

Between Technological Nostalgia and Engineering Imperialism: Digital History Readings of China in the Finnish Technoindustrial Public Sphere 1880–1912

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How does foreign technology influence a country's industrialization? Here this classical question within the history of technology is – inspired by recent cultural and transnational turns within historical research – approached through a national technological community's representations of the technology and industrialization of a foreign great power and how they can be mined for larger underlying cultural and political strata. More specifically, we analyze how Imperial China's technology and industry was represented in the central journals of the Finnish community of technologists during Finland's nascent industrial take-off. Furthermore, this is done by using quali-quantitative digital methods currently being developed within the field of digital humanities.

This article provides a study of how a national technological community saw itself and other nations' technological and industrial development through a political lens, contributing to what we describe as the history of *technological geopolitics*. This approach is inspired by historians such as Michael Adas, Henrik Björck, Peter Fritzsche, and Gabrielle Hecht focusing on intersections of technology and transnational global politics; how nations use their perceived technological and industrial standing to position themselves in relation to other nations – especially industrial and technological great powers. Fritzsche describes how from the end of the 19th century technology and nationalism

*reinforced each other; progress was widely perceived as a great scramble among states in which there were unmistakable winners and losers. [...] If machines were the measure of men in the modern era, as Michael Adas argues, airplanes and airships were the measure of nations at the beginning of the twentieth century, distinguishing not only European genius from an African or Asian mean, but also the truly great powers among the European nation-states.*³

We conceptualize this technological geopolitical struggle through the notion of an 'industrial league of nations' consisting of the countries a nation can be seen as primary positioning itself against. For Finland, we posit that it during its past and present industrialization has measured its technological and industrial position, its technoindustrial standing, implicitly or explicitly against two groups of nations: the *industrial powers* – the UK, France,

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³ Peter Fritzsche, *A nation of fliers: German aviation and the popular imagination* (Cambridge MA: Harvard University Press, 1992), 2–3.

Germany, USA, Japan and China, and its near *geographic neighbors* – the Scandinavian countries Norway, Sweden and Denmark, and Russia/Soviet Union. An indicative measure of the status of the interest in this league of nations among Finnish technologists is provided in the table below of their occurrence in Finnish technical journals 1880–1912.

Country	Total hits
US	7172
Germany	6800
England	5738
Sweden	5033
Russia	4079
France	2941
Norway	2265
Denmark	2143
Japan	538
China	445

Table 1. Appearance of selected countries in Finnish technical journals, 1880–1912.⁴ Source: Digital Collections of National Library of Finland, digi.kansalliskirjasto.fi.

Technological geopolitics have figured prominently although implicitly within Finnish history through studies of foreign influences emphasizing how Finnish industrialization has been characterized by learning from technological great powers abroad.⁵ Another geopolitical dimension recently emphasized is Finnish industrial nationalism. Business historians have shown how the industrial late-comer Finland followed principles of economic nationalism that combined active learning from abroad and protectionism, for example concerning company ownership and control of natural resources, and historians of technology have emphasized how Finnish technological projects aided development of national autonomy and identity.⁶

This industrial nationalism can be seen as part of a more encompassing way of 19th century Finland to perceive its current status and future position. Although not an independent country but a somewhat autonomous Grand Duchy in the Russian Empire, Finland's intellectual elite was inspired by the 19th century nationalism to perceive itself as constructors of a Finnish nation. This included active reflection on developments in the western more

⁴ Indicative key word searches conducted in our period and material for exemplifying the "interest" of the journals in different countries. The selected technical journals are described in the next section, footnote 15 in particular.

⁵ For example, Timo Myllyntaus, *The gatecrashing apprentice: Industrialising Finland as an adopter of new technology* (Helsinki: Helsingin yliopisto, 1990).

⁶ Karl-Erik Michelsen and Markku Kuisma, "Nationalism and industrial development in Finland," *Business and Economic History*, Second Series, 21 (1992): 343–353; Niklas Jensen-Eriksen, "Business, economic nationalism and Finnish foreign trade during the 19th and 20th centuries," *Revue française d'histoire économique – The French Economic History Review* 1, no. 3 (2015): 40–57; Petri Paju and Katariina Mauranen, *Tekniikkaa hyvässä Seurassa. Tampereen Teknillinen Seura 125 vuotta* (Tampere: Tampereen Teknillinen Seura ry, 2018); Saara Matala and Aaro Sahari, "Small nation, big ships: winter navigation and technological nationalism in a peripheral country, 1878–1978," *History and technology* 33, no. 2 (2017): 220–248.

“advanced” and “civilized” centers, which helped the Finns to formulate national reforms and prepare for a future that loomed elsewhere.⁷ Moreover, the elite was concerned about the nation’s visibility and success at international industrial fairs and events and in international statistical surveys. In this way, the Finnish elite, similar to other nations, was engaged in a civilizational struggle between nations, which perhaps in particular took place on the industrial field.⁸

Previous studies on Finnish transnational relations and technonationalist identities have almost exclusively focused on Finland’s relations to its neighbors and more advanced western countries rather than relations with non-Western areas. This article starts to fill this lacuna, by looking at Finland’s interactions with China, the once great ancient technological nation and future industrial superpower, which in the 19th century was a vast resourceful but industrially late-coming Empire.

Previous scholarship on Finnish-Chinese relations has primarily focused on connections to the Communist People’s Republic of China (PRC) and on contemporary issues. The rare studies on late Qing China mainly focus on Finnish cultural representations and relations, for example, through travels or object collections.⁹ The Russian Grand Duchy of Finland did not have official contacts with China, although as will be shown, Russia formed an important gateway for Finns to China. Notable is that Finland’s neighbor Sweden already at Qing China’s opening in the mid-19th century strived at establishing diplomatic contacts and later at the turn of the century similar to the other major western countries pushed its industrial and commercial interests in China.¹⁰

In the 19th century, only individual Finnish travelers went to China, but already by the early 20th century China had a small Finnish diaspora. There is no comprehensive knowledge about these Finns, but Tiina Airaksinen notes that they were, for instance, able to work as experts in the foreign multinational and imperialist context such as in British-led maritime customs.¹¹ Moreover, Finnish missionary activities were established in China by the

⁷ Matti La Mela, *The politics of property in a European periphery. The ownership of books, berries, and patents in the Grand Duchy of Finland 1850–1910* (PhD diss., European University Institute, 2016).

⁸ Anders Ekström, *Den utställda världen: Stockholmsutställningen 1897 och 1800-talets världsutställningar* (Stockholm: Nordiska museets förlag, 1994); Henrik Björck, *Teknikens art och teknikernas grad: Föreställningar om teknik, vetenskap och kultur speglade i debatterna kring en teknisk doktorsgrad, 1900–1927* (Stockholm: Kungliga tekniska högskolan, 1992); Kerstin Smeds, *Helsingfors–Paris: Finland på världsutställningarna 1857–1900* (Vammala: Svenska litteratursällskapet i Finland & Finska Historiska Samfundet, 1996); Mats Fridlund, “De nationalistiska systemen: Konstruktion av teknik och svenskhet kring selskiftet 1900,” in *Den konstruerade världen: Tekniska system i historiskt perspektiv*, ed. Pär Blomkvist and Arne Kaijser (Stockholm: Brutus Östlings Bokförlag Symposion, 1998), 77–103; Mats Fridlund, *Den gemensamma utvecklingen: staten, storföretaget och samarbetet kring den svenska elkrafttekniken* (Stockholm: Brutus Östlings Bokförlag, 1999). Matala and Sahari, “Small nation, big ships”.

⁹ Tiina H. Airaksinen, “Suomalaisuus 1900-luvun alun Kiinassa,” *Historiallinen aikakauskirja* 106, no. 3 (2008): 241–254; Leila Koivunen, *Eksotisoidut esineet ja avartuva maailma. Euroopan ulkopuoliset kulttuurit näytteillä Suomessa 1870–1910-luvuilla* (Helsinki: Suomalaisen Kirjallisuuden Seura, 2015); Max Engman, *Suureen itään: suomalaiset Venäjällä ja Aasiassa* (Turku: Siirtolaisuusinstituutti, 2005), 407–426.

¹⁰ Pär Cassel, “Traktaten som aldrig var och fördraget som nästan inte blev: De svensk-norsk-kinesiska förbindelserna 1847–1909,” *Historisk tidskrift* 130, no. 3 (2010): 437–466; Tiina H. Airaksinen, “Kiina ja Pohjoismaat,” in *Opera et dies: Festskrift till Lars-Folke Landgræn*, ed. Peter Stadius, Pirkko Hautamäki, and Stefan Nygård (Helsingfors: Schildts, 2011), 152–158.

¹¹ Airaksinen, “Suomalaisuus 1800-luvun alun Kiinassa,” 244–246; Engman, *Suureen itään*, 407–408, 414–417; Mikko Uola, *Suomi ja keskuksen valtakunta: Suomen suhteet Kiinan tasavaltaan 1919–1949* (PhD diss., University of Turku, 1995), 28–41.

turn of the century.¹² Our study contributes to this little-researched field of Finland-China relations by looking at Finnish perceptions of Chinese technology and Qing China as an industrial nation during the period of industrialization that is often referred to as the Second Industrial revolution.

The Finnish views of late Qing industrialization are approached through a digital history analysis of representations of Chinese technologies in Finnish technical journals. In the following we present the study's core methodological conceptions of the *technoindustrial public sphere* and *digital history 1.5*. This is followed by an analysis of the central elements of the Finnish perceptions of Chinese technology and industrial development. In conclusion we summarize our main results and points toward possible future studies.

The Finnish technoindustrial public sphere

The article investigates how China figured in the technical and industrial journals published in Finland, a central part of the Finnish public sphere devoted to technology and industry during the second industrial revolution, which we describe as the *technoindustrial public sphere*. Its underlying core idea is that the processes of industrialization from the 19th century onwards can be divided in public and private technological processes and where the public sphere is enacted as a space between authorities and individuals for critical debates about matters of public importance. Evident from the term itself, the technoindustrial public sphere is conceptualized as primarily the various public forum and media that were used for deliberation, debate, dissemination, agenda formulation and problem solving of central technological and industrial issues, such as technical association meetings, industrial fairs and exhibitions, public inquiries as well as newspapers, journals and books and visual and artistic depictions.¹³ Among those, the technical journals were a central media to Finnish technologists, and offer a good lens for examining what the readers could, and to some extent wanted, to read about the significant technoindustrial issues of the day – in our case those related to China.

The selected technical journals are specialized in that they primarily offer perspectives on technology and industry, and to some extent culture, but do not discuss, for example, political events that were reported by general newspapers. The journals' specialized perspective is beneficial to our method where manual close reading assists the digital text mining. The journals were published for and read by various kinds of technologists with divergent social and professional backgrounds. The modern profession of 'engineers' was only slowly

¹² Uola, *Suomi ja keskuksen valtakunta*, 35–38; Engman, *Suureen itään*, 410–413.

¹³ This application of Jürgen Habermas' concept of the public sphere to the area of technology and industry borrows from two partly overlapping notions of the "industrial public sphere" within business history as formulated by Paul Hirst & Jonathan Zeitlin and by Maxine Berg. The notion of Hirst & Zeitlin has a spatial focus on the creation of regional or sectoral interactive and cooperative social forums connection with 'industrial districts' while in Berg the emphasis is on the public sphere as a forum for disseminating 'useful knowledge'. See Jürgen Habermas, *Strukturwandel der Öffentlichkeit: Untersuchungen zu einer Kategorie der bürgerlichen Gesellschaft* (Neuwied; Berlin: Luchterhand, 1962); Jürgen Habermas, *The Structural Transformation of the public sphere: An inquiry into a category of bourgeois society* (Cambridge: MIT Press, 1989); Paul Hirst and Jonathan Zeitlin, "Flexible specialization versus post-Fordism: Theory, evidence and policy implications," *Economy and society* 20, no. 1 (1991): 5–9. Maxine Berg, "The genesis of 'useful knowledge,'" *History of science* 45, no. 2 (2007): 123–133.

taking shape in late 19th century Finland with, for example, university level education starting only in the early 20th century.¹⁴ The journals were part of the technical and industrial field's diversification, professionalization and regional development of the late 19th century, where these engineering-oriented individuals – from handicraft manufacturers to academically educated – had varying interests regarding technical journals. This evolving techno-industrial public sphere made the on-going technological and industrial transformation more visible, available and understandable, but also distributed the expert-roles differently among the various kinds of technologists.

We have selected all journals that specialized in technology or industries published between 1880–1912, starting when the first Finnish engineering journal began publishing and ending with the Chinese empire's dissolution on 12 February 1912. This collection consists of the four main technological journals, including their specialized supplementary journals.¹⁵ In the bilingual, slowly industrializing Finland, these journals can be divided according to their specialization and language: roughly speaking, the Swedish-language journals were more academic or technically-oriented, whereas the Finnish-language journals were directed to handicraft and industrial practitioners as well as a more general audience with technical interests.

The Swedish-language *Tekniska Föreningens i Finland förhandlingar* (TFiF), (*Proceedings of the Technical Association in Finland*), was the journal of the first Finnish technical association *Tekniska Föreningen i Finland* established in 1880. The association was founded to manage the growing flows of technical knowledge into Finland and to spread information among technical groups and to hone the professional engineers' identity. The academically minded TFiF was the association's organ primarily disseminating the latest technical-scientific information from abroad. In 1882, the industrial and handicraft associations founded the Finnish-language journal *Suomen Teollisuuslehti* (SI), (*The Finnish Industrial Magazine*). It published practical advice to craftsmen and artisans and news related to smaller industries. Its focus shifted towards technical matters towards the turn of the century, and it started to publish supplements for specific professional groups in industrial art, construction, forging, electricity, mechanical engineering and textile and paper industries. *Teknikern*, (*The Technician*), a second Swedish-language technical journal established in 1890, was situated between the two previous technical journals, and aimed at technical professionals and the broader public interested in modern technological-industrial development. In the early 1890s, technical associations were founded in the main cities outside the capital, and *Teknikern* became supported by the technical professionals of Finland's second city Turku (Åbo). Alongside with this regional expansion and due to criticism in the national *Tekniska Föreningen* about ignoring the needs of the Finnish-language technical field, the national Finnish-language technical association *Suomenkielisten Teknikkojen Seura* was founded in 1896. In 1911, it established

¹⁴ Karl-Erik Michelsen, *Insinöörit suomalaisessa yhteiskunnassa* (Helsinki: Tieteen akateemisten liitto; Suomen Historiallinen Seura, 1999), 116–121, 133–145, 179–184.

¹⁵ The journals studied are (in order of publication date): *Tekniska Föreningens i Finland förhandlingar* (1880–end), *Suomen teollisuuslehti* (1882–1910, 1911 merged with *Koneteollisuus*), *Teknikern* (1890–end), *Teknillinen Aikauslehti* (1911–end). Published with TFiF: *Arkitekten: tidskrift för arkitektur och dekorativ konst* (1903–end). Published with *Suomen teollisuuslehti*: *Suomenkielisten teknikkojen seuran julkaisuja* (1897, 1898, 1902, 1903), *Rakentaja* (1901–1905), *Kotitaide* (1902–end), *Seppo* (1902–1909), *Sähkö ja voima* (1902–1909), *Kutoma- ja paperiteollisuus* (1906–end). We have excluded journals of other professional technical associations and trade unions that were founded especially after 1905.

its own publication *Teknillinen aikakauslehti (TA)*, (*The Technical Journal*); before this, the ST offered space for the association while the TFIF remained the primary national forum for academic discussion.¹⁶

The representations of Chinese technology that these journals disseminated to its readers were produced through many steps of editing and selection. In the analysis, we have distinguished between the different readerships and backgrounds of the journals, but at times also looked at the provenance of the articles, which often points at Swedish and German engineering journals.

Digital history 1.5 readsearch of Chinese technology

To analyze the journals, we utilize ‘digital history 1.5’, semiautomatic historical methodologies in between ‘digital history 1.0’ – the use of normalized digital tools and methods – and potentially paradigmatic quantitative ‘digital history 2.0’ research methods. Examples of digital history 1.0 would be how many – probably most – contemporary historians have today incorporated the use of different digitally enhanced tools and materials as a part of their normal research practice. These include various digital applications, databases and sources (for example Google, JSTOR and finna.fi) for digitally augmenting their historical research.¹⁷ On the other hand, digital history 2.0 represents research practices with a paradigmatic potential to form a new digital historical discipline focused on the use of new quantitative and computational methods. It consists of historical research where various digital applications and quantitative methodologies are used systematically for big-data text and data mining calculations and visualizations such as topic modeling, network analysis and text and data scraping – several which necessitate investments in acquiring expertise in or collaborators skilled in programming and data base methodologies.

Digital history 1.5 can be described as digital history without programming, and is a hybrid or mixed methodology in that it is combining quantitative and qualitative historical research methodologies. It consists of the systematic use of various pre-programmed off-line and online calculation and visualization applications and tools using digital text and databases, such as GoogleBooks, Early English Books Online (EEBO) and digitized historical newspaper archives. Digital history 1.5 is different to digital history 1.0 by using digital tools and sources systematically, and where the digital methodologies, like in this study, are central and enabling rather than peripheral to the investigation. Furthermore, it is not digital history 2.0 as it is only using pre-programmed applications and resources without any need of separate advanced programming.¹⁸

The specific digital history 1.5 methodologies used in this article are semi-automatic text extraction and presentation in the form of what we describe as *trawl readsearch*, which combine quantitative computer-enabled ‘distant reading’ of big data digital text corpora and

¹⁶ Karl-Erik Michelsen, “Teollisuuden ja tekniikan aikakauslehdet,” in *Aikakauslehdistön historia 9*, ed. by Päiviö Tommila (Kuopio: Kustannuskiila Oy, 1991), 325–333; Paju and Mauranen, *Tekniikkaa hyvässä Seurassa*, 51, 54–59.

¹⁷ Besides using ‘invisible’ domesticated digital tools such as word processing, email, search engines and electronic articles, pictures and documents in their normal professional research practice.

¹⁸ Mats Fridlund, “Digital history 1.5: Historical research between domesticated and paradigmatic digital methods,” *HumLab Seminar Series*, Umeå University, 18 May 2018, accessed on 26 March 2019, https://web.archive.org/web/20190331123529/http://stream.humlab.umu.se/?streamName=digital_history_1_5.

qualitative ‘close reading’ of individual journal articles.¹⁹ Readsearch is a new hybrid concept denoting a quali-quantitative methodology combining targeted close manual and machine distant reading through the use of search engines on large digital text corpora. ‘Trawl read-search’ is a specific methodology which like trawl fishing is a combination of machine and manual work, using machine distant reading through search in an online digital journal archive to obtain many hits of articles containing a general term, word or phenomena – in our case China – that is subsequently refined using manual close reading.

This study uses a semi-automatically extracted and processed database, which in total incorporates 379 independent text entries about China published in the selected Finnish engineering journals between 1880 and February 1912. These journal articles were collected using the DIGI-online search interface of the National Library of Finland.²⁰ Our trawl read-search used a simple keyword search with the term ‘China’–‘Kiina’ in Finnish and ‘Kina/es’ in Swedish²¹ – which resulted in 445 hits where the keyword appeared at least once. If this is contrasted with similar searches for other countries, we see that ‘China’ is neither a very common nor rare keyword.²² The top countries – United States, Germany, England, Sweden, and Russia – give between 4,000 and 7,000 hits, with China close to countries such as Spain, Japan, and Belgium (450, 538, and 705 hits). Interestingly, this rough estimation seems to show more interest in China in the Finnish-language than the journals published in Swedish, as ‘China’ appears relatively more often than other countries²³. This difference is partly confirmed by our analysis below.

The 445 hits we received contained all hits produced by the search string. These hits do only refer to journal pages where the string was found and not to individual articles. Therefore, we ‘close read’ all the articles found by the search and entered them into a database. In this process, we evaluated their appropriateness of the hits (removed false hits, articles published outside our period), related the hits to individual text entries, classified the text entries according to their technological type and theme, and collected temporal and geographical location information from the entries. Among the 445 ‘China’ hits, 379 were individual text entries where ‘China’ appeared one or more times. The majority of the individual texts (45.9%) appeared in the Finnish-language *Suomen Teollisuuslehti*, whereas the Swedish-language share (TFiF and *Teknikern*) was almost one third (30.9%).²⁴ For the analy-

¹⁹ Franco Moretti, “Conjectures on world literature,” *New left review* 1 (Jan Feb 2000): 54–68; Franco Moretti, *Graphs, maps, trees: Abstract models for a literary history* (London: Verso, 2005); Franco Moretti, *Distant Reading* (London: Verso, 2013).

²⁰ Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/?language=en>.

²¹ The search strings used were: “kiina*” (Finnish) and “chin* OR Kina OR kines OR kines* NOT text.raw:kin NOT text.raw:kins NOT text.raw:kincr NOT text.raw:kiner NOT text.raw:kinen” (Swedish).

²² Obviously, such search does not tell anything about the content or the possible OCR-errors included in the hits, but is a very indicative figure.

²³ For China, there were 305 hits in Finnish in contrast to 140 hits found in Swedish-language journals. The difference is visible even with simpler Swedish search terms (which generate false hits). Also, Japan results in slightly more hits in Finnish than in Swedish (291 and 247). In other selected country searches—Germany, England, Russia, Norway, Sweden, Spain, India, for instance—the Swedish-language hits are more numerous. The differences for China could relate to better search results due to the relatively simpler word form in Finnish.

²⁴ Importantly, there seems not be any large structural differences between the journals: the shares of journals do not change when all hits (445) and the actual article corpus (231 texts) are used. Only the share of the Finnish-language Kotitaide (*domestic, industrial art*) decreases, due to the fact that the journal contained a substantial amount of advertisements of “Chinese tea”.

sis, we only picked the text entries about technology, industries or manufactured products, which narrowed them to 270 texts. Finally, we selected only the more substantial articles in the form of notices, actual articles and reviews of foreign journals, leaving aside all advertisements and other texts where ‘China’ appeared (such as tables of contents). This refined dataset, containing independent articles on technology, industries or manufactured goods with at least one mention of ‘China’, formed a corpus of 231 texts. This became our final article corpus that we analyzed using distant and close readings of how Qing technological and industrial things were represented to Finnish technologists.

Geopolitical contexts of China’s industrialization

As technoindustrially-minded Finns were eagerly looking abroad from the 1880s and onwards, how did they perceive the technological and industrial conditions in the distant Chinese Empire, the Great Qing dynasty that since 1644 had ruled one of the world’s largest empires with some 300 to 400 million subjects, and which by February 1912 was dissolved and transformed into the Republic of China? Chinese technology was a constant although not a very prominent subject in the technical journals (see Figure 1).

During the latter 19th century, Qing China was despite being a great power, perceived as an industrial laggard who had stagnated politically and economically in relation to the other world powers.²⁵ In general, contemporary western representations portrayed China as harboring a great industrial and commercial potential, which to Western industrial nations was seen both as a looming threat and as a great potential boon. David Scott has described Western perceptions of late Qing China as embodying a “paradox”, combining a view of China as weak and threatening, “where its ‘actual’ weakness was juxtaposed with perceptions in China and in the West of its latent ‘potential’ strength”. According to Scott, alongside a view of China as

*the decrepit Sick Man of Asia lay frequent talk of its awakening and, for some in the West, a lurking Yellow Peril threat. China was seen as a sleeping giant, a double-sided image. On the one hand, it was asleep and inert. On the other hand, if or when it awakened, it was perceived as having the ability to throw its weight around as a giant on the move.*²⁶

²⁵ Although the debate continues about the reasons for and the timing of the Chinese decline, previous interpretations of a closed, conservative and scientifically ignorant China has since the 1990s been revised. Especially Kenneth Pomeranz’ *The great divergence* (2000) argued that how the wealthiest areas of late 18th century Europe and China were still very much in par in commercial, demographical, and even industrial terms, see Kenneth Pomeranz, *The great divergence: China, Europe and the making of the modern world economy* (Princeton NJ: Princeton University Press, 2000). The debate challenged the idea of a single, western trajectory of modernization and helped to study the Chinese development much more on its own terms. In fact, instead of looking for reasons in failing to catch-up, recent scholarship has highlighted the successful steps in late 19th century Chinese industrialization and its importance for China’s and the West’s 21st century Great Convergence of industrial developments. See for example, William T. Rowe, *China’s last empire. The Great Qing* (Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 2009), 216–219; Tonio Andrade, *The gunpowder age: China, military innovation, and the rise of the west in world history* (Princeton N.J.: Princeton University Press, 2016). For a recent synthesis on the Great Divergence debate, see Loren Brandt, Debin Ma, and Thomas G. Rawski, “From divergence to convergence: Reevaluating the history behind China’s economic boom,” *Journal of economic literature* 52, no. 1 (2014): 45–123.

²⁶ David Scott, *China and the international system, 1840–1949: Power, presence, and perceptions in a century of humiliation* (SUNY Press, 2008), 3.

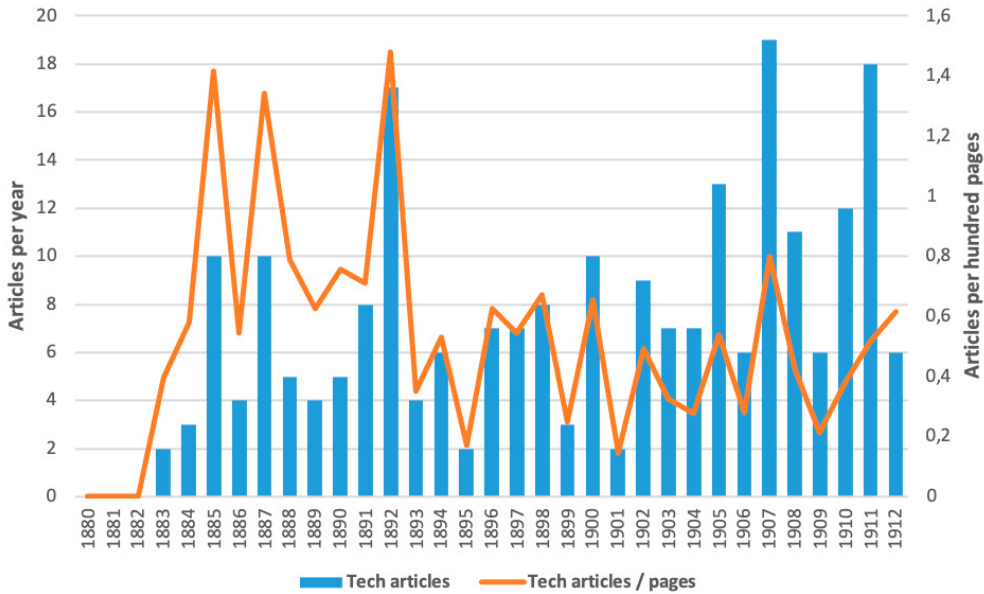


Figure 1. Articles on technology, industries or manufactured goods with a search hit on “China”.

The perception of China as a threat came from the “the basic power potential of China, its size, population, and resources”, and from the Qing ‘self-strengthening movement’ that started in the 1860s. This included military renewal, the establishment of (Chinese-owned) civilian and military industries with the help of western technology and experts and the opening up of maritime trade points and emigration.²⁷ The renewal was seen as taken effect in the 1880s. In 1883, one influential Western observer stated that it was “certain” that China had “passed its period of passivity” and was beginning its ‘Awakening’, in part thanks to it “seeming to put in place the required technological infrastructure”.²⁸ Especially China’s military buildup had been noted after its successes in 1881 in forcing Russia to give back disputed border territories and its victories on land during the 1884-85 Sino-French War, making some to see China as becoming “by far the strongest military nation in the world”.²⁹

But China, or rather migrating Chinese laborers, was also seen as an industrial threat as evidenced by racial theorist Arthur de Gobineau warning in 1881 about “the Chinaman” who had become “an object of horror and fear, because people do not know how to answer the industry, applications, persistence and ultimately, the unparalleled cheapness of his labour”.³⁰ The strengthening and opening up of China was to some summarized as “a triple

²⁷ Scott, *China and the international system*, 103; Rowe, *China’s last empire*, 201–216.

²⁸ Scott, *China and the international system*, 79.

²⁹ James Whitney, *The Chinese and the Chinese question*, 2nd ed. (1885) quoted in Scott, *China and the international system*, 84.

³⁰ Arthur De Gobineau, “Events in Asia” (1881) quoted in Scott, *China and the international system*, 97.

threat” to the West in the form of Chinese migration, industrialization and militarization: “the influx of such a people, the commercial enterprise of such a country, the possible [military] aggression ... of such a power.”³¹

However, there also existed a conflicting imperialistic view that saw China as still in decline, weak and “ripe for conquest” by foreign powers. This conquest was both commercial and military with China providing “dazzling prospects of profitable exploitation”. Such “conquistador imperialism” was especially espoused by Russia in Northern China (as discussed below in connection with Russian railways in China).³² A major example of Qing China’s waning position and incapability to keep up with other great powers was another military event, China’s defeat in 1895 against Japan in the Sino-Japanese War. China’s defeat exemplified the shifts in the power balance in East Asia; especially when the new industrial nation Japan showed its strength again when defeating Imperial Russia a decade later.³³ China in the early 1900s suffered increased foreign (military) presence following violent campaigns against foreigners in China, as in the Boxer rebellion of 1900. This was followed by introduction of western-style education and judicial reforms, but these rather costly developments seemed to, as Rowe writes, “offend everyone in the Qing society” and paved the way to the founding of the Republic of China and the Qing Empire’s end in 1912.³⁴

Both these perspectives on China was frequent in the general Finnish newspapers of the period, here illustrated by two articles among many from the Finnish press. The first was published in the Helsinki-based *Hufvudstadsbladet* and quoted the British former Qing official Robert Hart who when returning to Britain described the “peace-loving” China as “a country who will without doubt once strongly compete industrially and commercially against Europe, although it does not go fast”. But it “must become the great East Asian power in all aspects.” The second article “How will the yellow peril be fought?” taken from *Tammerfors Nyheter* presented a more threatening view in warning of the possible future migration towards Europe of the “yellow race”, and that if “Europe wants to be safe against the yellow peril China has to be divided”.³⁵ That these two general geopolitical contexts also contributed to forming the Finnish technological journals’ representations of Chinese technology and industry was apparent in both the distant and close readings of our study.

³¹ James Whitney, *The Chinese and the Chinese question* (1880) quoted in Scott, *China and the international system*, 80.

³² Scott, *China and the international system*, 105, 156.

³³ Peter C. Perdue, “What price empire? The Industrial Revolution and the case of China,” in *Reconceptualizing the Industrial Revolution*, ed. by Jeff Horn, Leonard N. Rosenband, and Merritt Roe Smith (Cambridge, Massachusetts; London, England: MIT Press, 2010), 309–328.

³⁴ Rowe, *China’s Last Empire*, 262, 280–283.

³⁵ F. H., “En hemkommande storman. Kinas reformator,” *Hufvudstadsbladet*, 21 June 1908. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/sanomalehti/binding/767618?page=10>; “Huru skall den gula faran bekämpas,” *Tammerfors Nyheter*, 10 August 1900. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/sanomalehti/binding/581776?page=3>. See also the mentioning in 1894 of the emergence in the far east of “a new ‘sick man’, China” in “Skall Kina falla I spillror?”, *Helsingfors Aftonblad*, 11 October 1894. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/sanomalehti/binding/520750?page=1>.

Nostalgic and modern representations of Chinese technologies

In the following, we analyze the refined article corpus of 231 texts, which includes all substantial articles where technology, industries or manufactured goods were discussed.³⁶

The distant reading of the articles published about China show a yearly oscillation between 2 to 10, and after 1900, there is a slight increase in yearly articles with the record year of 1907 with 19 articles. This growth in absolute numbers, however, disappears when considering the expansion of the technical press. The highest “visibility” of China is 1885–92 if normalized with the total yearly journal pages, and after that the theme falls to a lower level until the end of our investigation in 1912. It seems that the turn of the century was a turning point in the representation of Chinese technology, something which we will reflect upon in our analysis.

The close reading of the texts are used to investigate which technologies were discussed and how they were represented to Finnish technologists: and whether these technologies were represented as ancient or modern, and depicted as useful or as obsolete in relation to other contemporary technological solutions. Moreover, the articles contributed to position China in the broader global process of industrialization by discussing industrial China as an independent technological creative nation or as beholden to other (more advanced) technological countries.

Regarding the specific Chinese technologies, a broad range were discussed ranging from simple handicraft techniques and tools to larger or more advanced industrial technologies. This multitude is shown in the following word cloud, produced through a combination of our manual close reading classification of the technologies, industries, and goods connected to China in the articles and the distant reading of the resulting word cloud produced with the Wordle application. As seen from the word cloud, two broader families of technologies are distinguished.

The first consists of more traditional techniques, crafts and artisanship. Notably, such articles appeared especially in the Finnish-language journals. They describe different textile materials, such as nettle; various kinds of lacquers, ink, glues and fillers; small objects such as glassware and porcelain. The journals both explain the handicrafts as goods as well as the techniques or the manufacture of these matters. In some articles, the traditional Chinese techniques were contrasted with the science-backed European industrial production. In 1894, for instance, *Suomen Teollisuuslehti* published an article on the chemical method for producing Japanese and Chinese lacquer.³⁷ It stated that European lacquers could not compete in brilliance and durability with the Asian lacquerwork that Europeans for centuries in vain had attempted to imitate. Recently, however, a French chemist had discovered through “studies and experiments” the secrets of its composition and formation.

Second, the articles present China through the development of modern contemporary industrial technologies such as railroads and key natural resources. Importantly, as discussed

³⁶ References to all the articles and the data collected from these used in our analysis are deposited in the Zenodo digital data repository: Matti La Mela and Mats Fridlund, *References to Qing China technology and industry in Finnish technical journals 1880–1912*, Zenodo, 26 March 2019, <https://doi.org/10.5281/zenodo.2607892>.

³⁷ “Kemiallinen menettely japanilaista ja kiinalaista lakkaa valmistettaessa,” *Suomen teollisuuslehti*, 15 October 1894. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1119383?page=7>.

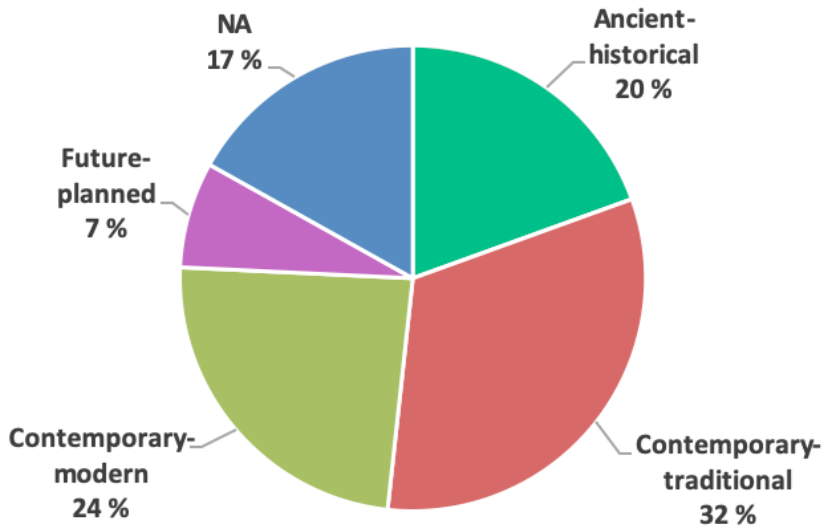


Figure 3. The temporalities assigned to Chinese technology in all the articles.

We have classified the technologies mentioned in each article in one or two temporal categories.³⁹ Figure 3 presents the shares of the different temporal categories. In figure 4, we open up the temporal categories and give a quantitative and qualitative representation of the content of the articles by naming and grouping the Chinese technologies and industries in each category.

This shows that the majority of Chinese technology was portrayed as ancient, historical or old, even if still used today. Very commonly, China appears among great ancient nations – India, Egypt, Greece, also Japan – where a technology, like gunpowder, paper, artistic or textile production, was first used. The articles, then, move forward to the first uses in Europe and finish with the expanding industrial production mentioning more in detail European cities and companies. When it comes to old technologies, what stands out in the close reading are that several articles describe the technologies in a positive sense: China was the originator of these technologies, or is still in the top with traditional manufacture. Perhaps symptomatically this applies to the first Swedish article focusing on independent contemporary Chinese industry rather than on how foreign technological developments are effecting China, a brief 1897 article on the manufacture in the Chinese Anhui province of India ink – ‘tusch’ in Swedish – also known as ‘Chinese ink’.⁴⁰ It describes what appears to be a pre-industrial manufacturing process and presents a traditional craft that still apparently thrives and exports to the world.

³⁹ Two temporalities were assigned, if the technology was presented in different temporal roles, for example in a longer article, or if the temporality was not clearly distinguishable. For articles with two temporalities, they have been given 0.5 weight in the calculation.

⁴⁰ “Tusch,” *Teknikern*, 1 November 1897. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1131808?page=11>.

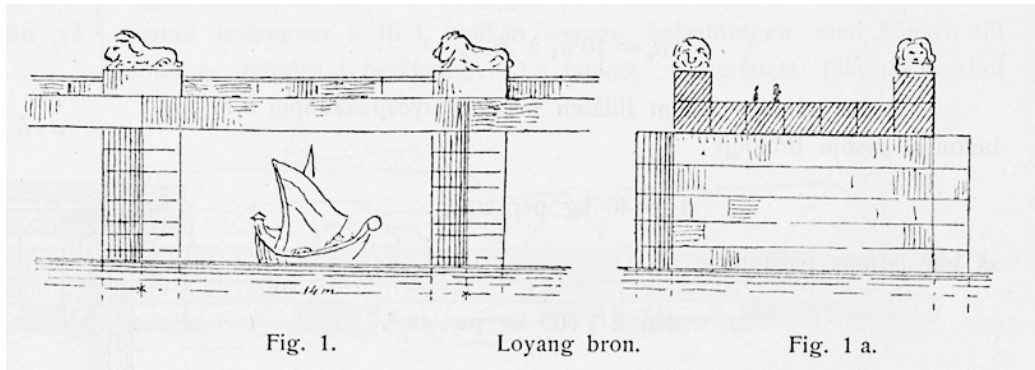


Figure 5. “An old chinese bridge”, the Luoyang bridge, as a curious historical example in bridge building. Source: *Teknikern*, 5 April 1905. Digital Collections of National library of Finland.

There are several similar articles describing old manufacturing that still exists and thrives producing products of high quality. These can be read as providing information about traditional manufacturing processes worthy of Finnish emulation, but also be viewed in a less positive and more nostalgic sense aimed at differentiating contemporary Western technologies from traditional and less effective technologies. In the article “The clay industry and its importance to our country” (1905), the author writes how in old days Finnish manufacturers had “elevated” Chinese porcelain as the exemplar and “invested all work and interest in recreating it”.⁴² This changed, however, during the 19th century when “natural science research” made “its victorious stride across the world, crushing prejudices and awakening new thoughts to life,” which also made possible a “modernization” of the ceramic arts when research revealed the properties of different clays. It praised the importance of science-based technology: “Get to know the material’s character and adapt your work after it, see that is the core of the modern technical-scientific idea!”

In a similar way, “General observations about the tanner’s profession” (1900) produce this temporal-geographic distinction. In this *Suomen Teollisuuslehti* article the roots of the tanner’s profession is traced to biblical texts, Egypt, India, and China.⁴³ After this historical “curiosity”, the article then notes how the leather industry only in the late 19th century has been developed “with scientific means”, chemistry and mechanics. The text discusses leather production methods from the US and Germany, and presents a German tanner school in Freiburg where also Finns could go and learn this profession (nobody from Finland was yet in the school’s register). The articles narratively construct the Chinese technology in a nostalgic sentimental sense, portraying things from a past era now surpassed or in the process of being outdone by modern industrial or even science-based technologies – a direction towards which also the Finns should be heading.

The second main interpretation that follows from the close reading is that when Chinese technologies are mentioned in the journals they are rarely used as examples of a domestic development, of independent indigenous technological creativity or Chinese industrial

⁴² Benj. Frosterus, “Lerindustrin och dess betydelse för vårt land,” *Teknikern*, 24 May 1905. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1121599?page=7>.

⁴³ L. O., “Yleispiirteitä nahkurin ammatista,” *Suomen teollisuuslehti*, 1 October 1900. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1119571?page=9>.

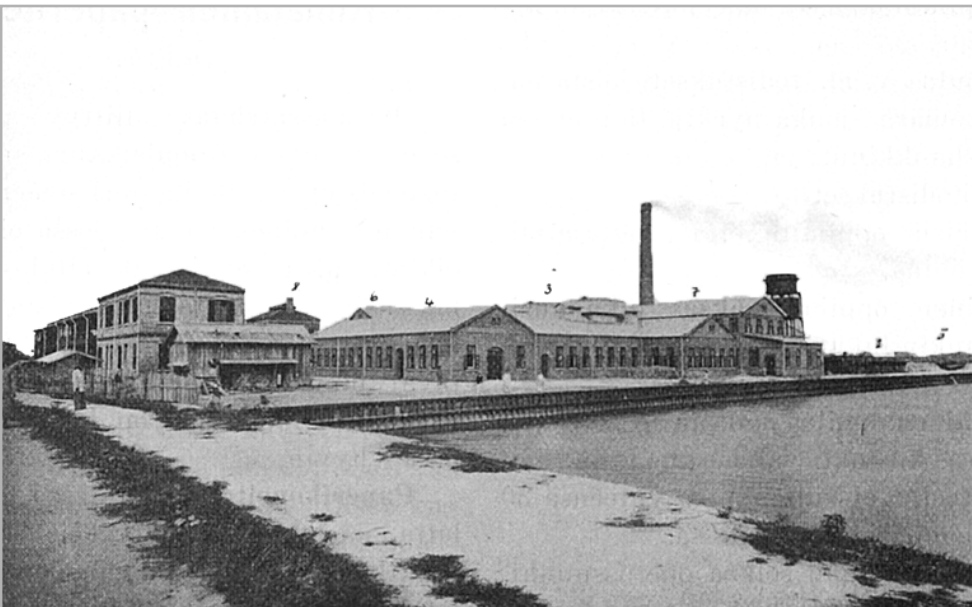
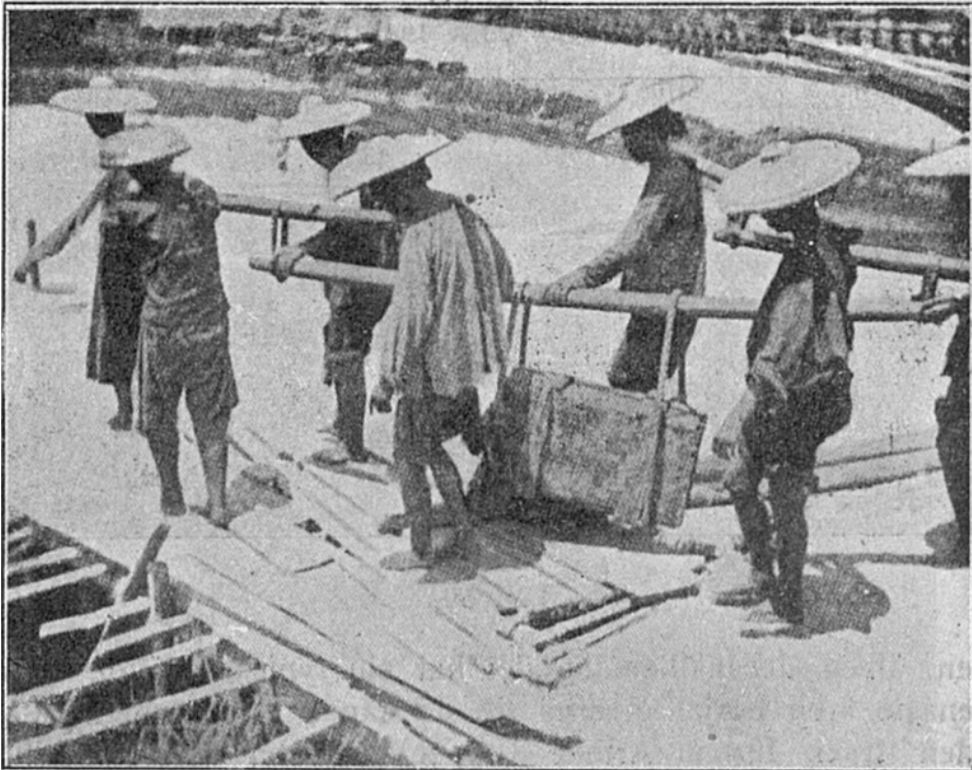


Figure 6. Old domestic vestigial and modern foreign transplanted technologies in China. Source: *Teknikern*, 28 August 1907; *Kutoma- ja paperiteollisuus*, 1 February 1912, Digital Collections of National Library of Finland.

development. Rather, the descriptions seek to emphasize the strength of Western technologies or highlight the possibilities found in Chinese natural resources. This view can be summarized by the description of the Chinese development of railways and coal mining, both modern technologies of critical importance to contemporary industrialization. They differ in being, as for railways, a technology that is a product of Western industrialization or, for coal mining, an industrial activity that has acquired its central contemporary prominence due to its importance to the development of the industrial technology of the steam engine that is subsequently used as prime movers in factories, power plants, railways and steam boats.

Railways is the dominant technology mentioned overall connected to China. Often it is in connection with current or future development and growth of the railway network in China, its current vast expanse, the building of new or planning of future railway lines. However, these Chinese railways are almost always controlled and operated by foreign companies and powers. They are mentioned as representing foreign control or influence on Chinese industrialization and technological development rather than indigenous Chinese development. These are often best seen as cases of exploitative foreign “railway imperialism”, in this following historians who have described how foreign railway tracks outside Europe “served to transform claims demarcated on maps drawn in the capitals of Europe into realities of possession on the ground.” In this, the railways “extended the power of the colonizer beyond coastal enclaves into the interior, making both military and commercial access economically feasible for the first time in many cases”.⁴⁴

Industrializing Finland and East Asian technological geopolitics

The nostalgic articles on Chinese technologies reflect a shift in Finnish technologists’ interpretation of industrial Finland. This is visible in how Finland appeared in these articles on China, but also in regards to the position that Finland was given in the technological geopolitics in the region of East Asia, where the western countries, Russia and Japan were the major players.

In our analysis, we mapped out what geopolitical role the articles assigned to China: whether the country was discussed *independently*, or *collectively* together with other countries in the East Asian region, or merely as part of the *international context*. Moreover, we collected information of articles where China was contrasted or compared to a particular country or to the West as a whole. The roles are not easily distinguishable and sometimes overlapping, but they show how China appeared rather equally in the different roles. In one fourth (26.8%) of the articles⁴⁵, the technology in question was discussed in relation to China only, as in the case of Chinese handicraft techniques. In bit more than third (37.9%) of the articles, China was viewed as part of the East Asian region or in the international context. The international reading, in particular, became more common towards the end of our period, which meant that China appeared, for instance, as part of international statistics or surveys. In another third (32.3%) of the texts, for example, in articles on trade relations or

⁴⁴ Bruce A. Elleman, Elisabeth Köll, and Y. Tak Matsusaka, “Introduction,” in *Manchurian railways and the opening of China: An international history*, ed. by Bruce A. Elleman and Stephen Kotkin (New York: M.E. Sharpe, 2010), 6.

⁴⁵ For articles where two geopolitical roles are equally present, the roles have been given 0.5 weight in the calculation.

railway operations, China was discussed in relation to the west or a particular country, or the role was difficultly defined (3.0%).

If we look at how Finland and China appeared together in the journal articles, no major ties between the two nations were presented in the articles. In general, Finland was mentioned in 36 of the articles (15.6%). The majority of articles did not build any direct relationship between China and Finland. They merely appeared together as part of the international context or, as discussed above, China was used to narrate the early history of a technology also concerning Finland. As an example, in an article on Tampere's new stone bridge, a Finnish engineer mentioned the Chinese as one of the great ancient bridge builders together with the Greeks and Etruscans.⁴⁶

Some articles discussed China as a potential market for Finnish exports. These were published especially in the early 20th century, and treated paper and match industries.⁴⁷ However, China was not of direct interest, but was listed among the other international market areas. For instance, *Suomen Teollisuuslehti* in "Finland's paper and pulp industry" (1907) mentioned how also smaller European and large Asian countries, such as "Spain, Greece, Turkey, China, and Japan" had increased their consumption of paper and pulp products.⁴⁸ Obviously, the Chinese market potential was explored – and tentative exports to East Asia took place concretely in the early 1900s⁴⁹ – but the question was not framed in any explicit relation to Finnish industries.

It is important to note again, however, that there was a broad interest in Chinese craft techniques and products in the earlier articles. These would have been suitable for smaller scale industrial production also in Finland, even though this was not always explicitly stated. The articles were among the small advice printed in the journals, and related not only to China. This interest in traditional technology is visible also in the temporalities of the articles. The *contemporary-traditional*-technologies were more present in articles published before the mid-1890s. Taking into account that the Finnish-language journals (*Suomen Teollisuuslehti*) published most articles on China in the early years of our study, we can hypothesize on a shift in the Finnish perceptions on the scope of their own domestic industries. Whereas the traditional techniques were still of interest in the 1880s, especially among the Finnish-language circles close to small industries and artisanal production, they slowly lost their importance in face of the modern industrial expectations. This shift was obviously related to the concurrent development of the technical journals: the 1900s saw the birth of the modern, professional technical journals, and in this narrative, mainly the ancient, historical, and nostalgic Chinese technologies had a place.

⁴⁶ A. Brandt, "Om Tammerfors nya stenbro," *Teknikern*, 1 June 1902. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1122449?page=7>.

⁴⁷ For example, Oskar Routala, "Tulitikkuteollisuutemme nykyinen tehtävä [The current role of our match industry]," *Teknillinen aikakauslehti*, 1 February 1911. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1125011?page=6>.

⁴⁸ "Suomen paperi- ja puuvanuketeollisuus [Finland's paper and pulp industry]," *Suomen Teollisuuslehti* (from Työtil. Aikak. I.), 1 September 1907. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1120448?page=7>.

⁴⁹ Juha Sahi, "Verkostot kaukaiseen itään. Suomen kauppasuhteet Japaniin 1919–1974." (PhD Diss., University of Oulu, 2016), 63–76. <http://urn.fi/urn:isbn:9789526211206>.

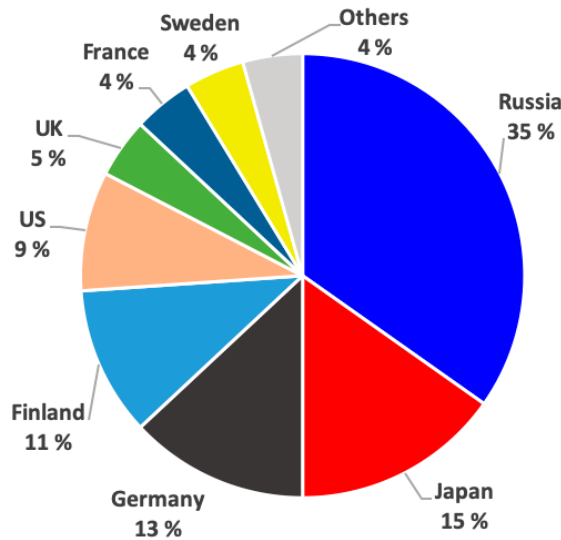


Figure 7. Shares of countries in the articles where China was discussed in relation to a specific country.

This alignment of industrial Finland to the camp of the more advanced nations in the eyes of the technologists becomes well exemplified in how the articles approached the East Asian context. When articles talked about China in relation to a specific country, we find three dominant countries: Russia, Japan, and Germany. Germany played a role – as discussed in the previous section – as the modern, industrial counterweight to the traditional Chinese techniques, whereas Russia and Japan add two distinct nuances to the technological geopolitics views on China and on the position of Finland.

Japan, was the second most common country to appear together with China in the journal articles, and it illustrates both the changes in East Asian power relations and in the growing interest in modern, industrial technologies among Finnish technologists. Interestingly, in the course of the period, China became portrayed in the articles as less central and overshadowed by Japan as the new rising Asian great power. In 1894–95, China and Japan fought a war concerning their influence over Korea. The war resulted in China’s somewhat surprising defeat, causing a major trauma for the country, but for a number of contemporaries it was also seen as important evidence for the weakening of the Qing Empire, now replacing Turkey as the “sick man of Asia”.⁵⁰ The war outcome and the example of the more advanced Japan became important references when describing China’s attempts to modernize the state and industrial structure. For instance, the non-existent railway network in China was seen as one of the reasons for the military defeat against Japan, and Chinese reformists who argued for a more liberal constitution referred to the 1899 Japanese constitution as a successful exemplar.⁵¹

⁵⁰ Rowe, *China’s last empire*, 231–233. As Andrade writes, China’s loss in particular resulted from political reasons, not technical. Andrade, *Gunpowder age*, 273–275.

⁵¹ Rowe, *China’s last empire*, 275–276, 277.

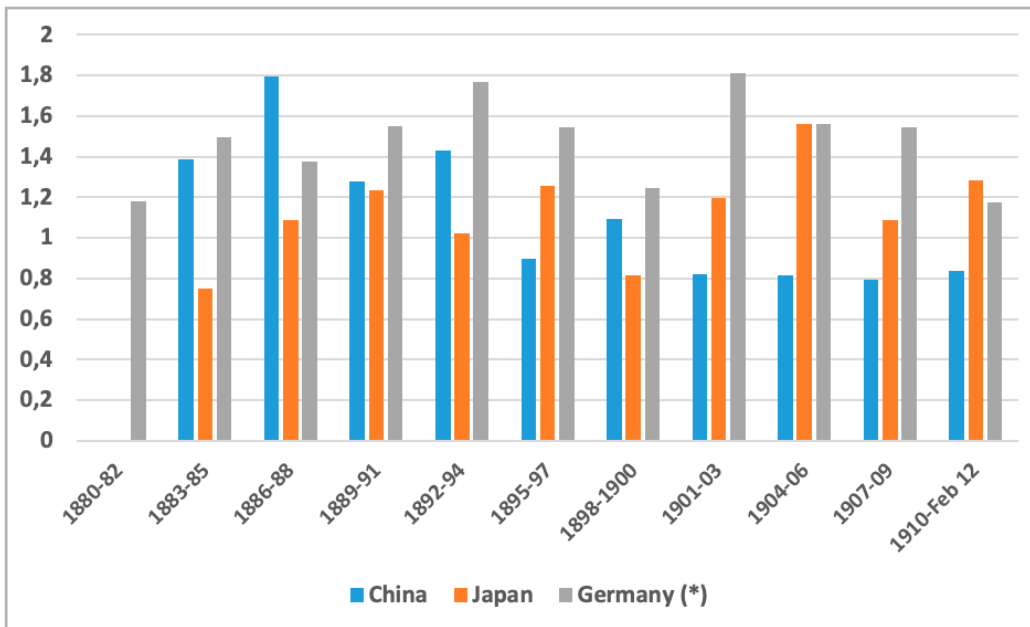


Figure 8. Search hits per hundred pages for China and Japan, and per ten pages (*) for Germany in the Finnish technical journals.⁵²

The growth of Japan's importance is seen in the texts after China's defeat in the Sino-Japanese war both in quantitative and qualitative terms. If we look at journal hits, we see that the normalized numbers of China mentions remain stagnant or decrease in the period. At the same time, the news coverage of Japan in the technical journals overtake China in 1895-97, and holds the upper hand after that and in contrast to China, does not decrease after 1900. It is possible that the increasing Finnish interest in Japan was to some degree connected to Japan's aggression towards Russia, which came to the fore during the Russo-Japanese war 1904–05. This was hailed by many Finns, who were struggling during the so-called Years of Oppression 1899–1905 against Russification and restrictions of their previous autonomy.

Interestingly, the war events were not much discussed even in the complete corpus (including the non-technical articles), which demonstrates the specialization of the technical journals. In some articles, however, the war clearly represents a watershed in the development of the two Asian countries and their relation towards the west. *Suomen Teollisuuslehti* in 1896 published a translated article from *Wieck's Gewerbezeitung* about the fourth national industrial exhibition held in Kyoto the previous year.⁵³ The article described the great development of the Japanese industries, which would have great importance in the future

⁵² The search strings used are "saksa*", "tysk*" for Germany, and "japan* OR jaapan* OR jaappan*", "japan* OR jaapan*" for Japan.

⁵³ "Japanin teollisuus [The industries of Japan]," *Suomen teollisuuslehti* (from *Wieck's Gewerbezeitung*), 15 February 1896, 1 March 1896. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1119396?page=4>, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1119397?page=2>.

inside “East Asian borders” and as a new competitor in Europe. The text noted how Japanese production in many sectors would take over the East Asian markets and that one sector of this “industrial nation” that had developed greatly during the Sino-Japanese war was the canning and preservation industries.

In 1898, *Suomen teollisuuslehti* published a similar article on Chinese industries, which in a comparable tone gave a positive image of the country’s current industrial development.⁵⁴ The article started by noting how one major ruling resulting from the Sino-Japanese war was that machinery could now be imported to China. As China already possessed prerequisites for development (raw material, cheap labor and transportation costs), the new machinery had enabled the Chinese industries to grow. In this process, the Chinese investors were taking more control of the industrial production, which had been very much in the hands of western countries.

In the articles, the potentials of the two countries were realized differently and Japan becomes the leading country of the region (and was already in 1896 described as an “industrial nation”) especially after the victory against Russia. In 1907, the ST supplement *Kutoma ja Paperiteollisuus (Weaving and Paper Industry)* discussed the textiles industries in Japan.⁵⁵ In its first lines, the text explains how excellence in warfare was not the only virtue of the Japanese nation, but that their activities in all industrial sectors and in trade were equally great. The text intends to present a picture of the textile industry, and show what the “feared yellow race can achieve” in the field, if the development goes on with such gigantic steps. The author concludes that the Japanese will completely rule the Asian markets and close them to Europeans and in this process, China will play the role of Japan’s “assistant”. The text envisages that Japan will make China wake up and help it in this “industrial battle”, and that this “feared yellow plague” will hit hard on Europe and the markets of the “current industrial countries”.

Russia was the country most frequently discussed together with China in the journal articles. The important role of Russia was due to the development of the railway network, but the articles also discussed natural resources and the city of Dalian, which Russia rented from China as part of its imperial interests in the area. To an important extent, Imperial Russia and its railways in particular, offered a very concrete possibility for the Finns to take part in the colonial conquests in China. In fact, the most prominent railway imperialism in China was the Russian one, described as “conquest by railway”.⁵⁶

⁵⁴ “Kiinan teollisuus-oloista [The Chinese industrial conditions],” *Suomen teollisuuslehti*, 15 February 1898. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1119532?page=7>.

⁵⁵ “Japanin tekstiiliteollisuudesta [The Japanese textile industry],” *Kutoma- ja paperiteollisuus*, 1 January 1907. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1120500?page=3>.

⁵⁶ Y. Tak. Matsusaka, “Japan’s South Manchuria Railway Company in northeast China, 1906–34,” in *Manchurian railways and the opening of China: An international history*, ed. by Bruce A. Elleman and Stephen Kotkin (New York: M.E. Sharpe, 2010), 37–58.

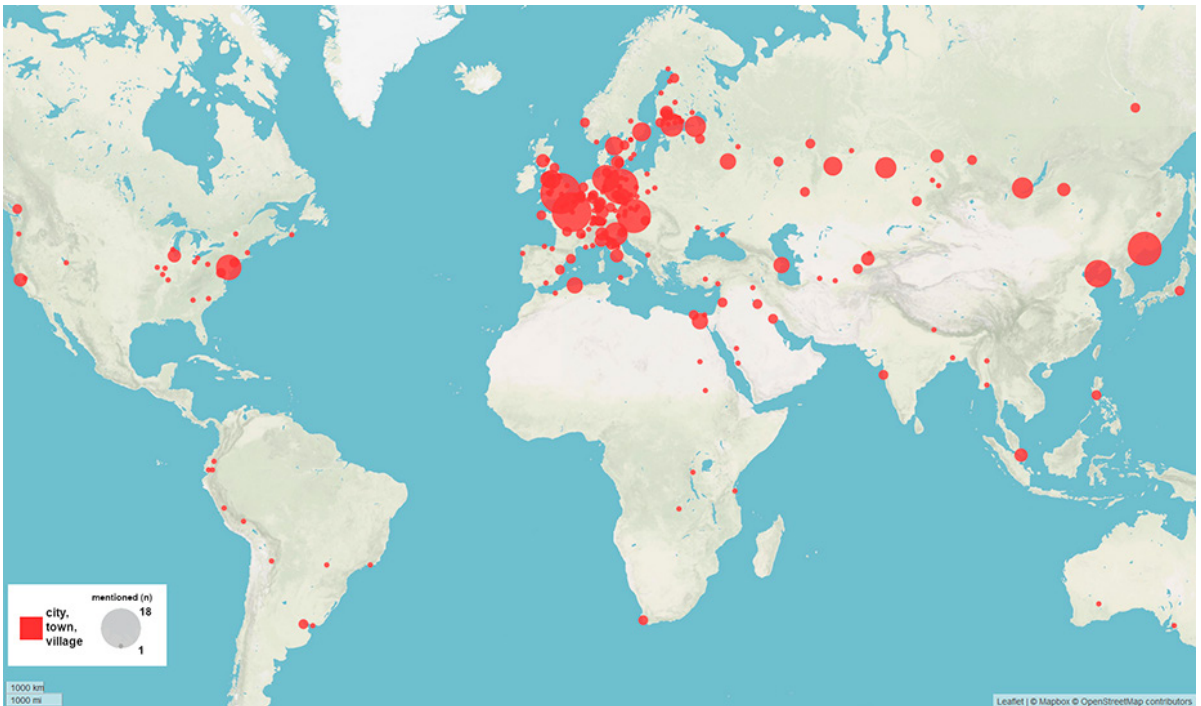


Figure 9. Localities outside China mentioned in the articles.⁵⁷

This railway imperialism is very visible in the articles. In 1897, *Suomen teollisuuslehti* published an article on the “Siberian railroad” and the changes the railroad would bring for travel time and connections between East Asia and the West. One aspect that the text highlighted were the railroad’s political benefits: the railroad “opened China to western civilization to a greater extent than a dozen of bloody wars could do”.⁵⁸ In 1904, *Teknikern* republished the *Deutsche Bauzeitung* article “Russian railway building and Russian railway plans in Asia” which described the various Russian concessions to operate and build railways in China, many of which were connected to the Russian Trans-Siberian railway that had got concession to build a southern branch through Manchuria in north-eastern China.⁵⁹ It talked about the Russian railway networks in China as “the Russian sphere of influence in east Asia”. Although the article described it as still “an open question”, whether all project was going to be accomplished, they “however show how Russia aims to expand its influence and power in Asia and by building railway lines in the East and the West accomplish the large trans-

⁵⁷ The place names have been manually collected from the articles and translated into English. The places have been geocoded with Opencage Geocoder (opencagedata.com) and visualized with the Palladio tool (<https://hdlab.stanford.edu/palladio/>). Places with least precision in geocoding (8-10 Opencage precision) have been omitted. The identified localities have been checked manually.

⁵⁸ “Siperian rautatie [The Siberian railroad],” *Suomen teollisuuslehti*, 1 February 1897. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1119419?page=10>.

⁵⁹ “Rysslands järnvägsbyggnader och järnvägsplaner i Asien,” *Teknikern* (from *Deutsche Bauzeitung*), 13 April 1904. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1132080?page=10>.



Figure 10. Russian railway imperialism. Source: Teknikern, 13 April 1904, Digital Collections of National Library of Finland.

Asian railway through the Middle Kingdom”, which of all transcontinental railways would “become the largest and most important”.

The clearest example is the article “On the port town Dalnij” which described the construction of the Russian company Chinese Eastern Railway (CER) of its South Manchurian Railway on the Liaodong Peninsula and the building of the connected new port town Dalian at the railway line’s terminus.⁶⁰ Here the new railway was described as “a technical masterwork of high degree” which had “caused its builders great difficulties, as they had to fight many battles against tropical summer sun, Siberian winter cold and a population initially inclined towards hostility.” The civilizing mission implicit in this description became even more explicit when it described the loss of the Russian railway to Japan following the Russo-Japanese war as being the termination of Russia’s dream to establish in China a “foothold” for “culture”.

⁶⁰ Carl Jahn, “Om hamnstaden Dalnij,” *Tekniska föreningens i Finland förhandlingar*, 1 December 1907. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/1134503?page=5>.

The author of this article was the Finnish civil engineer Carl Jahn, who was writing about his own experiences in the service of the Russian imperialism and the western civilizing mission in China. As a final part of the discussion of the Finnish encounter with China and its technologies and industries we will explore Jahn's story together with that of one of his compatriots in China. This will provide two concluding examples of Finnish engineers participation in Russian colonialism and an exposition of Finnish 'engineering imperialism' in China.

Finnish engineering imperialism

Our material does not reveal much direct Chinese influence on Finnish technology and industry but it opens up some interesting perspectives on direct Finnish technological influence on Chinese local society and global politics. During the nineteenth century, China was compelled by the western powers (including Russia), and Japan to open treaty ports, and to enable the foreign powers to establish concessions in Chinese cities. These were territories that remained under Chinese sovereignty, but were administered and managed by the foreign powers, and granted the foreign citizens rights of trade and residence. Besides the concessions, the western powers were granted rights to lease certain Chinese territories.

Swedish and Chinese historians have shown how in Finland's neighboring country Sweden the engineers and industrialists could as "small-country imperialists" try to achieve similar concessions in China as those of the Great Powers by using Sweden's role as a small, neutral non-threatening country.⁶¹ Our research shows that also Finland participated more directly in foreign Great Power imperialism in China through its subjects. A well-known example of this mentioned in previous research is the later Finnish commander-in-chief and President Carl Gustaf Emil Mannerheim (1867–1951), who served as an officer in the Imperial Russian Army at the turn of the century. In 1906–1908, Mannerheim worked as an intelligence-officer and was sent out undercover as part of a scholarly expedition to East Asia with the secret mission to report about the military capacities and societal conditions of Qing China.⁶² Moreover, in the early twentieth century, some of the Finns that resided in China were employed in western-led institutions supporting western imperialist endeavors, for example in the Chinese Maritime Customs Service.⁶³ In our material, we however see that also Finnish engineers contributed very concretely to the western imperialism in China as experts employed in foreign industrial enterprises and colonial technical projects.

One such example is presented in the article "Chinese paper factory" from 1912, where we find the report of the Finnish engineer Georg Mikael Wahlman (1880–1940) from Shanghai – one of the main treaty ports and western settlements of the time. Wahlman had gained his education as a paper engineer at the Technische Hochschule in Berlin and had worked at several paper factories in Finland, in Norway and in the United States. In 1910,

⁶¹ Per Högselius and Yunwei Song, "Extractive visions: Sweden's quest for China's natural resources, 1913–1918," *Scandinavian economic history review*, (forthcoming 2019).

⁶² Jonathan Clements, *Mannerheim: President, soldier, spy* (London: Haus Publishing, 2012), 65–68, 69–106. For another example of Finnish imperialism in this period, see Timo Särkkä, "Imperialists without an empire? Finnish settlers in late nineteenth- and early twentieth-century Rhodesia," *Journal of migration history* 1, no. 1 (2015): 75–99.

⁶³ Airaksinen, "Suomalaisuus 1800-luvun alun Kiinassa," 245–246.

Wahlman began working as the technical director of the local paper factory in Shanghai, which was owned by the British Hong Kong-based company Shanghai Paper and Pulp Co. One of his tasks was to take part in the modernizing of the factory machinery.⁶⁴

In his article, Wahlman mainly presented the technical qualities of the factory and its machinery. However, it provides at the same time an example of the broader imperialist process, where western capital, industrial production and technical expertise had taken root as part of the local economy. The factory used mainly Chinese rags in its production, and fabricated different paper qualities for the local market. Although the labour force was Chinese, the foremen and main technical operators were mainly Japanese, the machinery was mainly of American origin, and the commercial director of the factory was American, while an engineer from Sweden aided Wahlman himself.⁶⁵ Wahlman headed the factory until the outbreak of the First World War. At the time, he was on leave in Norway, and the war made his return to Shanghai too difficult. Wahlman continued his career in Norway, and in the 1920s, he returned to the independent Finland to work as the technical director at the Finnish Leppäkoski pulp and paper factory.⁶⁶

The Finnish participation in foreign engineering imperialism in China is even more visible in the previously mentioned article “On the port town Dalnij” (1907) in *TFiF* by the Finnish civil engineer Carl Jahn (1870–1937). Alongside with Wahlman, he was one of the few Finnish engineers appearing in the technical journals who had actually visited China. In his article, Jahn outlined some of the central element of Russia’s colonial project in China and his direct participation in this. From the perspective of our study, Jahn becomes the emblem of Finnish technologists, who contributed to the fabrication of a modern, industrial identity for Finland through the broader technological geopolitical situation.

Jahn comes across not just as a Finn with a rare personal experience of living in Qing China, he was perhaps the first Finnish technologist with personal experience of Qing technology and industry. He was a German immigrant, his parents Carl and Anna Jahn had moved to Helsinki in 1874 when Carl sr got employment as engraver at the Finnish Mint. After matriculating from *Nya Svenska Läroverket* Carl jr started studies at the Imperial Alexander University in Helsinki but soon changed over to the city’s Polytechnical Institute from which he graduated in 1896. Thereafter he left Finland to take employ in the service of the Russian empire as civil engineer working on the planned end-point of the Trans-Siberian railway in Vladivostok after which he moved to China to take part in building the new city of Dalnij (Dalian). And in this Jahn was a small but important agent not just in the service of Russian imperialism but also of a large Russian colonialist project in China.

The Russian railway colonialism in China started 1896 when Russia got a concession to build a southerly shortcut of its Trans-Siberian railway with a 900-mile line cutting through northern Chinese Manchuria to its endpoint in Vladivostok. Its colonialism came from the fact that with time the Russian-controlled joint stock company Chinese Eastern Railway (CER) gained de facto control of the 1,073 miles long geographic corridor surrounding the railway, which included the new city of Harbin. This CER zone “cut a three to four

⁶⁴ “Ingeniör Georg Mikael Wahlman [1880–1940],” *Suomen paperi- ja puutavara-lehti*, 15 April 1940.

⁶⁵ M. V. Vahlman [G. M. Wahlman], “Kiinalainen paperitehdas,” *Kutoma- ja paperiteollisuus*, 1 January 1912 and 1 February 1912. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/998391?page=4>, <https://digi.kansalliskirjasto.fi/aikakausi/binding/998393?page=5>.

⁶⁶ “Ingeniör Georg Mikael Wahlman [1880–1940],” *Suomen paperi- ja puutavara-lehti*, 15 April 1940.

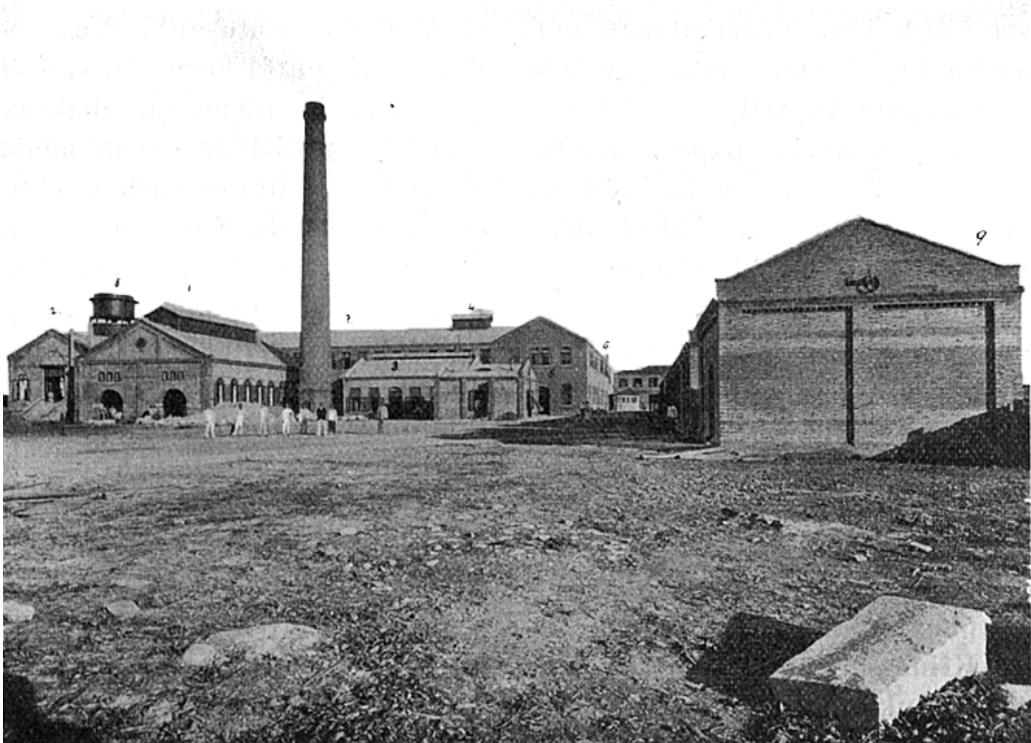


Figure 11. The factory of Shanghai Paper and Pulp Co. and its buildings described by the technical director, Finnish engineer Wahlman – perhaps found standing among the group of people in front of the boiler room. Source: Kutoma- ja paperiteollisuus, 1 February 1912, Digital Collections of National Library of Finland.

hundred-mile-deep swath through the heart of Manchuria along the hypotenuse of the big northward arc of the Amur River” and was “far larger than any other foreign concession ever appropriated from China”.⁶⁷

The next central part of the Russian colonial project came with the 1898 Pavlov Agreement which gave Russia a 25-year lease on the Chinese naval base Lüshun (Port Arthur) and adjacent territory on the Liaodong Peninsula’s southernmost tip. With this Russia got its first far-Eastern year-round ice-free military port and a strategic garrison town ensuring its “military foothold in southern Manchuria”.⁶⁸ This led Russia to develop “a powerful colonial blueprint for the future economic exploitation of Manchuria”.⁶⁹ The treaty had also given Russia right-of-way to build a southward branch line from the Chinese Eastern Railway through southern Manchuria connecting to Port Arthur. This South Manchuria railway line was initially only going to go to the closed military port of Port Arthur but the

⁶⁷ S.C.M. Paine, “The Chinese Eastern Railway from the First Sino-Japanese War until the Russo-Japanese War,” in *Manchurian railways and the opening of China: An international history*, ed. by Bruce A. Elleman and Stephen Kotkin (New York: M.E. Sharpe, 2010), 21.

⁶⁸ Christian A. Hess, *From colonial jewel to socialist metropolis: Dalian 1895–1955* (PhD diss., University of California, San Diego, 2006), 22.

⁶⁹ *Ibid.*, 28.

British protested against this reduction of commercial trading opportunities and thus it was according to Jahn "decided to build a new ice-free commercial free-port on the Yellow Sea at the railway's terminus" in order to "to give the railway a peaceful character". This became the new port city of Dalian, meaning far-away in Russian, and the technological project that led to Carl Jahn's involvement.⁷⁰

In January 1899, Carl Jahn together with several Russian engineers arrived from Vladivostok "as the first pioneers". Their pioneering task was to build the new city of Dalian at the railway's civilian end-point some 60 km from Port Arthur on the Liaodong peninsula's eastern shore. The new harbor town was located in a military as well as commercially strategic area as the peninsula's harbors were "logical ports through which to ship resources in and out of Manchuria. For the colonial powers of the world, armed with their railroad and steamship technology, this small territory had the potential to become the focal point of trade in Northeast Asia, with all of resource-rich Manchuria as its hinterland."⁷¹ Jahn spent the next six years working on developing Russia's modern international trading port in this far eastern part of the Russian Empire. The new 700 mile long South Manchuria Railway line was after the CER zone the largest foreign concession ever appropriated from China. Taken together this made the Russian Guangdong Leased Territory on the Liaodong peninsula into a de facto Russian colony in China. This new Russian colonialism was also materially inscribed in the plan and construction of the new city of Dalian.

The challenge of building the new city "was to come up with a masterplan that was modern, big, and could be constructed quickly to consolidate the Russian Empire's power in the new Far Eastern port city."⁷² Or as Jahn put it: "Now here a great task had to be solved, from a somewhat opposing population purchase their land and homes, remove what stood in the way of new structures, plan and build a city with modern port structures, or in short, within the Orient's medieval world create a modern Europe in miniature." Due to that "the strange living conditions of the Chinese did not allow the living together of natives and white" the city was spatially separated and ethnically segregated in a "Chinese" and "European" city separated by a large park with a zoo and with the Chinese not allowed in the European City.⁷³

The building of Dalian drew on the most advanced European urban technologies and planning theories and with the city's design strongly influenced by the Garden City Movement and Baron Haussmann's remaking of Paris.⁷⁴ Jahn described how the new streets

figuratively float up and down the hills; the groaning of the stone crusher, the puffing of the steam rollers, the tramping of mules and horses, pull carts squeaking and the monotonous song of thousands Chinese coalesced into one mighty, for the technical mind, harmonic music. New ideas shaped all the work and created the plan of present Dalnij.

⁷⁰ Paine, "Chinese Eastern Railway," 11.

⁷¹ Hess, *From colonial jewel to socialist metropolis*, 17.

⁷² Charles Kwun Sau Chiu, *Mobility in the city: Dalian's streetcar system from 1890s to 1940s*. (MA Thesis, University of Toronto, 2017), 11, 14.

⁷³ *Ibid*, 19.

⁷⁴ Chiu, *Mobility in the city*, 11.

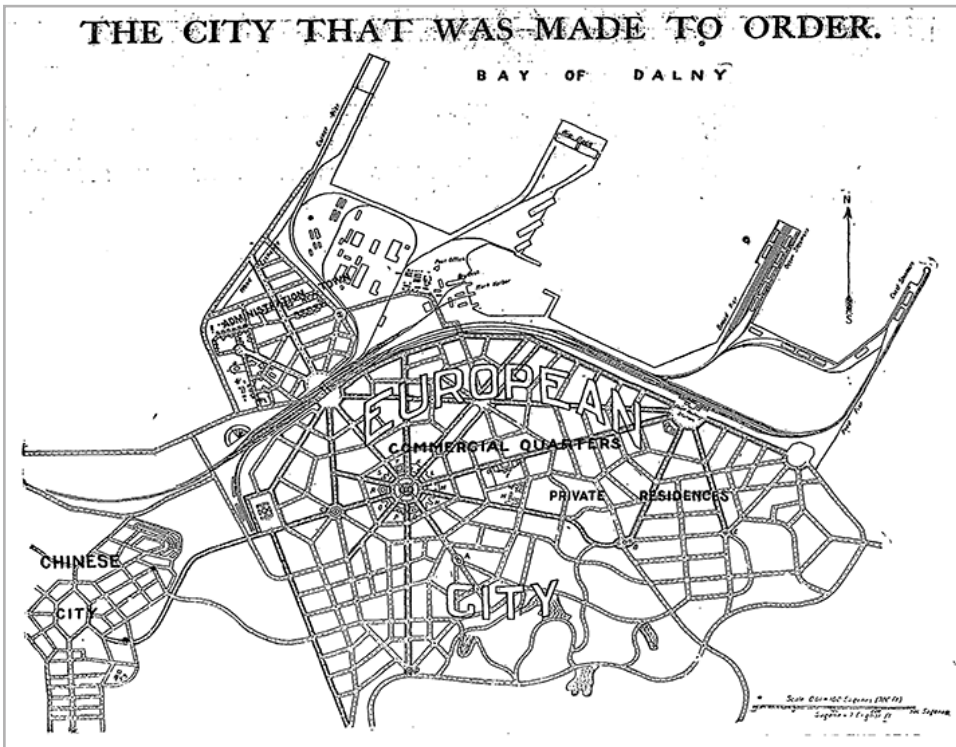


Figure 12. Helsinki in China. New York Times plan of Dalian with its 'Esplanade' traversing diagonally through the letters OP of 'EUROPEAN CITY'. Notice the size difference between the segregated European and Chinese cities. Source: New York Times, 23 March 1902. NYT Digital Archive.

The city was meant to be a European metropolis modeled on St Petersburg and Paris. But it appears that also a part of Finland was transplanted into China as Jahn claimed that the central 108 m wide boulevard, “was constructed with the Helsinki Esplanaden as model.” In March 1902, Dalian was presented in the New York Times as “The City that was Made to Order” stating that Russia had “created a city which it is no exaggeration to say is more perfectly arranged and more suitably ordered for the purpose in view than any other city in the world.”⁷⁵

However, Russia’s colonial project in China was to a large degree cut short with the Japanese conquest of Port Arthur and its subsequent defeat in the Russo-Japanese war that ceded Russia’s Liaodong territories to Japan. As Jahn put it: “Thus ended Russia’s attempt to in the Kingdom of Heaven realize its dreams of a foothold for the great power and for culture.” Thus ended also Jahn’s work not just in China but also to Russian imperialism.

⁷⁵ “The city that was made to order,” *New York Times*, 23 March 1902.



Figure 13. In the service of the Russian empire. The civil engineer Carl Jahn 1898 photographed 1898 surrounded by foreign colleagues while working in Siberia and while visiting Helsinki in 1903 with his wife Anna (nee Hartwall) both dressed in Chinese official garbs. Source: Finnish National Board of Antiquities (left)⁷⁶, Vapriikki Museum Photo Archive (right)⁷⁷



After returning to Finland in 1905, Jahn used the material and immaterial assets he had acquired while in China to further his Finnish engineering career: he donated Chinese art objects to the Ateneum-museum in Helsinki, gave presentations on his work in Dalian to fellow Finnish engineers and used his Chinese railway-related experience to get employment as engineer with the Finnish state railways. With time he rose through the professional and social ranks, was made vice-director in the Railway administration and elected Chairman of the Engineering section of the Technological Association and during the Civil War, he represented the Railway administration in the German staff. Like his compatriot Gustaf Mannerheim, Jahn had succeeded in converting his experience from servicing Russian imperialism abroad to service to Finnish nationalism at home.

Conclusion: imperialist engineering in the technoindustrial public sphere

This study has looked into the perceptions about Chinese technology and industries in the Finnish technoindustrial public sphere at the turn of the 20th century. In doing this, it has both offered novel empirical findings about Finnish Orientalist and imperialist imaginations and developed a perspective on the history of Finnish technological geopolitics: how nations such as Finland have measured themselves against each other through their own and through foreign imperial machines.

⁷⁶ Jahn Carl, photographer, “[Manuscharov, W. Trenjuhin, Carl Jahn, Tarasenko ja N. Protopopov pöydän ääressä],” Sahalin (Russia), 1898, Musketti, Finnish National Board of Antiquities. CC BY 4.0.

⁷⁷ Daniel Nyblin, photographer, “[Pariskunta itämaisissa vaatteissa],” Helsinki, c1903, Vapriikki Museum Photo Archive.

Even though a wide variety of technologies were presented in the Finnish technical journals, Chinese technology was primarily represented in two ways. First with China as a once great power now left behind, still using or manufacturing technology and goods that were ancient, historical or non-modern. In this, China and its industries played a nostalgic function, as an elevating backdrop to which to demonstrate the western advances in science and industrial production. Second, in a rather similar tone, when modern or future Chinese technologies or industries were portrayed, the emphasis was heavily on the strength of the West; discovering or extracting natural resources, constructing the Chinese railway network, or actively developing or taking use of the commercial possibilities that the East-Asian area offered. The interconnectedness of these two dimensions, with old Chinese technologies being replaced by modern imported technologies, is illustrated by one of the last articles in our sample, on “Exports of woven products to China” from February 1912 when it was clear that the Chinese empire was soon to be over. The article stated that as “soon as the Chinese have cut their queues off, they have started to talk seriously about abandoning their traditional way of dressing up” and that “the English wool industrialists, in particular, have begun to wish for great demand for their woolen products, even if just a few of the lads of the Heavenly Kingdom would wear woolen suits.”⁷⁸

Of the two main contemporary geopolitical personas of China, the one that dominated in the Finnish technoindustrial public sphere was the sick man rather than the awakening giant. If that also applies to the representations of other Western countries and cultural domains remains for future research to determine.

Besides opening up new empirical research within the history of Finnish technology, the study provides a novel contribution to the new digital history. In investigating Chinese representations in Finnish technical journals, we have used a quali-quantitative digital reading methodology that enabled a new way to analyze the Finnish technoindustrial public sphere. This digital method of text-mining, combining quantitative distant and qualitative close reading, made it possible to search through large source material and to discover and visualize larger discursive patterns in it. The application of the digital method to study attitudes of Finnish technologists turn our attention to Finnish relations towards the other main industrial countries. What aspects of the technologies and industries of the neighboring countries were interesting among the technical circles of the Grand Duchy, and what do these observations tell about Finland’s technical-industrial development?

The Finnish representations of Chinese technology is not only a lens through which to study perceptions of China, but also a mirror where Finnish expectations about the character and direction of its own nascent industrialization can be observed. The technical journals did not much discuss the direct relations between the Chinese Empire and the Finnish Grand Duchy, however, in particular the Finnish-language journals expressed a Finnish interest in emulating and using traditional Chinese techniques. This interest declined towards the turn of the century when China became more represented in its ancient, nostalgic role. This could reflect changes in Finnish industrial identity, where the representations of China assisted Finland’s alignment to the western camp of more advanced industrial nations. Furthermore, towards the end of our period, China was represented not as a model worthy of emulation but rather of exploitation: as a possible Finnish export market (for Finnish pa-

⁷⁸ “Kutomatuotteiden vienti Kiinaan,” *Kutoma- ja paperiteollisuus*, 1 February 1912. Digital Collections of National Library of Finland, <https://digi.kansalliskirjasto.fi/aikakausi/binding/998393?page=14>.

per), a country where western railways expanded, and an East-Asian country overshadowed by the expanding and threatening Japanese Empire, and a place where Finnish engineers could gain valuable cutting-edge experience in the service of foreign empires. This appears as a prelude to the 1920s, when the Finns began to actively explore the East Asian markets and to shape their role and identity as representatives of a young independent nation.⁷⁹

Finally and most interestingly, connected to the imaginary of exploitation, we unearthed a previously neglected Finnish colonialist attitude, which was manifested and realized in practice by the Finnish engineers through their careers. The engineer Carl Jahn concretely contributed in building Russian East-Asian imperialism through the railways and the port city of Dalian, and reported to colleagues back in Finland how Helsinki and its *Esplanaden* had been used as a western model in this Russian and Finnish imperial civilizing mission. Even though the careers and active role of Finns in the Empire have been studied previously,⁸⁰ such Finnish proxy imperialism, enabled through Finland's advantageous subaltern status, has not received the attention of earlier research. Our findings very much support Timo Särkkä's assertion "that even European countries that never had overseas colonies, such as Finland, were involved in the colonial world: Finns were sent out as colonisers and produced images of colonial 'others'".⁸¹ Finnish professionals such as Jahn, who were active towards and in China, merit further study and exemplify how the Russian empire was an approved sphere of action for many Finns, a vast potentiality where national, imperial and even colonialist identities were interwoven in the technological and industrial fields. Like our study has strived to show, national technoindustrial imaginations are not born and grown in isolation but are transnational through and through. Then, today and tomorrow.

⁷⁹ Airaksinen, "Suomalaisuus 1800-luvun alun Kiinassa"; Kalle K. Auermaa, *Itä-Aasian markkinamaat ja meidän mahdollisuutemme siellä* (Porvoo: WSOY, 1923).

⁸⁰ For example, Max Engman, *Lejonet och dubbelörnen: Finlands imperiella decennier 1830–1890* (Stockholm: Atlantis, 2000); Engman, *Suureen itään*.

⁸¹ Särkkä, "Imperialists without an empire," 98.

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