to sbri@delini.gov.uk.

SBRI Challenge Fund Expression of Interest

1. organisation / department name and address

Organisation Name & Department	Educational Authority Northern Ireland Educational Psychology Service
Address	Educational Psychology Service, Education Authority Armagh Office, 3 Charlemont Place, The Mall, Armagh
Postcode	BT61 9AX

Contact name in the organisation

Name	███████████████
Position	Principal Educational Psychologist
Tel. Number	███████████
E-mail	█████████████████████

2. Challenge Title:
See examples of current & past challenges

- **Immersive Technology ("Digital Puppetry") as a Communication and Educational Tool for Children with Autism Spectrum Disorder**

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

- 1% of the population is deemed to meet the criteria for diagnosis of Autism Spectrum Disorder (ASD); some recent studies have suggested this represents an underestimate of the true figure.
- Young people with ASD present with significant difficulties in the areas of social

communication and social interaction as well as restricted behaviour patterns. Conversely, many young people with ASD display marked strengths in the ability to work with visual information and display an aptitude for working with information technology.

- A high proportion of children and young people with ASD struggle to reach their full potential within the educational system as a direct result of their difficulties with social communication and interaction. This can negatively impact on their mental health and well-being as well as their long-term personal and economic opportunities.
- Immersive technology represents an important potential solution to the challenge of promoting effective communication and social interaction opportunities for children with ASD.
- Some pupils with ASD find it very difficult to pay attention to adults and to converse with them. Some of these pupils love cartoons and could find it easier to attend to and "converse" with an animated character than a teacher. A teacher could bridge this gap using a form of immersive technology known as "digital puppetry". A "digital puppet" is an animated character that can be controlled and voiced by the teacher in real-time.
- Recent research has highlighted the potential value of such approaches.
  - Lu, Y.; Ottenbreit-Leftwich, A.; Ding, A.; Glazewski, K. (2017) "Experienced, iPAD Using Early Childhood Teachers. Practices in the One to One iPAD Classroom" *Interdisciplinary Journal of Practice, Theory and Applied Research*, Vol. 34; 1-2
  - Wohlwend, K. (2015) "One Screen, Many Fingers. Young Children's Collaborative Literacy Play with Digital Puppetry Apps and Touchscreen Technologies" *Theory into Practice*, Vol. 54; 2

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation (250 words max)

- By building on the strengths and natural interests of children with ASD it will be possible to promote opportunities for personal and economic independence for this section of the population. A successful outcome for this project would help to improve the effectiveness of intervention strategies currently deployed to support this group of children and young people.
- Success in this project would provide opportunities for children with ASD to avail of early intervention strategies. Establishing "shared engagement" is a key principle at the outset of interventions to support children with ASD. "Shared engagement" means that the child pays attention to the teacher to undertake a joint task. Immersive technology builds on the natural attraction of many children with ASD toward animated characters, supporting a form of shared engagement at the very early stages of a child's educational journey.
- Success in this project would enable older children and adolescents with ASD to develop their social and communication skills by learning to voice and manipulate "digital puppets", thus improving self-esteem and personal well-being and broadening their range of personal and economic opportunities.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

- A US based company, "Invirtua" has developed avatars for use with children with ASD; a complete system requires a high end computer, software, tablet and joystick, which costs $2,790.00. This system is not compatible with assistive technology currently available in most schools and is therefore not a viable option for addressing the needs of up to 1% of the population.
- "Puppet Pals HD" is an app that has been developed which involves real-time animation and voice control. The level of animation is not suitable for addressing the specific needs of children with ASD and promoting the level of shared engagement needed to avail of educational opportunities

6. Please provide an estimate of the amount of funding you require?

- The current project is envisioned as a small SBRI project using digital technology with an estimated budget of £150k.

7. Have you identified any potential partners or funders you are considering working with?
If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

- Potential partners or funders have not yet been approached for support in this project.
- It may be appropriate to establish a collaborative partnership with a Northern Irish company such as Text Help. Alternatively, Look Creative Studios, based in England, may be an effective partner on this project.
- It may be appropriate to consider sources of cross-border funding in further developing this project.
- Alternatively, voluntary sector groups that support young people with ASD may be approached with regard to partnership or funding, e.g. the National Autistic Society.

8. Please indicate the confidence of completing all agreed phases by 31st March 2019, including any work that may have taken place already which may help accelerate the timetable.
9. If the proposal is a Phase 2 project which will require funding support beyond 31 March 2019 please confirm organisational commitment to meet that resource and complete the project.

- As a small SBRI project using digital technology it is anticipated that it could be completed in 2018, within a time-frame from 12 to 18 weeks.

Expressions of Interest must be signed by:

(i) the Lead Applicant
(ii) and, endorsed by a Director or equivalent senior representative from the applicant organisation

Signed	▮▮▮▮▮▮
Date	▮▮▮▮▮▮
Lead Applicant Name	▮▮▮▮▮▮
Position in Organisation	Principal Educational Psychologist
Endorsed by	▮▮▮▮▮▮
Position in Organisation	Director of Children & Young People's Services - E.A.

Submission of Expressions of Interest

Applications must be submitted via email only and by 29 January 2018. Please ensure that you use the words 'SBRI Challenge Fund Expression of Interest' in the email subject box. Email applications must be sent to sbri@economy-ni.gov.uk

Title	• **Immersive Technology as a Communication and Educational Tool for Children with Autism Spectrum Disorder**
Summary of Proposal	• Some pupils with Autism Spectrum Disorder find it very difficult to pay attention to adults and to converse with them. Some of these pupils love cartoons and could find it easier to attend to and "converse" with an animated character than a teacher. A teacher could bridge this gap using a form of immersive technology, a "digital puppet" or animated character, which could be controlled and voiced by the teacher in real-time.
Background	• "Digital puppetry" is a form of computer animation. Like a traditional puppet, the characters can be controlled by adults in real-time. Digital puppetry enables an adult to control and speak through an animated character on screen, and to respond to comments from children through that character. • Digital puppetry is in use by therapists in Mexico to help children to speak more openly about their experiences of abuse ("Mexico's Cartoon Therapists" BBC World Series Podcast, People Fixing the World)
Target Population	• Children with Autism Spectrum Disorder (ASD) display difficulties in the areas of social communication, social interaction and repetitive behaviour patterns. Some children with ASD show very limited engagement with other people and struggle to make contact or attend when people are talking to them. • A subset of children with ASD display a fascination for cartoon characters. They develop some of their language skills through copying what is said by cartoon characters. • For this subset of children with ASD it may be easier for them to attend to and "converse" with a cartoon character than with their teacher.
Uses in Education	• Teachers could use immersive technology to draw the attention of these pupils to aspects of literacy, numeracy or other curricular areas. • The digital puppet/ animated character could be very useful in enabling the teacher to talk about challenging but important topics with pupils, e.g. learning how to manage anxiety or to get along with other pupils. • For some older pupils with autism they may find it easier to express their own feelings or ideas through the medium of immersive technology than to speak about these issues directly to a teacher.
Cost	• The project is estimated to cost £150,000.
Time Frame	• The time frame for completion of the project is estimated at 12 to 16 weeks.
Technological Gap	• The technology for immersive technology/ digital puppetry exits. However, it does not exist in a user-friendly and cost-effective form for teachers, which could be adapted specifically to address the communication challenges for children with ASD, with due consideration to local conditions and frameworks of practice.

SBRI Challenge Fund Expression of Interest

1. Applicant organisation / department name and address

Organisation Name & Department	Joint application from: **Department of Justice**, And **Belfast City Council,**
Address	Castle Buildings, Stormont Estate, Belfast BT4 3SL City Hall, Belfast BT1 5GS
Postcode	

Contact name in the organisation

Name	▉▉▉▉▉▉▉	▉▉▉▉▉▉▉
Position	*Safer City Manager* Belfast City Council Cecil Ward Building 4-10 Linenhall Street Belfast BT2 8PB	*Head of Crime and Community Safety Branch* Community Safety Division Department of Justice Castle Buildings Stormont Estate Belfast BT1 5GS
Tel. Number	028 9032 0202 extension 3780	02890523787
E-mail	▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉	

2. Challenge Title:
See examples of current & past challenges

Data Informed Open Space Management (maximising access to open spaces)

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

Belfast City Council and other public-sector organisations have responsibility for the provision of high quality parks and open spaces. It's widely recognised that such space can contribute to better quality of life outcomes for citizens. The Council and its partners have invested significantly in such spaces both in terms of capital investments and supporting positive programming. There are plans for increased capital investments in the next few years.

However, there are challenges in managing urban open spaces well. One example is the challenge posed by the increasingly large numbers of young people (up to 250 at a time) gathering in such spaces raising concerns about their personal safety and the safety of the wider surrounding communities.

Addressing such challenges is complex, multi-faceted, long term and expensive; and requires the co-ordinated activity and interventions from many partner organisations in the city.

However, co-ordinated efforts are thwarted by a lack of relevant, dynamic, fine-grain data available to support analysis, predictions and insights that are required by decision-makers and planners (including information on usage and behaviours, trends, demographics, perceptions, etc.)

The challenge is to find solutions that can support the generation, collection, integration and analysis of such data in ways that support the wider programme of work and the better real-time management of public space to ensure our open spaces can be fully enjoyed by everyone.

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation
(250 words max)

At the end of phase 1 we expect proofs of concept to demonstrate potential for innovation to:

- ✓ Create affordable, scalable solutions that enable the real-time collection of relevant behavioural data that can inform the flexible and timely management of public space.

- ✓ Support the integration and analysis of fine-grain, timely data that generate useful insights to better inform the management of open space, early interventions and rapid responses.

- ✓ Identify a range of technology-led behavioural nudges to support safer usage of open space.

- ✓ Enable public sector partners to be better informed to procure and deploy innovative solutions.

- ✓ Better inform public sector partners regarding the allocation of resources.

- ✓ Support better co-ordination between agencies and reduced costs to the public purse.

They will also demonstrate broader societal outcomes:

- ✓ Anti-social behaviour is reduced in the city's open space.

- ✓ Maintenance and security costs are reduced.

- ✓ Open spaces are safer and more welcoming environments enjoyed by everyone.

5. Have you researched or are you aware of any commercially available solutions to the

problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

There are a number of individual 'solutions' on the market that could be used to address aspects of the challenge described above (eg. IoT devices, machine vision, predictive analytics, smart lighting, anti-loitering devices and Parks and Leisure Management Systems.) However, the evidence for their effective, integrated deployment remains inconclusive.

Belfast offers SMEs an opportunity to develop novel ideas in a complex, real-world environment alongside a range of professional decision-makers.

6. **Please provide an estimate of the amount of funding you require?**

Our application is for **£40,000** to support SMEs to develop a series of proofs of concepts under a six-month Phase One SBRI. These would be developed across a range of open space scenarios supported by Belfast City Council, Department of justice and a number of key stakeholder organisations.

If the application is successful Belfast Policing and Community Safety Partnership will, in principle, provide a further **£10,000.**

In addition partners will provide a range of in-kind support including staff time, access to partners, to existing data as well as access to relevant facilities, web and social media communications support, Smart Belfast networking support, Economic Development and Procurement advice, etc.

7. **Have you identified any potential partners or funders you are considering working with?**
If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

- The Department of Justice (DoJ) is the lead for the expression of interest. Expertise and contributions in-kind will be committed from DoJ, Belfast City Council and other agencies as necessary.

- SMEs would work alongside a strong strategic and operational partnership between Belfast City Council, Belfast Policing and Community Safety Partnership, the Police Service for NI, Youth Justice Agency, Probation Board NI, Education Authority, NI Housing Executive, Belfast Trust and NIFRS.

- We have secured commitment from these partners to support this SBRI challenge in order to support more 'intelligent effective and efficient' interventions' and to consider how best to generate and utilise data.

- A supporting operational strategy has recently been endorsed by the city's Elected Members for which the SBRI has the opportunity to being welcome insights and innovation.

- Belfast City Council is working with Ulster University to deploy a £100,000 LORWAN 'Internet of Things' radio network across the city. This network, and training, will be available free-of-charge to those SMEs that wish to have access to this for the SBRI challenge.

- Belfast City Council and partners will also seek to make relevant data available to the challenge (subject to privacy impact assessments). These may include public WiFi usage data, parks monitoring data, existing survey data, etc.
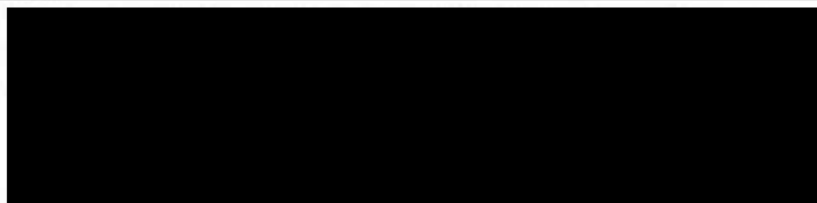
8. Please indicate the confidence of completing Phase 1 by 31st March 2019, including any work that may have taken place already which may help accelerate the timetable?

9. If the proposal is a Phase 2 project which will require funding support beyond 31 March 2019 please confirm organisational commitment to meet that resource and complete the project.

- The challenge will form part of the operational Community Safety programme for 2018/2019. The project will thus be managed as part of this programme and subject to professional project controls.
- There is a political commitment for monitoring on progress and agile project management will be provided by Belfast City Council.
- Belfast City Council has already demonstrated its capacity to manage a successful Rates Maximisation SBRI from phase 1 (proof of concept) to phase 2 (prototyping) and is the first NI local authority to do so. The challenge supported the development of two commercially viable products which have been showcased nationally and internationally and the products have provided significant new resources of revenue to the NI Executive and the Council.
- There are now products on the market which were not previously available, Belfast City Council is better informed and based on learning from the Rates Maximisation SBRI is developing a procurement specification.
- We will draw on our learning and experience to ensure this project is completed successfully and on time.

Applications must be signed by:

(i)   **the Lead Applicant**
(ii)   **and, endorsed by a Director or equivalent senior representative from the applicant organisation**

Signed	██████████████████████
Date	29/1/18
Lead Applicant Name	████████████

Position in Organisation	Head of Crime and Community Safety Branch, Community Safety Division, DoJ
Endorsed by	███████████████
Position in Organisation	Head of Community Safety Division, DoJ

Submission of Expressions of Interest

Applications must be submitted via email only and by 29th January 2018. Please ensure that you use the words 'SBRI Challenge Fund Expression of Interest in the email subject box. Email applications must be sent to sbri@detini.gov.uk

SBRI Challenge Fund Application

1. Applicant organisation / department name and address

Organisation Name & Department	Department of the Environment Northern Ireland Environment Agency (NIEA)
Address	Klondyke Building, , Gasworks Business Park, Lower Ormeau Road, Malone Lower, Belfast
Postcode	BT7 2JA

Contact name in the organisation

Name	███████████████
Position	Principal Scientific Officer
Tel. Number	████████████████████
E-mail	████████████████████

2. Challenge Title: See examples of current & past challenges https://sbri.innovateuk.org/competitions

Innovative and sustainable remediation treatments for the Mobuoy waste site and other illegal waste sites in Northern Ireland and the UK.

3. Briefly describe the public sector challenge that you would like to overcome?
(inc. Policy context, technical and/or operational issues which you are seeking to address)

(500 words max)

The Department of the Environment (DoE) through the Northern Ireland Environment Agency (NIEA) is seeking innovative remediation treatments for illegal waste and its impacts at what is Europe's largest illegal waste site on the Mobuoy Road approximately 1.5km east of Derry / Londonderry. Successful technologies and processes will be scaled –up and replicated at other illegal sites in Northern Ireland and at other UK sites.

Public sector is increasingly being challenged by the legacy arising from the illegal disposal of waste at unauthorised sites across Northern Ireland indeed in the wider UK. This was highlighted in the Mills Review (2013, *Mills Review*). An analysis of 454 offences (UK) involving illegal dumping of waste found that no waste had been removed nor any sites remediated. This Review reported that the long

term legacy of this could cost the State hundreds of millions of pounds in addition to infraction costs if the UK was found to be failing in its duty under the EU Waste Framework Directive.

At the Mobuoy waste site (incl City Industrial Waste and Campsie Sands & Gravels), site investigations by DoE has improved our understanding of the nature and extent of waste illegally disposed. At a stakeholder meeting on in November 2015, the estimated volume of waste illegally disposed at the Mobuoy waste site was reported to be a minimum of $913,105m^3$. An additional estimate of $252,050m^3$ of controlled waste is present in the area of the former associated licensed landfill some of which has been deposited illegally. The nature of the illegal deposits includes municipal waste, construction and demolition (C&D) waste and municipal waste mixed with C&D waste.

Managing the health and environmental impacts at the Mobouy waste site and similar illegal sites are critical in selecting remediation treatments and implementing effective remediation strategies at these sites. Traditional remediation approaches using excavation and disposal to a licensed facility are largely unaffordable to the public purse as a sole remediation solution, for example, removing the illegal waste at Mobuoy has been costed in the region of £140 Million. Hence there is a need for sustainable and economically viable remediation technologies and processes for dealing with illegal waste and its impacts that can be tailored on a site-specific basis.

In addition to cost savings these technologies will bring to the public sector when remediating illegal waste sites, there would also be wider economic benefits with opportunity for new start-up business and expansion of existing business contributing to economic growth and development.

4. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through adopting innovation (250 words max)

The successful outcome from this programme will be the provision of one or more innovative technologies or processes that will provide sustainable and economically viable remediation solutions at illegal waste sites that effectively manage risks to public health and the water environment.

This outcome will be driven by successfully delivering *proof of concept* and *prototypes* for innovative technologies and processes that can be subsequently scaled-up at the Mobuoy waste site and replicated at other illegal waste sites in Northern Ireland and across the UK to protect public health

and water quality at sensitive environmental receptors.

These technologies will ultimately lead to cost savings to the public procurer, firstly as these innovative treatments will be available at a reduced costs, and secondly as cost saving alternative treatments to the more traditional and costly options such as excavation and disposal.

5. Have you researched or are you aware of any commercially available solutions to the problem you are hoping to overcome?
If yes, please provide details and explain why these solutions are unsuitable? (150 words)

NIEA is seeking to identify a range of innovative sustainable and economically viable treatment options that support the development of an integrated remediation strategy at Mobouy that can be up-scaled and replicated on other illegal waste sites in Northern Ireland, the UK and Europe.

A high level assessment of remediation options has identified:

- excavation and disposal to a licensed landfill at estimated costs of £140 Million;
- *on-site* treatment (e.g. physical segregation and recycling, composting, recovery) at an estimated costs of £60 Million;
- containment using a capping system and hydraulic barriers at estimated costs of £20 Million.

These options were peer reviewed by Professor Phil Morgan at SiRIUS Geotechnical and Environmental Ltd. with the need to improve the strategy highlighted to accommodate other options such as

- engineered wetlands for leachate management
- treatment using an existing *on-site* lagoon
- ground gas management design in ACUMEN

6. Please provide an estimate of the amount of funding you require?

Estimated funding being sought is £400,000 in support of:

- Project management estimated in the region of £40,000. This resource is not currently available in NIEA, so it will need to be brought in from a suitable provider such as the Strategic Investment Board (SIB);

- CPD procurement advice and workshop to scope competition briefs at £10,000
- Costs of the successful companies in Phase 1 at £350,000

7. Have you identified any potential partners or funders you are considering working with?
If yes, identify who they are and explain their possible role and details of any potential financial contributions to your challenge?

No funding potential partners have been identified although NIEA will be working with:

- the Strategic Investment Board in project managing this programme
- our contractors developing the clean-up targets that remediation at Mobuoy will need to achieve (DoE funded); and
- our contractors developing the fully costed remediation strategy (DoE funded|)

8. Please indicate the confidence of completing Phase 1 by 31st March 2017, including any work that may have taken place already which may help accelerate the timetable?

Highly confident (100%) that Phase 1 will be delivered and completed by 31 March 2017. This level of confidence is based on:
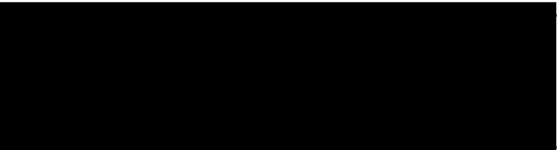
(i) the proposed work programme and timetable that will be project managed by the Strategic Investment Board (SIB) with support from staff in NIEA; and

(ii) extensive site data (e.g. extent & nature of waste, site setting, leachate, gas, groundwater quality and surface water quality) available from the ongoing WYG contract (Jan 2015 to May 2016). Also a new contract starting w/c 7 March 2016 will determine the remediation standards that the remediation treatments at Mobuoy needs to achieve. A further contract will shortly follow in Spring 2016 to develop a fully costed remediation strategy for the Mobouy waste site.

The proposed work programme and timetable for this Phase 1 project in 2016/17 is:

Tasks	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
	Mo.1	Mo. 2	Mo.3	Mo.4	Mo. 5	Mo.6	Mo.7	Mo.8	Mo.9	Mo.10	Mo.11	Mo.12
Business case development incl market research	■											
Preparation of procurement package & tendering		■	■									
Tender assessments and award of contracts					■	■						
Phase 1 contracts							■	■	■	■	■	■
Final Reporting												■

Applications must be signed by: (i) the Lead Applicant (ii) and, endorsed by a Director or equivalent senior representative from the applicant organisation	
Signed	███████████████████████
Date	**26 February 2016**
Lead Applicant Name	████████████████
Position in Organisation	**Principal Scientific Officer**
Endorsed by	███████
Position in Organisation	**Director of Resource Efficiency Division, NIEA**

Submission of Applications

Applications must be submitted via email only and by 26th February 2016. Please ensure that you use the words '**SBRI Challenge Fund Application**' in the email subject box. Email applications must be sent to sbri@detini.gov.uk

SBRI Government challenges
Ideas from business
Innovative solutions

DfE
Department
for the Economy
www.economy-ni.gov.uk

SBRI Challenge Fund Expression of Interest – 2019/20

1. **Name**

   [redacted]

2. **Department/Arm's length body name & address**

   Northern Ireland Water
   Westland House,
   40 Old Westland Road
   BELFAST, BT14 6TE

3. **Contact details**

   [redacted]

4. **Challenge title**

   - Enabling Water treatment process Improvement through the use of Artificial
     Intelligence and Machine Learning

5. **Briefly describe the challenge you would like to overcome**
   (Include policy context, technical and operational issues which you are seeking to address)

   - The supply of high quality drinking water is core to our business – Northern Ireland water
     have a number of Water treatment works across the country supplying 600 million litres per
     day. The Treatment works must be capable of supplying high quality drinking water at the
     best efficiency point. The Water treatment works are highly automated and large quantities
     of data are produced on a real time basis from the systems that control the operation.
   - This project is intended to fully understand the large scale data sets from our Water treatment
     works in order to identify potential quality improvement and / or costs opportunities.
   - The use of Artificial intelligence or machine learning has the capability to provide the
     organisation with a deeper understand of our processes in order to provide best case
     decisions for NIWater.
   - Improvements could be achieved in the areas of Quality control improvement, Cost reduction
     and Energy reduction.

6. Describe what a successful outcome would look like including the potential for improved efficiency/sustainability of public services through the adoption of innovative new approaches

- Success would involve the deployment of a real time learning system that can accurately identify emerging asset or measurement trends in order to allow the organisation to make improved value decisions earlier in the process cycle.
- The system / tools will enable our staff to become much more proactive through enhanced Artificial Intelligence tools. This will allow the organisation to make earlier interventions in order to trim Process parameters and carry out smaller scale maintenance activities prior to failure occurring.
- The system will lead to improved Process control – this should lead to reduction in both chemical and Energy costs.
- The project will allow us to improve control of our Water treatment assets and ensure the high water quality standards are sustained and improved for our Customers.

7. Describe how the project aligns with the PfG (including the Industrial Strategy or Public Sector Reform)

The objectives of this project align with the following PfG outcome chapters
- Chapter 2. We live and work sustainably – protecting the environment
- Chapter 4. We enjoy long, healthy, active lives
- Chapter 11. We have high quality public services

The submission relates closely to these outcomes through improved detailed analysis and control of our Water treatment processes we will seek to improve water quality at a lower cost to the business

8. List potential partners or funders you plan to work with during the challenge and indicate if they have been contacted or involved in the submission. Indicate if they are willing to be involved in the project – if so, how

- Irish Water will be involved in the project in order to identify potential cross organisational opportunities. This will involve specification development and project progress representation.

9. Provide an estimate of the amount of funding you require for the entire project. Separate your estimates for what you for what you generally expect to provide during phase 1 prototyping and phase 2/3 development stages. Also, indicate the estimated length of each phase

- Phase 1 - £70K (approx.3 months)
- Phase 2 - £70K (approx. 2 months)
- Phase 3 – £250K (approx. 6 months)
- Dedicated resource from NIWater will be assigned to this project from the Business Analytics team

- This is exclusive of VAT

Expressions of Interest must be:
(i)   signed by the lead applicant;
(ii)   endorsed by a Director or equivalent senior representative from the applicant organisation; and,
(iii)   endorsed by parent department if applicant is an arm's length body

Lead applicant name

Signed ███████████████

Position in organisation: Head of Business Analytics

Date 1st April 2███████████

Endorsed by ███████████████

Position in orga███████████████r of Business Services

If relevant, endorsed by Parent Department (SCS level)

███████████████

DIRECTOR OF WATER + DRAINAGE POLICY, (GS), DEPARTMENT FOR INFRASTRUCTURE

Applications must be submitted via email to sbri@economy-ni.gov.uk Please ensure that you use the words 'SBRI Challenge Fund Expression of Interest' in the email subject box. The deadline for applications is 4pm on 5 April 2019.