Translation for tomorrow:
Understanding the impact of Neural Machine Translation
on Language Service Providers

Word Count: 800 words

In our increasingly globalized world, expansion across boarders has become more of a question of "when" rather than "if." This expansion, however, does not come without challenges. Companies need to translate their business in way that resonates in other culture and other languages. Language Service Provides (LSPs) seek to meet that need.

Services offered by LSPs range from translation of documents, such as user manuals, to translation / localization of software, to transcreation (translation with a particular emphasis on maintaining tone, e.g., translating an advertising campaign). These companies have historically relied on human translation aided by various technologies.

Machine learning has created a new type of translation called neural machine translation (NMT). NMT uses a neural network to make probabilistic guesses of translations for sequences of words.[1][2] This type of translation has improved machine translation technologies to provide more accurate and natural translations. NMT presents both opportunity and risk for Lionbridge, one of the major players in the fragmented LSP market.

The introduction of machine translation has impacted product development at Lionbridge and other LSPs because it has increased price competition and attracted new entrants to the market. LSPs have had to think more creatively about their product offerings to offset these trends. NMT has also expanded the various applications available for translation; text that was not 'worth' translating before now can be translated using NMT (e.g., automatic translation of news articles). Additionally, improving NMT has taken 'share' from human translation, by number of words translated, due to its lower costs.

NMT faces certain limitations. NMT performs best for translations of common, shorter phrases.

> *"NMT performs relatively well on short sentences without unknown words, but its performance degrades rapidly as the length of the sentence and the number of unknown words increase."*[3]

[1] Nal Kalchbrenner and Phil Blunsom. "Recurrent Continuous Translation Models." *Association for Computational Linguistics,* (2013): 1700-1709. Accessed November 2018.

[2] Yoshua Bengio, Rejean Ducharme, Pascal Vincent, and ´ Christian Janvin. "A neural probabilistic language model." *Journal of Machine Learning Research*, (2003): 1137–1155. Accessed November 2018.

[3] Cho, Kyunghyun et al. "On the Properties of Neural Machine Translation: Encoder-Decoder Approaches." SSST@EMNLP (2014). Accessed November 2018.

NMT performs best in cases where accuracy of the translation is not paramount and the translation is more common and less creative. Exhibit 1 shows the potential impacts of NMT on various types of translation services. An example of this applied to LSPs would be translation for legal services. The large databases of phrases built up by, for example, Google in its machine translation libraries are not likely to be able to accommodate the specialized language and high level of accuracy needed for certain translations. These companies must simultaneously (1) incorporate NMT into their product offerings to remain competitive with other LSPs and (2) navigate the threat of tech firms that are entering the market (e.g., Google) for certain applications (see Exhibit 1).

Exhibit 1

Source: Literature search, including Lionbridge and competitor websites
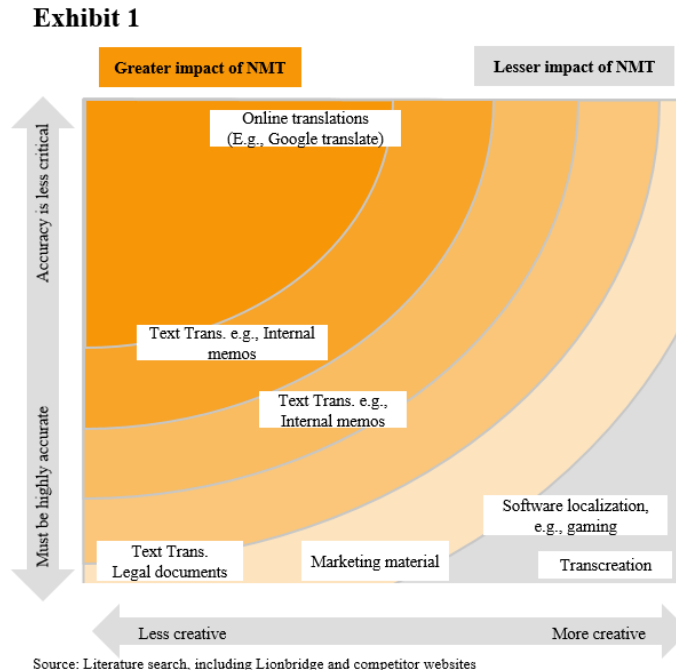
There are three moves Lionbridge has made in order to address these issues in the short to medium term: focusing on more 'protected' content, integrating NMT into their translation offerings, and developing expertise in the use of machine learning for natural language processing.

First, Lionbridge has moved to focus on content that is more protected from disruption from NMT, namely, gaming[4], digital content[5], and legal services. These areas are more protected because they require a high level of creativity (e.g., gaming), they require a high level of accuracy (e.g., Legal services), or they require both.

Lionbridge is also moving to integrate NMT and machine learning into their current offerings to improve quality, speed, and cost of human translations (LSPs currently use more established technologies, such as Translation Memory[6] for this purpose). Additionally, Lionbridge is moving into product offerings that live at the intersection of language and AI, such as natural language processing capabilities for application in customer service.

In order to further address the threat of NMT and further develop its potential, Lionbridge should focus on developing additional expertise on when to use what types of translation, regardless if that falls into the product offerings at Lionbridge. For example, Lionbridge should position themselves as global language consultants, specializing in assisting companies more broadly in globalizing their content.

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[4] Lionbridge Technologies, Inc. "Let the Games Begin: A Q&A with Lionbridge Gaming's Tugdual Delisle." http://content.lionbridge.com/let-the-games-begin-qa/, accessed November 2018.

[5] Lionbridge Technologies, Inc. "Lionbridge Named to EContent 100 for Digital Innovation." http://content.lionbridge.com/lionbridge-named-to-econtent-100/, accessed November 2018.

[6] Elina Lagoudaki. "Translation Memories Survey 2006: Users' perceptions around TM use." *Translating and the Computer* 28 (2006): 1-29. Accessed November 2018.

While LSPs need to incorporate NMT into their services in order to stay competitive, relying too heavily on this alone presents risks. Players like Google, Microsoft, and Amazon have all entered the machine translation space.[7] Staying competitive with these players on technology would likely require investment beyond what an LSP would be able to provide. Lionbridge should develop expertise on language and globalization strategy – in addition providing translation services for contexts when NMT is not sufficient or appropriate. LSPs should seek to work with, rather than against, the new entrants this disruptive technology has brought to the translation services market.

Looking to the long-term (10+ years from today), Lionbridge faces a high level of uncertainty. *Will technological advances leave too little 'share of word' for LSPs? Will demand for translation services continue to grow or soften as populations become increasingly multilingual?* While in the short-term, LSPs can continue to provide the services that machine translation cannot address, the long-term prospects of the industry are at risk.

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[7] Jordan Novet. "Amazon is planning to rival Google with a service that translates languages." CNBC News, June 26, 2017, https://www.cnbc.com/2017/06/26/amazon-web-services-launching-machine-translation-service.html, accessed November 2018.