INT

IMPROVEMENTS TO NAATI TESTING PROJECT

KEYBOARDED TRANSLATION ASSESSMENT DISCUSSION PAPER

The following paper has been prepared by two independent researchers – Dr Stephen Doherty (UNSW) and Dr Ignacio Garcia (UWS). It discusses options and alternatives for NAATI transitioning to Keyboarded Translator Assessment.

NAATI commissioned this to support discussions with the broad group of stakeholders who engage with translator assessments – as the taker of tests, the deliverer of assessments or for other reasons.

NAATI is seeking feedback and comment on the options put forward in the paper.

After considering the information in the paper and any feedback received NAATI intends to publish a response including how it intends to move away from the current paper-based model for translator assessment.

If you have feedback please email it to intproject@naati.com.au.

GREEN PAPER ON NAATI TRANSLATOR TESTING USING COMPUTERS

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For: The National Accreditation Authority for Translators and Interpreters (NAATI)

Background

In 2011 and with a call for Expressions of Interest to develop "a conceptual overview for a new model for NAATI standards, testing and assessment", NAATI launched what was to be known as the *INT Project*, the most ambitious review of its accreditation system since its inception in 1977. A team of academics commissioned for the task delivered in the following year its *Improvements to NAATI Testing* report (Hale et al. 2012), hereafter the *INT Report*, which included seventeen recommendations. Following a national round of consultations on this report, the NAATI Board approved in November 2013 the release of the *INT Project Discussion Paper* that included its responses to those recommendations. Recommendation 8 refers to the use of computers in translation testing:

> **Recommendation 8**: That NAATI move to computerised translator tests in the first place. Secondly, that test candidates undertaking computerised translator tests be allowed access to the Internet while taking the test, taking into account of security considerations.

> **Response**: Keyboarded translator testing is agreed in principle subject to costing and resources. Whether access to the Internet during testing will be agreed will require more work (p. 13).

With this Green Paper, NAATI is initiating a process to consider in more detail how this recommendation might be implemented. Based on the research already conducted for the *INT Report* and on the decision taken to go ahead with the 'keyboarded' exam, this paper focuses on discussing its possible implementation within NAATI's current parameters. It will not deal with, in as much as it can be avoided, overarching themes of certification fairness, validity and reliability, or with concerns regarding the setting up and grading of the tests, or of the training required for both candidates and graders, issues the *INT Report* deals with in detail and that are covered by the other sixteen recommendations. It will focus only on: how to move the certification tests from pen and paper to keyboard (and mouse) and screen; which resources candidates will be allowed to consult during testing; recommendations for infrastructure; and pilot testing. Those overarching themes will, however, need to be brought in when needed to understand how decisions on which electronic tools to use may condition decisions that will at a later stage be taken in response to other recommendations.

In terms of structure, Section 1 of this paper will provide relevant context to frame later discussions and recommendations. There are already examples of certifying bodies conducting translation exams on computers. However, that the implementation of computerised certification testing for translation is not meant to be easy is proven by the fact that there are not yet any clear models to follow, as will be demonstrated in Section 2. Difficulties relating to the resources to be made available to candidates: whether they should write on a simple text editor or a word-processor, and whether consultation can be granted beyond hardcopy dictionaries to include online resources, etc., will be detailed in Section 3. Another area of difficulty has to do with implementation, including infrastructure, access, and security, all of which will be covered in Section 4. Section 5 then moves to discuss avenues for pilot testing and, finally, Section 6 makes a series of recommendations informed by the discussions and findings from each of the previous sections.

In line with NAATI's decision to adopt standard ISO17024 nomenclature, we will use the term certification, rather than accreditation, to refer to the awarding of certifications to people, reserving the term accreditation to be applied to the organisations that provide such credentials. NAATI currently offers three credentials for translation: Paraprofessional Translator, Professional Translator, and Advanced Translator. This document focuses on the Professional as this level represents approximately 95% of NAATI's candidates and is the level that, according to the aforementioned *INT Project Discussion Paper,* is less likely to undergo any significant change. Once the Professional test has been computerised, only minor adjustments will be required, from a technical point of view, to deliver the exam at the other two levels.

1. The case for computerised exams

Computers have been a part of the translator's working environment since the early nineties. With advances in computer power and connectivity and, in relation to language scripts, the almost universal acceptance of Unicode standards, the digitization of translation tests is, for most languages, not a technical challenge. The so-called digital divide is no longer an issue in Australia where access to broadband Internet can be taken for granted. On the other hand, handwriting is becoming a lost art. Most translators and most candidates for the certification tests would expect these exams conducted on computers. The *INT Report* quotes this response from a translator to a survey:

> Having to sit the exam with pen and paper is nonsense. Translators should be able to sit the exam in the same

environment and with the same tools as they would use in real life, that is, a word processor and Internet resources. The exam cannot reflect the real ability of the translator if they are restricted to pen, paper and dictionaries that they might not even use in daily life. (pp. 70-71)

To find examples of certifying bodies conducting translation exams on computers we do not need to move overseas. NAATI itself conducts the Advanced Translator texts on a word-processor:

Candidates are allowed to use dictionaries and all types of reference materials, such as encyclopaedias, handbooks, technical and scientific journals, terminology lists and private notes. Candidates are permitted to use computers or laptops for this test but must bring their own. Candidates should specify on the acceptance form whether or not they intend to do so. Consultation with other persons by any means, including the use of mobile phones, e-mail or the Internet is not permitted during the eight hour period of the test (2015: 11).

NAATI does not publicly publish the rationale for this setup, but as the main concern with the use of computers in tests is of security, it is understood that at the time when Advanced Translator tests were introduced, this risk was considered manageable given the very small numbers of candidates expected to sit the Advanced test and the nature and complexity of the assessment at this level.

The first reference to computers in regards to the Professional Translator test appears in the 2002 *NAATI Test Review*, which summarises a wide-ranging process commenced in 2000. In its Executive Summary we find: "Some respondents made a specific comment that computers and electronic devices must be accepted as standard tools to be used by candidates at Translation tests" (p. 4). As part of this review, the Translators Group had identified, back in April 2001, two groups of resources, Group 1 which included computers, Internet and terminology databases, and Group 2 with email, mobiles phones and translation memory. The recommendation was that only Group 1 resources be allowed (pp. 16-17).

The *Review of NAATI Administrative Processes Related to Testing Including Quality Control Processes* (Cook and Dixon, 2005), known as *The Cook Review,* delves more in detail on the issue, with two recommendations made:

Recommendation 17: In-principle approval be given for the use of computers by candidates presenting for the Professional Level Translation Test, subject to there being a "phase-in" period of up to five years where candidates have the choice of handwriting their responses or using a computer to provide their responses.

Recommendation 18: NAATI undertakes a feasibility study of the options that are viable to phase in the use of computers for translating tests (pp. 22-25).

Reasons given included that it would reflect practice in the industry, "practice at some levels of NAATI testing", in a reference to the Advanced Translators tests conducted already on a word-processor, and that it will facilitate "independent double marking", rather than the second marker deducting points on the same paper the first marker had done it. The report estimated the costs involved at some $20,000 (p. 64).

These recommendations do not seem to have been pursued and the issue remained dormant until it was raised by NAATI in 2011 in its *Improvements to NAATI testing: Expressions of Interest* document:

With the advent of much new ICT the Board hopes that this will be taken into account in considering the practicality of proposed changes to testing . . . it is hoped that the benefits of available and emerging technology will be captured as much as possible (p. 6).

2. The use of computers in translation certification by testing

Not much is known about the use of computers in translation certification by testing, and finding out how the different certifying authorities apply it is not an easy task. The *Survey of the FIT[1] Committee for Information on the Status of the Translation and Interpreting Profession* prepared by Stejskal in 2005, which just barely touched on it, is still the main source of information available. Of the 39 questions put to the surveyed entities, question 29 read: "For written examination, is it possible to use a computer?" Eight responded with a yes, fifteen, no, and forty did not respond. Affirmative answers were given by:

- Institute of Translation and Interpreting (ITI, UK)

- South African Translators Institute (SATI)

- Ukrainian Translators Association (UTA)

- Austrian Translators and Interpreters Association (UNIVERSITAS)

- World Arab Translators Association (WATA)

- The Translators and Interpreters Guild (TIG, US)

- Chartered Institute of Linguists (CIoL, UK)

- Polish Society of Economic, Legal and Court Translators (TEPIS)

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1   Fédération Internationale des Traducteurs (International Federation of Translations)

A single item in a survey could not capture the complexity embedded in the question. NAATI itself, which boasts one of the most sophisticated translation certification systems and its willingness to improve it, could not provide in its negative answer, a full account of its situation: by that time, NAATI's Advanced Translator exams indeed already allowed for full word-processing. Another organisation that had to answer in the negative was the American Translators Association (ATA), of which Stejskal had been an office bearer. The ATA initiated, precisely in 2005, the process to computerise its tests, a process that has been conducted in quite a public and transparent way, although not always exempt of controversy (see Hanlen, 2006; Koby and Champe, 2013; Bokor, 2015). The Working Group 3: Technology and translation testing which assisted in preparing the *INT Report* tried to update Stejskal's information by contacting by email the relevant bodies, but did not succeed in gaining any additional information to what was available on their websites.

We now focus on what is being done at SATI, CIoL and ATA, which is of particular interest to the purpose of this paper.

The South African Translators Institute (SATI) accreditation is offered based only on a test "operated on a distance basis". Candidates must choose the person who will act as invigilator, to whom the exam paper will be sent. Once the seal of the exam is broken, the candidate has 24 hours to complete the exam. Once completed, the invigilator posts the exam back to the examinations officer: "An electronic copy of the translations should also be submitted if at all possible (by e-mail)." Whether computers are used and to how much of an extent is left to the discretion, or the resources, of the candidate. Tests are available in combinations of all eleven official languages, plus in a range of foreign languages. If adequate expertise is not available locally, SATI may arrange for candidates to be tested by other agencies: "At present this applies to testing for translation in Arabic, Chinese and Russian, which is carried out in association with the Australian accreditation authority, NAATI." [2]

In post-apartheid South Africa, SATI testing clearly prioritises access and equity. Its main concern is getting competent translators into the field, and to achieve that is ready to make significant concessions on other areas, especially security. Although some checks and balances are in place, there is still risk of collusion between candidates and invigilators for test or identity fraud. Beyond the current existing links between SATI and NAATI, lessons from the South African experience could perhaps be applied in Australia, particularly in regards to indigenous and emerging languages.

The Chartered Institute of Languages (CIoL) offers several qualifications, all through the Institute of Languages Educational Trust (IoLET), the most relevant for our purpose being the Diploma in Translation (DipTrans). DipTrans examinations comprise a number of parts candidates can undertake over a period of five years. It is presented as "a postgraduate level equivalent qualification" and, although it is possible to just sit the exams, it is assumed that most will attempt it through coursework. Candidates will sit exams through Course Providers in the first instance or through Examination Centres in the second, with the British Council being the default centre for candidates living outside the UK. [3]

Both hand written and word-processed exams are allowed, but the use of translation software or access to the Internet is not permitted. Candidates are not allowed either to bring their own laptops "as it is difficult, if not impossible, to monitor the programs installed". Whether the candidates will actually type their exams on computers will depend on whether the examination centres can provide computers for them. When using computers, candidates still need to print the file and present a paper copy of the script for marking, with no electronic copies accepted. "No distinction is made by examiners during the marking process between candidates who word-process their scripts and those who handwrite" (IoL Educational Trust, 2014: 13).

The ATA has been conducting certification exams since 1973. Its exam offers similarities to the NAATI Professional test both in format, three passages of about 250 words of which two have to be translated by the candidate, and in philosophy, which just one sitting test conferring the certification. The volume of candidates sitting the ATA certification may be bigger, but NAATI needs to cope with a much larger number of languages (currently, 17 in ATA as against 55 for NAATI). Exams are still hand written. ATA has been considering computerising its exams since 2005, but its solution has not yet fully implemented. The ATA is, however, one significant step ahead of NAATI in its stage of readiness, with the proposed computerisation of certification (known as CertSoft) already being, if hesitantly, tested. It was anticipated that the system would be fully operational by 2007, yet the first successful sitting was in 2012. The certification's frequently asked questions section describes the current situation as follows:

> **Is it true that the exam is handwritten?**
> Most of the time. Two to three keyboarded examinations with limited seating are offered each year. These are clearly noted on the exam schedule. All other exams are handwritten. [4]

Of the three, on the information available at the time of writing, the ATA procedure is clearly the most carefully crafted and advanced. It combines old-fashioned elements such as on-site invigilators who can manage security concerns regarding candidate identity and exam theft, fraud or manipulation, with state-of-the-art centralised server control alongside fully online delivery and collection of exam papers thus greatly streamlining administrative processes. This procedure allows for the simultaneous testing of up to approximately 50 individuals and the possibility to go beyond this number given the appropriate technological resources.

Given the similarities in format and philosophy between the ATA and the NAATI Professional exams, the *Working Group 3: Technology and Translation Testing* which assisted in preparing the *INT Report* involved Prof. Alan K. Melby, then member of ATA Board of Directors, in its deliberations. Melby was instrumental in the development of the ATA CertSoft model and has since been also involved in the discussions within the *INT Project*.

2   http://translators.org.za/sati_cms/index.php?frontend_action=display_text_content&content_id=1761
3   https://www.ciol.org.uk/qualifications/CentresProviders/DTCentres2012.pdf
4   http://atanet.org/certification/certification_FAQ.php

Before drawing further into what specifications a safe and workable NAATI model for computerised exams would contain, a mention should be made of the European Union based TransCert initiative to harmonise criteria amongst the member countries and thus make translator certification more "portable".[5] Awareness of this initiative is needed to ensure that NAATI aligns itself to the most advanced international practices.

3. Resources which might be made available to candidates

The NAATI Board has clearly indicated its willingness to move its tests to a fully digitised system including delivery of the exams, typing of exam responses and marking by the examiners. Of the full gamut of digital resources, a discussion is needed now on which ones might be made available to candidates. "Keyboarded" in the 2013 Discussion Paper (p. 13) is a term borrowed from the ATA's CertSoft vocabulary that opposes "word-processed". It does not include the use of spelling and grammar checkers and other features (Look up, Synonyms, Translate) available in current word-processors; it involves, simply, typing on a screen window with just the functionality of a plain text editor (i.e. Window's Notepad). Concerning Internet access, the CertSoft approach provides the option of "limited" access, meaning access to a small number of preapproved whitelisted websites.

To better understand what is at stake when some resources (i.e. spell checkers or online dictionaries) are allowed or withdrawn, we will first review several available options. Each option measures in a different way the abilities, skills and knowledge required in the professional environment in which the credential will be used - Table 1 illustrates this. The better the test reflects what is required from the candidate in the actual professional world, the better its context validity (see Weir, 2005) will be. Basic writing skills such as spelling and grammar are at the core of any translation task analysis, but they cannot be measured on a word-processed text at the same level of detail as with pen and paper. Security, ensuring that the submitted text is the unaided work of the candidate, also needs to be a main concern; while collaboration is indeed expected in professional work, certification is meant to measure individual performance only.

Digital resources allowed	Context validity	Measures basic writing skills	Security	Certifying body
Full access to all	****	*	*	SATI (if on computer)
Full word processing	***	**	**	CIoL DipTrans (if on computer)
Text editor	**	***	***	ATA (proposed CertSoft)
None (pen & paper)	*	****	****	NAATI Professional (& "all")

Table 1: Overview of permissible resources for each certifying body

3.1 Resources available for current computerised testing

(a) Full access to resources: The only known model is SATI, and only in the case of candidates having at their disposal a computer with Internet access. Candidates would work on the test almost as they would on a paid assignment, i.e. the test carries maximum context validity. Security, however, is a concern as collusion between candidates and invigilators can happen, particularly if passing the test affords community status or better pay conditions.

(b) Full word processing: The DipTrans of the CIoL and NAATI's own Advanced Translator are the best known models in this category. The DipTrans does not keep the electronic file but asks the candidate to print and submit the paper (with no extra time allocated for printing), a practice that seems not to have been updated since circa 1999, when inputting text in languages other than English was still difficult and special characters and diacritics were regularly added to the copy after it had been printed. In both cases, there are no differences in marking criteria between the handwritten and the word-processed tests. Yet, the marker of a hand written paper is likely to deduct points for spelling mistakes or grammatical errors, while the word-processed paper is much less likely to contain as many errors as the writer is warned by on-screen coloured underlines. Furthermore, within the word-processor candidates can always access a clean copy for revision while on pen and paper revision can only be done through the messier process of crossing out some words and adding others. Security is guaranteed by a physically present invigilator (and in the DipTrans case by the pre-configuration of the computers).

(c) Text editor environment only: This is the model proposed by the ATA CertSoft. Being more contemporary than the DipTrans one, this model will make full use of Unicode standards to allow for keyboard input in most language scripts. Markers will be able to assess candidates' mastering of spelling and basic grammar as they would on pen and paper, just in a more ergonomic environment. The text editor will still help candidates by allowing - through insertions, deletions and copying and pasting - doing away with the 'forward planning' required for handwriting, making the revision of their work a less stressful task.

(d) Pen and paper tests: All known certifying entities, including all mentioned above, allow for candidates to translate on pen and paper. Candidates bring to the examination room their own pen and reference materials, mostly monolingual and bilingual dictionaries and printed glossaries, and are provided with paper, including paper for drafting. It gives an advantage to candidates as they are able to forward plan to produce an almost perfect first draft copy that will require only minimal revision.

Hard-copy referenced materials are allowed by all certifying entities, irrespective of whether the exam is done on computer or on paper. A limitation in the number of books the candidate can bring is only set by the CIoL DipTrans and in relation to the working space given to each candidate (200cm wide by 50cm deep).

3.2 Range of resources available

Online aids provided to the candidate could range from (a) machine translation (so that the candidate actually "post-edits" rather than "translates") and collaborative tools (so that the text can be translated by more than one translator) to (b) all types of web resources except those two, to (c) restricted access to only a few reference sites. The web being an environment not particularly conductive to restriction, the last option will rely more on whitelisting a few sites than in blacklisting many. Options (a) and (b) are only entertained by SATI, which bans only collaborative tools. The ATA CertSoft favours limited Internet access. All of the other reviewed models forbid not only Internet access, but even access to off-line electronic dictionaries, with the exception of NAATI that, under certain conditions, allows them.[6] It was common up to some ten years ago to debate, when considering the computerisation of the exams, whether to allow for off-line resources. This discussion is now moot, since in the age of modern and cloud computing the CD-ROM (and even the DVD) has become as obsolete for reference materials as the hard-copy.

There is merit in allowing Internet access, if only to a small amount of dictionary sites, and not just for convenience. In the case of Chinese and Japanese, for example, hard-copy dictionary consultation of words for which the exact pronunciation is not known can be extremely time consuming even for talented candidates with English as Language A who have, thus, little chance of passing the 'into English' exam. Online, all it involves is copying and pasting the character.

Apart from which (if any) online resources will candidates be allowed to consult, the other big decision to make when considering doing the exams in computers is whether to allow typing on a text editor window or on a word-processor. This is a decision that needs to be taken after a careful evaluation of how important it is to know how to spell and use basic grammar outside of the digital environment. Do engineers need to be tested on how they add and subtract without a calculator? After all, candidates should have acquired already those mechanical skills through secondary education, and the use of full word-processing features would make the task more authentic and thus more valid. On the other hand, measuring those mechanical skills as the pen and paper exam does may make sense at the entry-level generalist exam, especially as experience tells us that not all candidates have mastered them. Then, on a diachronic system of credentialing with embedded training, as the *INT Report* proposes, the subsequent Advanced/'Specialist' certifications could already take those skills for granted.

The text editor option can also be defended on equity and on security grounds. On the handwritten exam, all candidates produce their answer exactly with the same resources: pen and paper; using the word-processor, those sitting the exam for well digitised languages will have at their disposal spelling checkers and other features that poorly digitised languages will not. As for security, it is easier to enforce that no text can be copied and pasted from a text editor than from a word-processor.

Is not uncommon for professional translators to work in a mixed environment, drafting the translation on the screen and revising it on paper. The CIoL DipTrans and the SATI models require the submission of a paper copy and allow for pen marks to be added to it. Both systems still work in a pre-digital management mode in which exam papers, whether handwritten or printed, are put in envelopes and posted. The ATA's CertSoft is based on full digital management with exam papers delivered, collected and graded fully online. In such a setting, allowing candidates to print their draft to revise it before submission is likely to create more problems (including security-related) that it would solve. The ATA's CertSoft allows, however, for invigilators to hand out a paper copy of the exam to candidates and collect it before they leave the room.

While Unicode has solved most of the problems that made measures like the collection of printed copies on which diacritics were marked with pen obsolete, the advantages of typing are not shared equally across languages. Arabic, for instance, and this may apply to other scripts, remains a language in which most candidates will find much easier to handwrite their 'into Arabic' exam than to type it, even on an Arabic keyboard. For other languages, including Assyrian, Dinka, Nueer and Tigrinya, languages for which NAATI is currently offering Paraprofessional Translator testing, Microsoft or Apple do not yet offer a language input solution.

3.3 From pen and paper to keyboard and screen

Even if NAATI were to settle with the text editor option to input the target text (rather than the word-processor) and the limited access to Internet resources (rather than full access), three scenarios do still appear to move us all forward:

(a) Pen and paper plus hardcopy dictionaries. For the time being, the tests 'from English' into the languages which cannot yet be typed with ease will need to be conducted on pen and paper. Even for tests 'into Arabic', it would still not be fair to force all candidates to type. It could be that the issue of the digitization of some languages is solved sooner via speech recognition – another way often used by professional translators to input text onto the screen which has been, on purpose, overlooked here. Regardless of typing difficulties, all computerised systems examined allow candidates the choice of doing the test on paper. They are given in both cases the same amount of time to complete the test, and the test is marked under the same guidelines. In 2005, the mentioned NAATI's *Cook Report* in its Recommendation 17 referred to "a 'phase-in' period of up to five years"; for tests 'from English', this period may need be much longer. Meanwhile, for tests 'into English' the phase-in period will probably be very swift, by the lack of candidates willing to take them on paper.

(b) Pen and paper plus hardcopy dictionaries plus limited Internet resources. This could be an option for "from English" tests for those languages for which typing is still challenging. In favour, it will make the tests more comparable with the tests

into the better resourced languages; against, providing Internet access will add to the costs of pen and paper tests and, probably, will not be of much help to candidates since, given those difficulties for typing, resources in those languages are likely to be scarce. If that were the case, this option would needlessly complicate a model that is better to keep as simple as practicable. Language panels for the affected languages could be consulted first.

(c) Text editor plus hard-copy dictionaries plus limited Internet resources. All computerised translation tests currently allow for hard-copy dictionaries to be brought into the examination room. This does not involve additional costs and does not present security risks for the examining body. Once candidates get used to preparing for testing with online resources only, it is unlikely that they will bring many hard-copy dictionaries to the test itself.

In addition to these three scenarios, a further issue remains: how limited this 'limited' range of whitelisted sites should be. Allowing only for one bilingual and two monolingual dictionaries will make this test more comparable with the hardcopy only scenario. On the other hand, there is not technical difficulty in adding access to massive online bi-text repositories such as Linguee.com. It could be argued that such resources are not equally helpful for all language pairs but, in the traditional pen and paper exam, hardcopy dictionaries have never been equally helpful either. The only difference is that while in the hardcopy realm it is the candidate who chooses which resources to use, in the computerised exam it will be the certifying body on the advice of its language panels. Consideration may be given to restricting the number of whitelisted sites in the Professional test while widening it for the Advanced tests.

4. Consideration of implementation issues

On a macro-scale the implementation of testing using computers, as with any significant structural change, requires considerable detailed planning, implementation, review, and on-going monitoring. This section discusses issues of infrastructure, access to computers for testing, security, and technical support.

4.1 Infrastructure

The existing infrastructure within NAATI (including servers) is already in a position to support computerised assessment once the appropriate technical resources and support are made available or sourced externally. Given that at this initial stage the test content and structure (e.g. nature of the task, number and length of texts, number of translations required, marking criteria, ethics questions, etc.) and is unlikely to be changed significantly, the transition to computerised assessment is much more likely to succeed if appropriate planning and piloting are carried out and lessons are learned from other similar ventures, particularly from the ATA's CertSoft. However, given that changes may be introduced as per NAATI's response to the *INT Report*'s Recommendation 6, any such future changes will need to be factored into the implementation for computerised testing once they become formalised.

From the review of existing bodies using computerised assessment presented in the previous section, it is apparent that the ATA's CertSoft model demonstrates the greatest compatibility with NAATI's current requirements in terms of resources available to candidates during testing (i.e. whitelisting), and full secure digitisation including input, delivery and grading. From the perspective of NAATI's current testing requirements, other reviewed models pose more significant compatibility and logistical issues in that they: offer too much freedom in allowing unlimited use of online resources (e.g. SATI); do not scale to the large number of candidates in the NAATI system (e.g. SATI); and do not cater for testing based on one sitting (e.g. DipTrans).

In terms of infrastructure then, we present the two options that currently match NAATI's needs:

1. Customising an existing solution: the ATA's CertSoft;

2. Customising other commercially available solutions.

4.1.1 Customising an existing solution: the ATA's Certsoft

Given the previously identified compatibility between NAATI's requirements and the ATA's CertSoft, this solution appears to be the most desirable given the ATA's extensive experience with CertSoft and the possibility of collaboration with the the ATA to significantly reduce risk and cost. The planning and implementation conducted by the ATA over the past ten years can provide NAATI with both a wealth of experience and an existing, road-tested solution. Due to the long-standing development of CertSoft many issues have already have been resolved, however, in order to ensure as much compatibility as possible, an extensive list of functionality requirements will need to be finalised for NAATI's implementation (see Section 4.1.2), and comprehensive usability testing will also be required via pilot testing (see Section 5).

A critical issue of any form of customisation will be ownership. NAATI may wish to explore the option to buy its own version of CertSoft that it will own and maintain in future. The alternative to this is for NAATI to license the software and hardware solutions from a provider, thereby renting them for a defined period. This approach can be beneficial if a defined trial period is identified (e.g. 5 years) after which NAATI may decide to make a full purchase, continue renting, seek alternative suppliers, or abandon computerised assessment in the proposed form. This option will require on-going technical support for NAATI to successfully implement them, an issue we return to in Section 4.4.

4.1.2 Commissioning other commercially available solutions

An alternative solution is to customise an existing generic solution to NAATI's unique requirements. The option lies in customising an existing Translation Management System (TMS). Similar to its better-known generic predecessor, the Content Management System, a TMS is a type of software that automates many parts of the translation process across numerous

users of different levels of access. It allows for a workflow to be customised to the needs of the company and is in widespread use in the translation industry of today. A customised and basic TMS would provide similar basic functionality to the ATA's CertSoft, however, this customisation would require more significant development from a specialist third party (IT provider and/or software developer) and comprehensive testing in terms of usability and security. A comparison of contemporary TMSs can be found in the Common Sense Advisory industry publications listed in the reference list. As this solution requires a significantly greater amount of research, development, technical resources, and technical support, it is a much less desirable avenue compared to the ATA's CertSoft.

A variation of this option involves identifying a suitable software development company that NAATI can commission to develop a custom-built software solution from scratch. In terms of technical requirement, this development comes in the form of a 'front-end' and a 'back-end', and should cater for different levels of user access, namely: candidate; test administrator; Approved Course test administrator; grader; and NAATI.

The 'front-end' is the user facing side of the system which would be interacted with by all users in accordance with their different levels of access. The following is a list of essential user needs in each category (which will also be of use in the other implementation options listed throughout this paper):

Candidate:

1. Secure login to server regardless of location

2. Ability to conduct a dry run for familiarization

3. Access to correct test materials (language, direction, level)

4. Access to language input options (input method, language/region-specific formats)

5. Verified Unicode support

6. Access to the test materials assignment to them (translations, ethics questions)

7. Access to appropriate whitelisted resources in accordance with test level (dictionaries, glossaries, thesauri, specialised materials)

8. Access to basic text editor window for inputting translations (or alternatively access to the full word processor available depending on NAATI's preference)

9. Suitable warnings (on test commencement, detailed instructions as per existing paper version, on submission of final versions)

10. Ability to manually save work in progress

11. Ability to have work automatically saved at regular intervals – this function is not optional to the candidate

12. Assurance of confidentiality

Test Administrator:

1. Secure login to server regardless of location (to input and verify candidate, test, and test centre information)

2. Ability to conduct trial testing

3. Ability to login simultaneously with other test administrators if necessary (e.g. in the event of illness during testing, large number of candidates, etc.)

4. Ability to assign texts to candidate (language, direction, level)

5. Verified Unicode support

6. Ability to request technical support

7. Ability to monitor candidate activity as required

8. Ability to confirm test commencement and completion (to ensure appropriate time given, and, on completion, that texts are sent to graders)

9. Suitable warnings (on test commencement and completion)

10. Assurance of confidentiality

Approved Course Test Administrator:

Test administrators at Approved Course institutions will require the same functionality as Test Administrators as listed above,

in addition to:

1. Ability to create their own pool of texts and to assign them to candidates

2. Ability to send texts to own pool of internal graders prior to external grading

Grader:

1. Secure login to server regardless of location

2. Access to assigned texts and ethics questions

3. Access to user-friendly grading interface (e.g. plugin from GradeMark from Turnitin)

4. Access to appropriate marking criteria

5. Verified Unicode support

6. Access to appropriate whitelisted resources in accordance with test level (dictionaries, glossaries, thesauri, specialised materials)

7. Ability to request technical support

8. Suitable warnings (on submission of grades)

9. Assurance of confidentiality

NAATI:

1. Secure login to server regardless of location

2. Access to user information for all users in the above categories (i.e., management of confidentiality as per current ID number system)

3. Access to manage all test materials for all languages, levels, directions (e.g., add, remove, edit exam papers)

4. Verified Unicode support

5. Ability to add and remove resources from whitelist

6. Ability to override users in the above categories

7. Ability to request technical support

8. Suitable warnings on major events (e.g. deleting, submission of grades, sending outcomes to candidates, etc.)

9. Assurance of confidentiality

The 'back-end' of the system would require high-quality security at all points and should maintain an encrypted and secure link between users' computers (regardless of location, for instance, at a NAATI office or external institution) and external (x1) and back-up (x1) servers hosted by NAATI or its nominated third party (e.g. Amazon hosting). In addition to security, the back-end should support regular timed back-ups of candidates' work (e.g. once per minute) most probably realised via a virtual machine or direct access to the server from the front-end of the system, i.e., a cloud-based service. In this way access can be granted to users of Windows and Mac operating systems, which are both popular operating systems in Australia. Depending on the sophistication of NAATI's current server infrastructure, such a 'back-end' may be realised as an upgrade rather than a completely new installation.

Comprehensive usability testing for all envisaged users will be required before pilot testing can be implemented with particular attention paid to language input, whitelisting of resources, security, accessibility, usability to candidates and graders, confidentiality, and back-ups. Usability testing is an integral part of any hardware and/or software implementation and greatly reduces the risks of loss of data, security and user experience.

Additionally, a number of web-based services may be explored to ascertain their ability to meet NAATI's needs. Many other testing organisations have implemented their testing environments using such services, of which QuestionMark[7] is a leading example. With these services, NAATI could use the provided web-based platform to deliver its testing to candidates in any location. There are however many uncertainties with such services, particularly with regard to the limited customisation options available, the untested reliability and security and, possibly, the lack of technical support for some of the languages into which NAATI tests are offered. In researching this paper, the authors have learned that these services are currently being empirically tested for translation testing by organisations similar to NAATI. Thus, this option may prove to be more attractive if such benchmarking is successfully completed and risks are within a more acceptable level.

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7   http://www.questionmark.com/

4.2 Access to computers for testing

With the exception of inaction, all of the above options will require NAATI to obtain sufficient computing facilities to provide access to testing for candidates. Provision of computers will be required across NAATI test centres and also across Approved Course institutions where computerised-testing is chosen. NAATI will need to accurately identify its ability to provide computers to candidates in line with candidate numbers in recent years and/or work with Approved Course institutions to make use of their computing facilities (see Sections 4.4 and 5 below).

An alternative to this exists whereby candidates provide their own computers, or are given the option to choose. If candidates are allowed to bring their own computers, the user needs described in Section 4.1.2 still apply as the candidate logs into the server to take the test. However, several significant security issues arise due to the difficulty of monitoring access to other programs on the candidate's computer (e.g. e-mail, translation memories, machine translation, resources not whitelisted, etc.). While it is technically possible for the proposed software to monitor such activity on the candidate's computer, it would require the candidate to download or install software that would then need to be verified by the test administrator. The downloaded software's monitoring functionality would be able to record activity on the computer but such activity would have to be analysed by the test administrator or another party after the fact, thus adding considerable workload to testing. If the downloaded software were to restrict the use of non-whitelisted resources, such review of monitoring activity would not be necessary however there would still exist a significant risk of the candidate disabling or interfering with the downloaded software given that they will be the administrator of the computer and thus have full access rights to do so.

Similar to the software download option is the use of a USB device that can be inserted into the candidate's own computer to monitor and record activity, or introduce restrictions to enable testing. Similar to the issues above, this option also presents issues in terms of its invasiveness, reliability, risk of being tampered with, and the complexity and instability of candidates' computers and operating systems. Additionally, the contents of the USB device are also easily vulnerable to being copied or manipulated by candidates given sufficient preparation and technical expertise. This security risk appears to be too great and unless NAATI can provide assurances and evidence from the developer of the USB solution, this option is considerably less desirable.

Additional and more fundamental issues also arise from candidates providing their own computers. These include the unreliability of candidates' computers during testing, variety in operating systems' requirements, variety in functionality, language input, and the increased resources required by test administrators to check each candidate's computer prior to test commencement (e.g. access to power, correct installation of USB device, verification of device's functionality, monitoring of each candidate's activity throughout the test). Other institutions, such as CIoL have also come to these conclusions and do not allow candidates to bring their own computers.

Furthermore, a common complaint from candidates for computerised testing sitting the 'from English' exams is likely to be the lack of choice of keyboards available to them. Due consideration should be given to allowing candidates to bring their own keyboards to tests so that they can be plugged into the computers provided. While modern installations of Windows and Mac allow for a variety of user-defined input methods to suit all languages, some users may still struggle with using a physical English keyboard to write in another language, i.e., the labels on the keyboard are in English and a QWERTY keyboard is used. This option to allow candidates to bring their own keyboards poses a very low risk to the computers provided. However, NAATI or Approved Course institutions cannot accept responsibility for the candidate's keyboard or account for the risk that it will not work on the computer provided or that it will cease to function, in full or in part, at any point in the test. Test administrators also cannot be responsible for installing the keyboards.

Finally, it should be acknowledged that, in addition to test centres, a large network of Approved Course institutions carry out assessment on a regular basis, many of which are universities that already possess the capacity to conduct computerised testing once the front-end becomes available to them. Due to the value and convenience of this existing resource, we recommended that NAATI carefully consider collaborating with such institutions to enable the provision of computerised testing, especially at the pilot testing stage (see Section 5). Within the framework of Approved Courses, this provision would of course apply to students of the respective programmes. In addition, NAATI may seek to make use of the institutions computing facilities to provide testing to candidates who are not students of that institution. Terms for this collaboration would of course need to be formally agreed upon by each party.

4.3 Security

The issue of security is paramount to NAATI testing and each possible option for proceeding is not without security concerns. Regardless of the configuration of the system (e.g. CertSoft, customised TMS, other third-party solutions) a dedicated, secure, and modern infrastructure, back-end and front-end, will be required to ensure the highest possible level of security and confidentiality for all stakeholders. Learning from the ATA's considerable experience with CertSoft, we recommended that a 3-layer structure be adopted in line with ATA's most recent implementation of CertSoft (which was initially implemented as a 2-layer system). This 3-layer system has clear advantages in terms of ensuring universal language input options, increased security, availability of full configuration options for test computers, and reduced invasiveness. This 3-layer structure comes in the form of: local, exam, and server, and should be devised based on the ATA's tried and tested specifications.

Back-end requirements:

1. Maintenance of secure server

2. Maintenance of back-up server

3. Independent user identification system to keep user IDs and user personal information separate (if implementing using current ID number system already in place for pen-and-paper system) – this should only be accessible to NAATI

4. NAATI will remain responsible for the provision of user access to all users listed in the previous point

5. Test administrators and Approved Course test administrators should be allowed to create, or obtain from NAATI, candidate IDs to allow for local testing

6. Realised in a format supported by the IT support and software developer, such as PHP, ASPX, Java, etc.

Front-end requirements:

1. Ability to use only resources that have been whitelisted for the test (this will prevent exam texts being disseminated)

2. Blocking of all other software applications to eliminate possibility of using non-whitelisted resources such as translation memories, machine translation, uploading and downloading information to the Internet, communication with others such as e-mail or instant messaging

3. Maintenance of existing security requirements for testing, i.e., other equipment forbidden, including phones, communication devices, and USB keys in any form

4. Other than using the software program, e.g. CertSoft, candidates have no other access rights to use any of the computer's other functions, including printing and Internet access

5. No printing allowed in any form nor local printing facilities available

6. Identification of test materials (texts to be translated, ethics questions) re-used in current naming convention so that no identifiable features can be linked, i.e., texts are named Passage A, B, C., so that candidates cannot identify texts by unique numbers, e.g., learning that text Number 123 is about finance and sharing this information with others after the test, etc.

7. Test materials are presented as an image with Optical Character Recognition disabled thus ensuring text cannot be copied and pasted to other applications, and all language scripts and fonts will displayed correctly across all exam computers.

8. Vigilance on the part of the test administrator in not allowing external equipment to be taken into the exam, including phones, communication devices, cameras, and USB keys in any form

9. Consideration of an additional layer of recording such as screen recording and archiving either for each test or randomly across sites to ensure quality and performance – such data will also be valuable to NAATI and researchers in developing the tests and being externally auditable

10. Consideration of using CCTV at sites identified at being of higher risk.

4.4 Technical support for computerised testing

As the majority of options presented in this paper require at least a minimal level of technical support, it is recommended that NAATI secure, internally or externally, sufficient resources in line with the options chosen. It is likely that this technical support will need to be provided by an external company or through NAATI's existing IT provider(s). A possible alternative to a commercial technical support provider lies in partnership with an Approve Course institution with in-house expertise. As many of these institutions are large universities with considerable IT resources and technical expertise, NAATI should explore possible collaboration as it may be more financially attractive and also allow for additional benefits in terms of dedicated access to computers for all NAATI candidates, specialist knowledge, and centralised testing locations. It is beyond the scope of this paper to identify individual technical support providers and cost estimates.

5. Proposal for pilot testing

Following the points made in the previous sections and the recommendations made by the *INT Report* and *The Cook Review* as well as the uncertainty associated with all of the options presented in this paper, we propose that NAATI conducts a small-scale pilot implementation of translator testing using computers prior to a large-scale rollout.

The pilot testing could take the form of one or several of the options below:

1. Collaborative piloting with existing university partners;

2. Internal piloting within NAATI;

3. Outsourced third-party commercial piloting.

5.1 Collaborative piloting with existing university partners

Based on the findings of this paper, we believe that pilot testing should continue to involve internal and external collaboration to draw upon a wider range of expertise, increase the validity and quality of the testing, and reduce risk as well as cost.

This scenario holds several benefits:

1. Significantly reduced and minimal cost given the points below

2. Increased validity of results given piloting at multiple external and independent sites;

3. Existing in-house technical expertise (depending on university);

4. Existing in-house technical resources (depending on university), namely: computers with a wide range of languages and input options; rooms capable of maintaining exam conditions including verifiable identity, keeping constant observation, and monitoring computer activity, etc.; ability to whitelist online resources as required; in-house technical support and maintenance;

5. Existing pool of large number of students with several language pairs and directions already scheduled to take accreditation exams in each academic semester;

6. Reduced risk given each university's existing relationship with NAATI;

7. Ability to easily run piloting in tandem with in-house NAATI piloting (see point 6.2 below);

8. Flexibility around scheduling and coordination across sites due to similar academic semesters;

9. Minimal disruption to existing infrastructure.

Potential risks for this scenario include:

1. Securing appropriate collaborators with technical expertise and willingness to pilot test in proposed timeframe;

2. Securing sufficient technical resources with appropriate language compatibilities and technical support;

3. Scheduling issues with academic semesters and NAATI;

4. Less secure than working internally;

5. Typical risks of working with external parties.

Nature of Risk	Probability of Risk	Impact of Risk
Timing	Low	High
Human resources	Low	High
Technical	Low	Medium
Quality assurance	Low	High
Security	Medium	High

Table 2: Critical risk analysis for collaborative piloting with existing university partners

Given the unique relationships between NAATI and Approved Courses institutions and the latter's large number of candidates/students in each semester, due consideration should be given to the implementation of computerised assessment to these courses and their institutions. For the majority of Approved Course institutions, NAATI will need to provide access for the institution's staff to log into the system. Currently, some institutions have an independent status in terms of setting trial and final assessments using self-developed NAATI-audited texts and in selecting internal graders. Moving to computerised assessment does not necessarily need to affect this arrangement if the recommended list of users in Section 4.1.2 is implemented. Allowing NAATI-approved staff at Approved Course institution to maintain this independence is relatively simplistic in any given software implementation. This implementation may also allow, with modification, for compatibility with ISO17024 if implemented by NAATI in the future.

5.2 Internal piloting within NAATI

A second option would be for NAATI to conduct the pilot testing within its own organisation using its existing facilities, staff, and test centres. This option could be explored as an exclusive arrangement or in addition to collaboration with external institutions (as per Sections 6.1 above, and 6.3 below).

Benefits of this option come in the form of:

1. Maximum control over timing, security, and quality assurance;

2. Access to existing pool of candidates with many language pairs and directions;

3. Possibility of conducting pilots across several NAATI sites;

4. May be cost-effective depending on existing staff cost, training, and availability of technical resources and expertise.

Risks are as follows:

1. Decreased validity of results given gap between internal testing and external testing scenarios;

2. Ability to find appropriate in-house technical expertise;

3. Training and capacity management for staff;

4. Unknown level of disruption to existing infrastructure;

5. Ability to source and maintain sufficient in-house technical resources, including testing and storage space, technical support, ability to whitelist resources, language compatibility;

6. May not be cost-effective depending on existing staff cost, training, and availability of technical resources and expertise.

Nature of Risk	Probability of Risk	Impact of Risk
Timing	Low	High
Human resources	Medium	High
Technical	High	Medium
Quality assurance	Low	High
Security	Low	High

Table 3: Critical risk analysis for internal piloting within NAATI

5.3 Outsourced third-party commercial piloting

Alternatively, NAATI may wish to explore outsourcing the pilot testing to a third-party commercial company should one be identifiable and suited to the unique requirements of the pilot testing. Such a third-party commercial company could, for example, conduct the tests with greater independence or support NAATI in their own internal pilot test as per point 6.2.

Benefits to this alternative lie in:

1. Relatively independent pilot testing to increase validity;

2. Probably availability of technical resources, technical support and maintenance thereof;

3. Some degree of control over timing and coordination.

However, risks come in the form of:

1. Lack of suitable expertise and technical ability within the company, especially with regard to language compatibility;

2. Lack of security and confidentiality if testing handled entirely by the third-party;

3. Validity is still lacking given testing will not only be carried out via the third-party (e.g. Approved Courses, universities);

4. No direct access to candidates unless provided directly by NAATI;

5. Strong degree of disruption to existing infrastructure;

6. Likely to be the most costly option for piloting.

Nature of Risk	Probability of Risk	Impact of Risk
Timing	Low	High
Human resources	High	High
Technical	High	Medium
Quality assurance	Medium	High
Security	Medium	High

Table 4: Critical risk analysis for outsourced third-party commercial piloting

Overall, these options for pilot testing have presented the benefits and risks to each of the proposed options. Given the presented findings, we propose that the pilot testing be carried out in collaboration with: more than one external institution that holds Approved Courses in translation, has sufficient in-house technical expertise and resources, and can work with NAATI within the required timeframe and as soon as the front-end becomes available. This pilot can be coordinated in tandem as each university holds trial accreditation exams during each academic semester as preparation for the final accreditation exam. Students of these programmes can voluntarily opt into this pilot testing in their trial exam and retain this right to choose either option for their final exam.

6. Recommendations

This section consolidates the findings from each of the previous sections to form the list of recommendations proposed by this paper. Each of these recommendations has been reached by the authors from: the findings of the relevant research presented in this paper; detailed feedback from NAATI and its advisors, and from the INT Steering Committee.

We therefore make the following recommendations to NAATI for computerised translation testing:

1. That the introduction of computerised testing is considered based on the Professional level exam; adjustments can then be made (e.g., whitelisted resources) for Paraprofessional and Advanced level testing.

The rationale for this is that, following other recommendations to the INT Report, changes to Paraprofessional and Advanced level translation testing are likely to be more substantial than for the Professional level. In addition, Professional level accounts for the vast majority of NAATI's candidates, approximately 95%.

2. That the option for candidates to sit translation testing on computers is pursued while taking into account that, for a period of 5 years, both pen and paper and computerised exams will have to coexist.

The assumption is that pen and paper testing 'into English' will be phased out soon but, for some language scripts, e.g., Arabic, candidates will still prefer siting the 'from English' testing using on pen and paper given the limitations of existing input options for these languages. As an alternative, if after the phase-in period, adequate language input options are still unavailable for this small number of languages, candidates in this category be given the option to take either the pen and paper or computerised option until an adequate language input option is implemented.

3. That no changes are introduced to current pen and paper testing and no hard-copy resources are allowed in computerised testing as the entire test is conducted on the computer using whitelisted resources and full digital delivery of all test materials.

As has been explained, other interim options exist: adding whitelisted resources to the current pen and paper model or hardcopy dictionaries to the computer-only model; the proposed model (see Recommendation 10 below) is the most simple and cost-effective solution. Each language panel can agree upon whitelisted resources for their languages and should include, at least, one monolingual dictionary for each language and one bilingual dictionary. The front-end of the system will allow the candidate's web browser to only visit the whitelisted resources. Necessary resources for Paraprofessional and Advanced level testing should also be provided by the language panels and reviewed at an agreed-upon interval.

4. That the computerised test only allows candidates to work on a plain text editor rather than on a full word-processor.

The text editor has the advantages of (a) giving all languages a level playing field, since the word-processor offers for some languages more sophisticated features than for others (e.g., spelling and grammar checking, thesauri, Microsoft Word's in-built translate function); and (b) greater security, since copying in the plain text editor environment can be more easily restricted.

5. That candidates on the computerised test are given access to limited, agreed-upon Internet resources.

This should take the form of a whitelisted websites chosen by the language panels. These resources should be limited to dictionaries only (monolingual and bilingual), not including access to online bi-text repositories such as Linguee, Computer-Assisted Translation tools, and machine translation. For Advanced level testing, the list of whitelisted sites should be widened to include the appropriate specialised resources as agreed and reviewed by each language panel.

6. That candidates are not permitted to bring their own computers, rather computers are provided for them.

While the technology allows for a reasonably secure delivery of testing on the candidate's own computers (and even for remote testing), there will always be the strong possibility of candidates interfering in the delivery process since they will still retain administrator rights. This also applies to USB delivery methods. Candidate-provided computers have also been excluded by the majority of other accreditation bodies.

7. That under certain conditions and for 'from English' testing candidates be allowed to bring their own keyboards.

Candidates should request and be given permission prior to testing; only USB keyboards may be allowed; NAATI cannot take any responsibility whatsoever for the installation and on-going function of the candidate's keyboard. Keyboard overlay covers may also be used, if provided by the candidate and prior permission has been granted from NAATI.

8. That candidates are allowed to familiarise themselves with the software used for testing prior to testing.

Without this, candidates will not be allowed to make an informed decision on whether to opt for the pen and paper or for the computer exam. This dry run will not include any translation task, it will simply allow candidates to familiarise themselves with the language input options, the interface, and the text editor. This basic version of the testing software should be available online via NAATI's website so that candidates do not have to come to the test centre in person.

9. That the exam delivery system is implemented on a 3-layer, not a 2-layer, architecture.

The rationale for this being that at not much additional cost, it can ensure greater security, reliability, and flexibility. This 3-layer structure comes in the form of: local, exam, and server, and has been devised based on the ATA's extensive testing of 2- and 3-layer options using CertSoft.

10. That the ATA's CertSoft system be trialled by NAATI in collaboration with the T&I community

NAATI can learn valuable lessons from the ATA's CertSoft system and gain from its extensive testing over the last decade, thus providing the closest option to an off-the-shelf solution that is currently available and is likely to be available in the future given the unique nature of translation testing and the small market it represents. While other secure systems may become available in the future, some degree of customisation and technical support will invariably be required.

As an alternative, NAATI should explore the usage of web-based testing platforms such as QuestionMark to ascertain the compatibility of such services with its needs, and explore collaboration with more of the world's 100+ translator testing bodies to identify the possibility of sharing resources and costs in approaching software developers and/or IT providers to create other solutions.

As already described, most of the technical resources and expertise that are required for rolling out computerised testing are already available through NAATI's Approved Course institution network. By collaborating with large-scale institutions that have Approved Courses in translation, the appropriate technical expertise, resources, and in-house technical support, NAATI can greatly increase the likelihood of executing a shorter and more successful piloting and implementation period with reduced cost and risk.

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