The Night Lights of North Korea. Prosperity Shining and Public Policy Governance

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NB: A more detailed geo-spatial analysis with interactive graphs and images is available at Story Maps: Geo-Spatial Analysis North Korea

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Abstract

This article looks into the night lights of North Korea and their relationship to prosperity shining. The first introductory section discusses the political economy of North Korea. It highlights its strengths and shortcomings. The second section introduces to new methods of geo-spatial micro and macro econometric analysis. The following night lights analysis is based on near real-time big data. It includes high-resolution remote-sensing and satellite imagery from the NASA (Earth Obervatory) Visible Infrared Imaging Radiometer Suite (VIIRS) sensor on the Suomi NPP satellite. The third and fourth section address important issues related to North Korea's prices, co-optation and mobilization of anger. The final section deals with problems in public policy administration.

Keywords: North Korea, Varieties of Capitalism, Night Lights, Satellite Imagery, Political Economy, public policy administration, *buyngjing* line.

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Introduction: *The Political Economy of North Korea*

North Korea (the Democratic People's Republic of Korea - DPRK) is characterized by a military-intensive political economy with associated form of capitalism. The *buyngjing* line introduced in 2013 coupled policies aimed at nuclear development with socio-economic growth programs (Haggard 2017, p.4). The path-breaking work of Hall and Soskice (2001) on *Varieties of Capitalism (VoC)* identifies crucial *institutional complementarities* of the capitalist system, as well as important *comparative institutional advantages,* which affect system stability or change (Hall 2006). These, in turn, shed light on the economic vulnerabilities that each different variety of capitalism entails (Scharpf and Schmidt 2000).

The communist apparatus and the military-industrial complex of North Korea is the key driver of what can be described a *State-Interfered Planned Market Economy,* in which political and military elites not only capture resources but also redistribute benefits among the population (see also Cerami and Stubbs 2013). As in the United States, military investments and spending determine the contemporary foreign policy of the country, resulting in an escalating "nuclear race agenda-setting".

Similarly to the case of the USA-Soviet Union space race of the 1960s, these are expensive political exercises that in some way have to be financed. Funds can only be raised at this point either from a reduction in expenditures for those policies indirectly aimed at subsidizing the economy and, hence, at raising living standards (such as price subsidies or subvention to modernize the firms) or, as last resort, from an increase in trade or external debt. The latter is, clearly, no more a feasible option because of embargos. The third and the last remaining option has therefore been a continuous increase in military production and exports, as well as a realignment towards new trade partners, notably China, South Korea, the Russian Federation and associated new satellite states.

Beside human development shortcomings, the systemic problems present in North Korea can be summarized into six main groups:

- presence of not fully developed infrastructures (such as in the electricity sector);
- oil-dependence;
- reduced export-led and import-led growth opportunities;
- shortcomings in the correct exploitation and redistribution of resources;
- persistence of bad governance and, in particular, of military-political capture; and, as mentioned,
- a military-spending foreign-dependent based economy.

A recent report by the Bank of [South] Korea (2017) revealed in 2016: 1) a real annual GDP growth of 3.9 percent; 2) an increase in agriculture, forestry and fishing sector by 2.5 percent; 3) a rise in mining production by 8.4 percent; 4) an expansion in electricity, gas and water production by 22.3 percent; 5) a growth in building construction and civil engineering by 1.2 percent; and 6) a gain in the services sector by 0.6 percent (see Noland 2017; see also Table 1 and Table 2). In 2017, as a result of nuclear escalation, real annual GDP decreased, instead, by 3.5 percent. Production in the agriculture, forestry & fishing sector decreased by 1.3 percent, mining production by 11.0 percent, manufacturing production by 6.9 percent, electricity, gas & water production by 2.9 percent, construction by 4.4 percent. The service sector increased by only 0.5 percent. North Korean GNI per capita was equal only 4.4 percent the one of South Korea (Bank of Korea 2018, pp. 1-6).

As argued in the 2017 report, "bilateral trade between South and North Korea decreased by 87.7 percent year-on-year to record 0.33 billion dollars in 2016", whilst the trade between China and North Korea in 2015 corresponded to approximately 80 percent of total trade (Bank of Korea 2017). In 2017, external trade further decreased (Bank of South Korea 2018).

As a translation of the Korean Trade Investment Promotion Agency (KOTRA) Report, which provided adjusted and revised data, has unmasked, from 2014 to 2016, North Korea's trade exports

increased by 4 percent (from $3,164.6 million in 2014 to $2,820.9 million in 2016). Imports grew by 4 percent (from $4,446.2 in 2014 to $3,725.7 million in 2016. In 2016, North Korea had, however, a negative trade balance of -5.4 percent ($-904,786,000 USD in 2016). North Korea's export with China increased from $582,521,000 in 2007 to $2,634,402,000 in 2016. But its imports overcame the exports, increasing from $1,392,453,000 in 2007 to $3,422,035,000 in 2016. In 2016, North Korea's top trading partners were China, Russia, India, Thailand, Philippines, Pakistan, Luxembourg, Singapore, Taiwan, and Sri Lanka (see Boydston 2017). South Korea's trade partnerships lagged behind.

According to calculations made by MIT researchers (2018), in 2015, North Korea's main exports consisted of coal briquettes, non-knit men's coats, non-knit men's suits, non-knit women's coats, and non-knit women's suits. Sea-fishes and molluscs also figured prominently in the list of exports. Imports consisted, instead, of refined petroleum, synthetic filament yarn wozen, delivery trucks, soybean oil and broadcasting equipment.

The dollarization and (Chinese Yuan) Renminbization of the economy (see Park 2017, p.67) has resulted in unprecendeted growth, but it has also created serious vulnerabilities because of the embargos, with associated human and health costs. Similarly, military spending in 2014 corresponded to 24 percent of GDP (USD 2016), though its real volume is likely to have increased in 2016 due to the "nuclear space race".

As Haggard (2017) has argued, North Korea has undergone a "marketization from below" that has witnessed the development of private initiative and some lessening of government involvement. This, however, has occurred in a state-interfered and still planned market economy. The development of formal General Markets side by side to a growth of the informal *jangmadang* has slowly gone out of state control. This has involved a variety of market segments, among which consumer goods, services, real estate, financial services, etc. (Haggard 2017, p. 7).

As the report by Daily NK (2017) has shown, there are approximately 612,661 stalls across all

General Markets over a population of 24,851,267, distributed in 66 urban areas, 147 counties, 66 districts and three larger districts. Competition between state and private providers has emerged (Park 2017, pp.22, 44).

It is important to note that North Korea is highly dependent on oil and gas imports, as well as on the exports of consumer goods and military equipments. As Nölke and Vliegenthart (2009) have argued for the case of former communist countries in Europe, North Korea can be described also as a 'dependent market economy'. Taking into account Hall's (2017) work on the demand-led and supply-side led economies of Europe, North Korea is characterized by three dangerously contrasting political economy models with associated *institutional complementarities* and *comparative institutional dis/advantages*:

(1) a military-led political economy dependent on exports in the industrial-military complex;

(2) an import-led political economy dependent on the imports of oil and gas and/or other socio-technical advancement equipments (such as bio-technologies in the health care or agricultural sector) (see Haggard and Noland 2017); and

(3) export-led political economy dependent on the exports of minerals, textiles, agricultural and fishery products.

[Table 1 about here]

[Table 2 about here]

Needless to say, should a system transformation occur, a dramatic change in the strategic coordination of labor and wages (see also Kollmorgen et al. 2015; and Dolata 2013), as well as in trade realignment, becomes necessary. This also implies the emergence of new social classes. For

example, the *Donju* (money masters) (Park 2017, p.57) are the North Korean *nouveaux riches,* who can be compared to the oligarchs of the Russian Federation: individuals who acquire a disproportionate amount of wealth and therefore are able to pursue both private income-generating and foreign policy objectives.

North Korea is a *coastal* and could be a *high opportunity economy* (see Ndulu *et al.* 2008) dependent on oil and gas. Its main future trading partners are likely to become China, the Russian Federation and South Korea, whose realignment will also depend on oil and gas partnerships and associated dependencies (Ross 2012; Cerami 2013).

Geo-Spatial Analysis[1]

The Mount Paektu (2,744 m; 9,003 ft) in the China-North Korean border (see Fig. 1 and 2) is a tourist attraction, but also a sacred mountain (National Geographic 2016). It is the home of tigers, bears, wolves and other wild animals. For North Koreans, it is addressed as the birth place of the mythical founder of the first Korean kingdom - King Dangun (4,350 years ago) (Smith and Kim 2018) and later the historical revolutionary site, which gave birth to Kim Jong-un's father, Kim Jong-il. The Paektu bloodline (Paektu descendent) includes mythological, as well as political connotations. The 'Chosun Tiger' (or Gojoseon Tiger) and the bear-woman represent, simoultaneosly, mythological sacred wilde animals of this strato-volcano, as well as important figures in state-formation. Kim Jong-un could, in this case, be seen as the "Chosun Tiger" of North Korean nation building. Kim Jong-un's wife - Ri Sol-ju - and sister - Kim Yo-jong - (both differently associated to the Mt. Paektu bloodline) play in North Korean politics different roles associated with the Bear-woman (UMG 2018).

[1] A more detailed geo-spatial analysis with interactive graphs and images is available at Story Maps: Geo-Spatial Analysis North Korea https://arcg.is/0vrrje

[Fig, 1 and 2 about here]

In recent years, new methods of geo-spatial micro and macro econometric analysis have been developed based on near real-time big data. These include high-resolution NASA Earth Observatory remote-sensing satellite imagery where single pixels become the smallest units of scientific enquiry. NASA nighttime lights are derived from the Visible Infrared Imaging Radiometer Suite (VIIRS)[2] sensor on the SUOMI NPP satellite[3]. Data involve the average visible band digital number of cloud-free light detections multiplied by the percent frequency of light detection. Variations are normalized so as to avoid fires and background noises. A special algorithm is developed to remove remaining clouds' and snows' shades.

New ad hoc macro- and micro econometric measures of human, economic and market activity can, in this way, be obtained. This analysis can provide useful insights on current GDP and GDP growth, or "True GDP" Growth and the size of the informal economy (Medina and Schneider 2018), current and future income growth, presence of roads and infrastructures, wealth of cities, urban versus rural divides, the effects of diseases on growth (such as malaria), growth at the coast versus the interior. Computer-based satellite imagery analysis can also be useful to natural resource discovery, pollution, as well as in identifying building types, agricultural land use, monitoring climate and weather, etc. (see Henderson et al. 2012; Donaldson and Storeygard 2016; Leitzell 2012). For Leitzell (2012), nighttime lights can here be understood as a proxy of economic prosperity and shining, which can be defined as **"**the condition of being successful or thriving, *especially with reference to* economic well-being"[4]. The night time light photos incorporate, therefore, a huge variety of human, economic, trade and development information. Light shining is also a scene of human action, economicable and bankable human activity, human and economic dynamism, vitality

[2] https://jointmission.gsfc.nasa.gov/viirs.html
[3] https://jointmission.gsfc.nasa.gov/
[4] https://www.merriam-webster.com/dictionary/prosperity

and vibrance, socio-technical advancement, “net progress”, and human socialization. For example, investigating how energy consumption behaviors vary across different cultural settings, Román and Stokes (2015) have succeeded to shed new light on the cultural patterns according to which cities and “people illuminate the night” and their life (such as during he Christmas and New Year’s season and the Holy Month of Ramadan). The number and the intensity of lights is, in fact, very often associated to the wealth of a city and of a nation (think, for example, to Paris or New York night lights).

Over the period 1992-2011, analysis by Leitzell (2012) and Haggard and Pope (2014a,b,c) on luminosity changes has shown the existence of huge intra-country regional disparities, urban-rural divides, and inbalances in city lights per capita.

More recent analysis has revealed that huge differences between South Korea and North Korea persist over the period 2012-2018. Seoul’s night lights shine, though to a lesser extent than before. Night lights development ("True" GDP development) in Pyongyang lags behind (see almost not-visible shining point north of Seoul). From March 2017 to March 2018, prosperity shining decreased in South Korea and continued to decrease in North Korea as a result of the "nuclear space race".

More in details, between 2012 and 2016, Pyongyang slightly expanded its prosperity shining in the center of the city, though this happened at the expenses of the neighboring areas (see Fig. 3 and Fig. 4). This was caused by new real-estate investments for *cadres* in the center (the so-called The Pyonghattan project).

From March 2017 to March 2018, prosperity shining decreased in Pyongyang from 248.2 sq KM in March 2017 to 136.9 sq KM in March 2018. The zones of highest prosperity shining decreased from 60 sq KM in 2017 to 1.5 sq KM in March 2018 (see figs. 3-10). The main human and economic activity remained concentrated in the center of the city (se fig. 11). Embargos and reduced trade activity were the main causes for this decrease in “True” GDP.

[Fig, 3, 4, 5, 6, 6a, 7, 7a, 8, 8a, 9, 9a, 10, 10a, 11 about here]

More in-depth geo-spatial macro- and micro- econometric analysis on local human and market activity has highlighted the different levels of North Korea's economic growth: national, regional and local (more detailed analysis with interactive graphs and images is available at Story Maps: Geo-Spatial Analysis North Korea https://arcg.is/0vrrje). It has also shown that city development policies must take into account different neighborhood's development lights of human and market activities, with associated prosperity shining and shortcomings. The cost of living in Pyongyang, as of October 12, 2017, has exponentially risen. A monthly rent for 85 m2 in a normal area was about 2,800,000 KPW ($1 is about 8,000 KPW), whilst in an expensive area was equal to 4,213,490 KPW. 1 liter of fat milk was 392 KPW. 12 eggs large costed 790 KPW. 500 grams of local cheese 4,460 KPW. 1 bottle of red table wine (good quality) 2,009 KPW. Bread (not brioches) for 2 people for 1 day 356 KPW. 1 month internet (8 Mbps) 49,300 KPW. 40" flat screen TV 100,000 KPW. 1 summer dress in high street store (Zara, etc.) 67,790 KPW. 1 liter of gas 786 KPW. 1 Volkswagen Golf 1.4 TSI 150 CV (or equivalent) 36,000,000 KPW. 1 Monthly ticket public transport 54,042 KPW. 1 box of antibiotics (12 doses) 50,868 KPW. 4 rolls of toilet paper 3,103 KPW (Source: Expatistan.com 2017[5]).

Ageing Population and the Politics of Mortality

Because of ongoing and complex processes of political, economic, cultural and societal restructuring, where new social risks emerge (Armingeon and Bonoli 2006), the challenges for North Korea are even more serious and pressing than the ones that other Western nations are called upon to face. North Korea is not only confronted with similar demographic pressures as other Western societies are (such as ageing population). It is also forced to deal with more dramatic

[5] https://www.expatistan.com/cost-of-living

systemic problems. They stem, on the one hand, from the transition from a centrally planned to a mixed-central planned market economy. On the other, they derive from the negative occurences that the North Korean population is called urpon to deal with because of war threats and the escalation of nuclear proliferation activities. Problems of *Democratic Transition and Consolidation* (see Linz and Stepan 1996; also O'Donnel and Schmitter 1986) become here more pressing.

The North Korean society is ageing. According to the United Nations (UN) Population Division (2017) (see Figure 12), the number of people aged 65 and above will double by 2050, and will continue to rise until 2100.

[Fig. 12 about here]

Low birth rates associated with an increase in life expectancy are the major causes for these demographic developments. North Korea is expected to witness a constant increase in life expectancy followed by decrease in the number of births (see Figure 13 and Figure 14).

[Fig. 13 about here]

[Fig. 14 about here]

As shown in Figure 15, these societal changes have important repercussions for public policy making. Different population pyramids need different policy responses (UNDP 2017). Needless to say, this has also important consequences in terms of politics of inequality (Cerami 2013), politics of anger management (Cerami 2015), as well as the associated distributive conflicts (Haggard and Kaufman 2008, 2016).

[Fig. 15 about here]

As shown in Fig. 16, after a significant decrease in the deaths between the period 1950 to 1990, the crude death rate of the North Korean population is expected to grow until 2100. However, this trend, already negative, does not fully take into account future amenities of war and of nuclear proliferation, such as those linked to famine and the increase in war-related fatalities and illnesses.

[Fig. 16 about here]

A recent article in *The Lancet*, one of the world's leading medical journals, has highlighted that rapid mass privatization has been one of the most crucial determinants of differences in adult mortality trends in post-communist countries, accounting for up to 1 million lives. The authors (Stuckler, King, & McKee 2009) have explained the main reason for this increase in mortality rates as caused by the captured nature of privatized resources by oligarchs (see also Novokmet et al. 2017) and by other former communist party members (including their sons). Though real mortality rates remained often a state secret during communism (Vlassov and Vishnevsky 2017), the captured nature of resources has fostered further stages of political and administrative corruption. This has led to the re-emergence of different mafia organizations, with a subsequent increase in inequality and mortality rates.

Interestingly, the negative effects of rapid privatization were reduced if the social capital of citizens was high. This was clearly the case of former members of the communist elites. Notwithstanding, when more than 45 per cent of the population affected by rapid mass privatization was part of at least one social organization, such as church or trade union, privatization was no longer significantly associated with increased mortality rates (Stuckler, King and McKee 2009). Slow privatization also helped to reduce mortality rates and vulnerabilities (Azarova et al. 2017). Who are

then the real winners of contemporary North Korea's *buyngjing* line? What patterns of community integration (*Vergeimeinschaftung)* and integration in the society (*Vergesellschaftung)*[6] will arise in North Korea?

Prices, Co-optation and the Mobilization of Anger

The 2017 nuclear missile ballistic crisis has done nothing more than crystallizing already existing systemic problems. The prolonged drought of 2017, coupled with a slow increase in cereal production since the fall of 1988-2001 (FAO 2017), has resulted in a subsequent growth in food prices (see also Haggard and Noland 2007). This was followed by a set of new sanctions by the international community, which aimed at stopping the nuclear proliferation aspirations of Kim Jong-un's North Korea. In order to limit the possible explosion of anger among the population, the North Korean regime introduced a set of price stabilizing measures, as well as increased repression for the illegal trade of goods.

What kind of social pacifying strategies (*divide and conquer*, *divide and pacify*, *unify and conquer* and *unify and pacify,* see Vanhuysse 2006; Cerami 2013) has the North Korean regime implemented in order to calm the masses? This raises questions of how the dissent *voices* of citizens could be successfully reduced by the regime through redistributive social policies so as to increase their *loyalty* to the system and, thus, limiting their *options* for *exit* and protest (Hirschman 1970, 1978). As another journalist of the Daily NK has ascertained, "As fuel prices have been fluctuating, gasoline coupons have become popular items in Pyongyang's black markets. The merchants who previously bought dozens of coupons have started offering them for sale as the prices began to rise" (Ah 2017, p.1). Interesting to note here is that coupons were initially issued by the central government, but also foreign currency enterprises can also issue them. They were mostly delivered to high ranking officials and members of the *cadres* and could also be used in restaurants, resold in

[6] For a discussion on *Vergesellschaftung*, see, for instance, Mau (2007).

the black market or exchanged for dollars (Ah 2017).

The absence of a clear social pacifying strategy of the regime (such as unify and conquer) might have resulted in anger among the *cadres*, which could then have potentially crossed national borders and territories, representing a threat to regime stability. In order to avoid this, the North Korean regime implemented a stricter control over the system of coupons, introducing a «politics of de-mobilization of anger» (Ost 2009) centered on the co-optation of *cadres*. In the eyes of the regime, this should also have resulted in the indirect co-optation of citizens. However, strange circles of semi-loyalty around the leader were created.

When introducing strategies of social cooptation, a particular attention should be given to unintended consequences. Dividing the masses can result in events impossible to predict, such as formation of new elites and clienteles, unexpected civil riots, insurgencies, deaths of innocent people, etc. (anonymous source). As aptly described by Svolik (2011, p.1), 'after a transition to democracy, politicians have yet to form reputations, a condition that facilitates the entry into politics of those who see this period as their "one-time opportunity to get rich." After repeatedly disappointing government performance, voters may come to believe that "all politicians are crooks," stop discriminating among them, to which politicians rationally respond by "acting like crooks"'. Svolik calls such an expectation-driven social mechanism the 'trap of pessimistic expectations', whose consequences for the democratization process, as well as for the consolidation of democratic institutions can be disastrous.

As discussed elsewhere (see Cerami 2013, esp. ch. 9 and ch. 10), poverty and the increase in vertical and horizontal inequalities can be addressed as the primary causes of civil conflicts, but this tells us nothing about how these driving forces turn into practical results. It becomes immediately evident that the North Korean regime has seen in the absence of social protection a key social transmission mechanism of protest. When the first concessions became insufficient to pacify the masses, as it happened during the Arab revolts (Cerami 2015), police and military repression mostly

follows. Whilst in my previous book I discussed "The Exclusive Origins of Dictatorship and Democracy" (Cerami 2013), I did not pay sufficient attention to "The Inclusive Origins of Dictatorship and Democracy".

Co-optation – broadly understood as the capacity of the ruling elite to bind strategic actors via formal and informal institutions - becomes, in this context, an important mechanism of institutional maintenance (Cerami 2013, p.194; Merkel and Gerschewski 2011). Commonly employed by authoritarian leaders in the Middle East (Joshua 2011) to substitute democratic participation by ensuring the inclusion of strategically important parts of the population into politics, *co-optation* is more often applied to the case of North Korea, especially for those citizens belonging to the industrial-military complex and the foreign currency earning enterprises. When transactions occur in non-democratic settings, these usually take place on an open *do ut des* basis between the autocrats and their 'clients', leading to sub-optimal results (Svolik 2012).

To provide some more clearer examples (see Cerami 2013, pp. 94-96), there are several institutional and social mechanisms of differential inclusion and exclusion that can simultaneously foster the emergence and consolidation of both dictatorships and democracies. A first set of institutional and social mechanisms responsible for hindering poverty-reduction and the overall human development goals in the country had to do with the inheritance of status inequality. By restricting the chances for successful institutional and social interactions (such as social mechanisms of boundary de-activation and de-brokerage; see MacAdam et al. 2001; Tilly and Tarrow 2007), the inheritance of status inequality limits, through institutional lock-in and self-reinforcing mechanisms, the possibility of autonomous self-advancement of the population.

A second set of institutional and social mechanisms is related to the issue of lost childhood and the need to invest in children and youths. As Esping-Andersen (2008) has shown, if not sufficiently addressed by adequate political, economic and welfare institutions, the impact of social origins on child outcomes tends to persist, greatly affecting the chances of the economic and social

development of a society.

A third set of institutional and social mechanisms of inequality reproduction is concerned with the cyclicity of poverty. Through a self-sustaining and self-reinforcing institutional mechanism of exclusion, poverty reduces the chances of the affected from accessing the most valuable resources, often elitist institutions, such as good schools, universities, centers of excellence, better equipped hospitals, safe neighborhoods and so on (Petersen 2009).

A fourth set of institutional and social mechanisms is associated with the presence of negative cultural, ethnic or religious repertoires with particular reference to those that hindered access to key positions by excluding individuals based on class, gender, race or ethnic origin. Sociological studies within this topic are innumerable and a list of the most important articles or even books would fill several hundred pages (see Cerami 2013).

A final set of institutional and social mechanisms of exclusion concerned the access to political power and associated local governance dynamics (Ostrom 1990, 2005). Excluding poor people from education in the best universities implied not simply having less access to the labour market but also having fewer chances to access political positions in democratic ways. Clearly, when all institutional doors were closed by the elites, poor people turned to political mobilization and eventually to violence to ensure the representation of their interests and access to the few power positions available (Justino 2010).

In this context, a correct understanding of the facilitators of democratization becomes particularly important, especially in presence of state fragility where conflict, low development status, vulnerability to endogenous and exogenous threats, and the lack of a developmental state capable of addressing the emerging socio-economic problems (such as those related to technology and learning, the business-government nexus or trade politics) in a consistent way are the key characteristics (Haggard 2018). The costs associated to the existence of ‘fragile’ states are enormous and can affect the economic development and system stabilization possibilities of the countries for

several years to come (Naudé *et al* 2011). Here, despite the persistence of some shortcomings, aid for democracy-enhancing related projects represents the most important element in democracy promotion (Burnell 2011) and consolidation (Resnick 2012), as an increasing number of studies have recently and unequivocally shown. However, equally important is to understand past mistakes made and the problems associated with past waves of system transformation.

Public Policy Administration and System Transformation in North Korea

As mentioned, North Korea is a military-based *State-Interfered Planned Market Economy*, whose dominant predatory mixed-capitalist mode of production and allocation of resources influences the leading social relationships. This results in various forms of social segregation and exploitation. A portfolio of different sources of formal and informal revenue affects the living conditions of the population subjected to this political economy of war with growing insecurity that is very often associated to extensive forms of patronage and clientelism. This, subsequently, leads to unexpressed *cadres* and social conflicts (see also Gough 2004, Figure 1.3, p.32). North Korean markets are, in this context, to be seen as social structures (see Beckert *et al.* 2007) with unique social-patronage relations. As it often happens in real-life situations, most of the social interactions on money depend, and on money push (Bergsdorf et al. 2007). Government co-optation of civil society greatly influences the patterns of system transformation. Coupons for the *cadres*, sexy photos with the smiling leader, the monopolization of local market stands, the introduction of compulsory cash cards for workers, special privileges for scientists, and tolerance for oligarchs-like real estate brokers are indicators of new forms of community and societal differentiation and de-differentiation (Leibfried and Mau 2008. See also Radio Free Asia http://www.rfa.org/english/news/korea).

Which pathways to democratic transformation can be envisaged? While it is certainly correct to affirm that *history matters* in political, institutional, economic, cultural and social change (see Pierson 2004), this does not mean that the patterns of system transformation are already set in

advance, as important institutional and societal adaptations, mutations and evolutions may occur (Lewis and Steinmo 2012), significantly altering the make-up of a country. A better understanding of the patterns of system transformation requires also an improved knowledge of the relationship that exists between fixed-immovable objects (Pierson 1998) in the public policy administration sphere and the dynamic actions of public policy administrators (Farrel and Shalizi 2012). The dichotomy between institutions and agency or, if one prefers, between *structure* and *agency* (see Giddens 1984) is often misleading (Mahoney and Thelen 2010) when applied to regional settings (de Bruijn *et al* 2007), and, especially, when one element is supposed to exclude the other (Katznelson and Milner 2002). Through a circular process, institutions influence the actions of actors, which, in turn, are capable of influencing the patterns of system transformation. The issue at stake here is if a system transformation in North Korea must occur, how to deal with authoritarian historical legacies, institutions, ideas and culture (see Kollmorgen *et al.* 2015). Another important set of issues is whether democracy can be exported through bombing, and, consequently, whether abrupt institutional change in public policy administration is to be preferred to gradual or evolutionary transformation (Lewis and Steinmo 2012).

Public Policy Administration and the Governance of War Desire

The governance of war desire becomes, in this context, an important factor for public policy administration stability and change. Democratization through war is a risky endeavor (Grimm 2015). The responsibility to protect, as defined by the Report of the International Commission on Intervention and State Sovereignty (2001), sets some pre-conditions necessary for intervention, among which the protection of populations from mass murders and genocides. The governance of war desire is an additional necessity.

As mentioned elsewhere (Carmel and Cerami 2011, p.10), “emotions (Elster 1999, 2009a,b) play a central role in institutional and policy change, favouring the formation of specific beliefs (Rydgren

2009) and preferences (Freese 2009), which, in turn, structure the attitudes of citizens and institutional agents and, subsequently, limit the set of opportunities available (Petersen 2009). For Jon Elster (1999, 2007, 2009a,b), the distinction between *rational* and *irrational behaviour* is a trivial misunderstanding (see also Damasio 1994), because, as Raymond Boudon has also emphasized (2003), reason is often subjected to emotions, but emotions often rely on reasoning to crystallize. As argued by Frank (1988), passions often serve our interests in a co-producing and self-sustaining process of interest-maximizing preference formation and vice versa (Elster 2007).

Bombing is expensive for the state budget. It is also a lucrative business. But when no clear idea of future system transformation pathways exists, it becomes, additionally, a suicidal political exercise[7]. Similarly, North Korea's nuclear program has been estimated at $1 billion to $3 billion. According to CNBC estimations, each “Scud costs between $1 million and $2 million; each Musudan from $3 million to $6 million” (Source: CNBC 2017). In September 2017, the cost of one kilogram of rice was around KPW 6,000 that corresponded to approximately $0.75 (exchange rate $1 = 8086 KPW 28.9.2017). This meant North's nuclear program costed between 1 million tons of rice and 4 million tons of rice. Each Scud costed between 1.3 thousand tons of rice and 2.6 thousand tons of rice; each Musudan from 4 thousand tons of rice and 8 thousand of rice; and each submarine-launched ballistic missile at 6.6 thousand tons of rice and 13.3 thousand tons of rice. Over a total population of 24,851,267 inhabitants, North Korea's nuclear program, as mentioned before estimated between $1 billion and $3 billion, corresponded to 54 kilos of rice per capita and 161 kilos of rice per capita. This, subsequently, corresponded to 150 grams and 450 grams of rice per day for each inhabitant (see also Daily NK 2017, p.12). It comes then as no surprise that the patterns of North Korean inclusion greatly changed after the 2018 unofficial peace talks with South Korea and China during

[7] The cost of a simple US air-to-air AIM-7 Sparrow missile is, for example, around US$ 150,000 per unit, whilst the RIM-161 standard antiballistic missile 3 (SM-3) costs between US$ 9 and 24 million per unit.

the winter Olympics, since they corresponded to more long-term political objectives of system stability and peace.

However, continuous stop-and-go phases in nuclear disarmament spilt-over in embargos and international trade restrictions, which resulted in a compression of human and economic activity, with subsequent reduction in prosperity shining and living standards. Kim Il Sung's legacy (Kim Jong Un's grandfather) of North Korea as a “nuclear-armed state” (Jin 2018), associated with fears of invasion and international trade dependence were probably behind the difficulties in the round-table talks. This happened despite Kim Jong-Un's expressed desire for denuclearization, though delayed (Sik 2018). In October 2018, the exchange rate against the US dollar increased, food availability decreased because of bad weather (e.g. Typhoons) (Daily NK 2018; FAO 2018) and trade restrictions. Price subsidies to food and to gas were clearly not a sufficient measure for covering the costs of nuclear proliferation.

Conclusions

Size matters, some claim. Others emphasize the usage. Contrasting theories. The North Korean ballistic missile Taepodong 2 is presumably bigger than the Taepodong 1 with a wider scope of action. Its real goals, however, are still unclear, but, presumably, they are disastrous for peace-building. The 'metric us' (*Das metrische Wir*)[8] of North Korea, where Kim Jong-un's regime must quantify each citizen through a parametrization of his/her loyalty to the system seems to be dangerously linked to a *politics of military spending*[9] in the *buyngjing* line of political economy, which might lead through a self-reinforcing social mechanism to further nuclear escalation.

In *Choice Architecture*, 2017 Nobel Prize Winner Richard H. Thaler with his colleagues Cass R.

[8]On the concept of *Das metrische Wir* ('the metric us'), see Mau (2017).

[9] On the politics of military spending and the assumptions behind defense expenses, see, for instance, *El Gasto Militar* (Gutiérrez 1994).

Sunstein and John P. Balz (2014) define the NUDGES approach. It comprises of six main principles for making good policy choices: iNcentives, Understand mappings, Defaults, Give feedback, Expect error, and Structure complex choices. *iNcentives* refers to prices and incentives. More specifically, it has to do with: who uses, who chooses, who pays, who profits of (and by) a determined policy choice. *Understand mappings* concerns the right policy choices that lead to the welfare of society. This, for example, involves selecting which policies to choose among a wide variety of possible equally suitable alternatives. *Defaults* means avoiding the least pathway of resistance when this default option (*doing nothing* or no change) leads to negative results (Thaler et al. 2014, p. 430). In complex systems, *Give feedback* is a necessary endeavor to avoid mistakes. What rose the admiration of baseball fans and gives them joy is often the individual achievements of players. But the player there does not stand alone at the plate, because s/he is part of a team. Looks, throws, catches, hustles are all elements part of one big team. Giving feedback to players becomes, in this context, necessary to ensure the consistency of their game choices (anonymous quote). *Expect error* is a fifth important element in order to improve a policy-maker's choice architecture. If a player goes out there for himself/herself without thinking about the team (or caring about the team), he or she gets nowhere. The team must fit, players must expect errors and learn how to deal with them. *Structure complex choices* is hence the sixth and final element of the NUDGES approach. It involves the necessity of adopting different strategies for dealing with complex problems and choosing the best alternative with more trade-offs. Structure complex choices means, in brief, having in mind a structure of alternative suitable strategies.

This discussion includes also the ways in which public policy administrators deal with the *Descartes' Error* (Damasio 1994) – that is to say – the tensions that exist between their emotions and ir/rational behaviors. In other words, their *Feeling of What Happens* (Damasio 2000), as well as the desires' contraints that public policy actors face in their everyday life, especially when socialized in determined institutions. As Thaler and Mullainathan (2001) have correctly

emphasized, departures from pre-existing ir/rationalities are not rare (on path-departures, see also Cerami and Vanhuysse 2009; Cerami 2013). In this context, it is not extraordinary to adopt "the rule of the thumb as a way to economize on cognitive faculties" (Thaler and Mullainathan 2001, p.3).

In the case of the North Korean public policy administration diatribe, an important issue is, to paraphrase Thaler and Mullainathan (2001, p.2), whether it makes sense to follow "dumb money", as in the case of nuclear proliferation activities promoted by the industrial-military complex, versus following "smart money", as in the case of ensuring a correct functioning in the public policy domain.

As mentioned previously, the costs associated with nuclear proliferation and war escalation activities are enormous, as introduced by the *buyngjing* line of political economy. These incalculable costs include political costs, economic costs, cultural costs and social costs that public policy administrators are called to deal with in some way with limited budget possibilities. The relational *elective affinities* between nuclear proliferation and effective public policy administration must still be clarified.

To conclude, the ancient Greeks had a nuanced conception of time: *Cronos* referred to the chronological quantification of time and to its sequentiality – or put it simply – of how many hours have passed. *Kairos* referred instead to the right or opportune moment, for example, when it is the right time to speak or to act. In our everyday lives, the "rythm of timing" (Gelang 2013) has to do with the rythm of "now". The feeling of "now" can also be understood in terms of "real-time impermanence" (Peary 2016), which means occurrences at Time 1 (t1) that mutate at Time 2 (t2) (just think, for example, to your first kiss or to the birth of a child). In the public policy administration domain, timing and sequentiality of reforms (see Pierson 2004) mean for policy-analysts, as well as for public policy administrators exactly choosing the right moment to implement the opportune reforms. It also means having a feeling of what happens. Understanding

the negative incentives, the mappings (that is- the right policy choices that lead to the welfare of society), the defaults of these choices, the negative feedbacks, the errors, and the obsolete structure of complex choices linked to the *buyngjing* line of political economy remains crucial.

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ANNEX

Table 1. North Korean GDP Growth (percentage change over previous year)

	1990	1995	2000	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
North Korea	-4.3	-4.4	0.4	-1.0	-1.2	3.1	-0.9	-0.5	0.8	1.3	1.1	1.0	-1.1	3.9
South Korea	-9.8	9.6	8.9	5.2	5.5	2.8	0.7	6.5	3.7	2.3	2.9	3.3	2.8	2.8

Note: Figures for South Korea's GDP growth rates are based on 2010 prices.

Source: Bank of South Korea (2017).

Table 2. North Korean GDP Growth, by Industry

(percentage change over previous year)

	North Korea			South Korea	
	2014	2015	2016	2015	2016
Agriculture, forestry & fishing	1.2	-0.8	2.5	-0.4	-2.9
Mining & manufacturing	1.1	-3.1	6.2	1.7	2.3
Mining	1.6	-2.6	8.4	-1.3	1.6
Manufacturing	0.8	-3.4	4.8	1.8	2.3
(Light industry)	(1.5)	(-0.8)	(1.1)	(0.5)	(0.7)
(Heavy & chemical industry)	(0.5)	(-4.6)	(6.7)	(2.0)	(2.7)
Electricity, gas & water supply	-2.8	-12.7	22.3	5.1	3.6
Construction	1.4	4.8	1.2	5.7	10.5
Services	1.3	0.8	0.6	2.8	2.3
(Government)	(1.6)	(0.8)	(0.6)	(2.1)	(1.9)
(Other services[1)])	(0.5)	(0.6)	(0.5)	(3.0)	(2.6)
GDP	1.0	-1.1	3.9	2.8	2.8

Note: 1) Includes sub-sectors such as (i) wholesale & retail trade and restaurants & accommodation, (ii) transportation & communications and (iii) finance, insurance & real estate.

Source: Bank of South Korea (2017, Table at p.2)

Fig. 1 Korean Peninsula 3 January 2018

Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

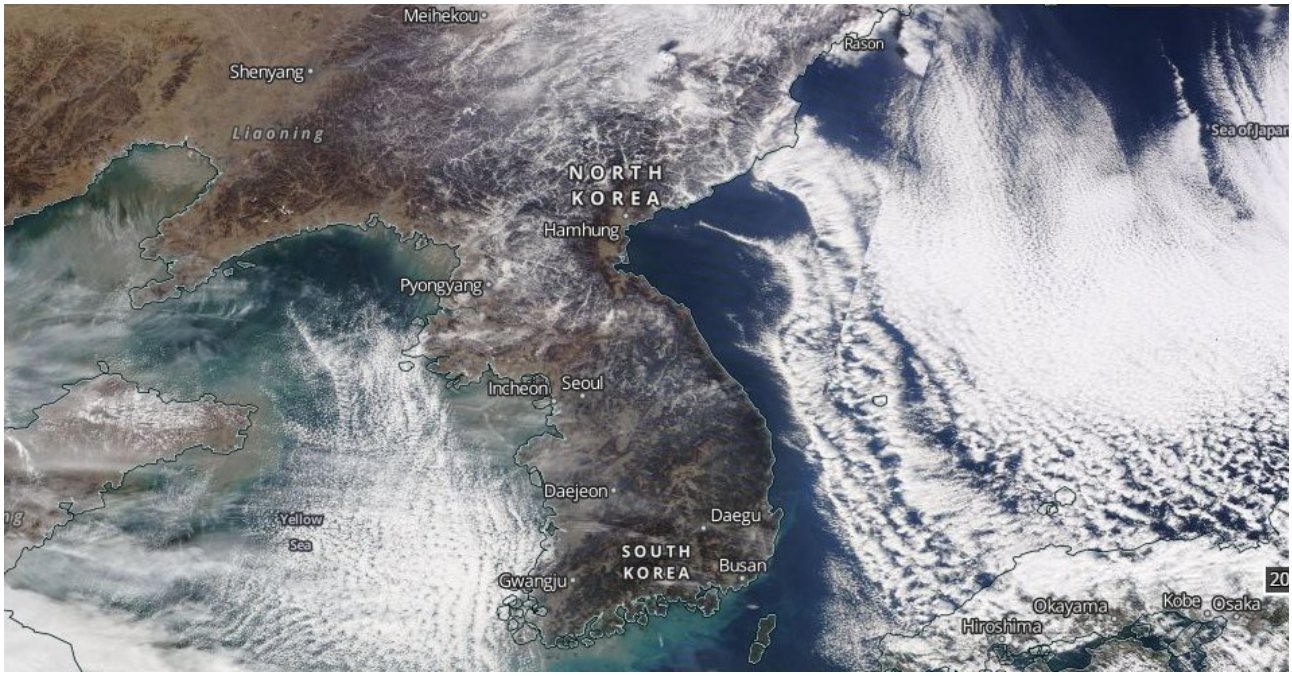
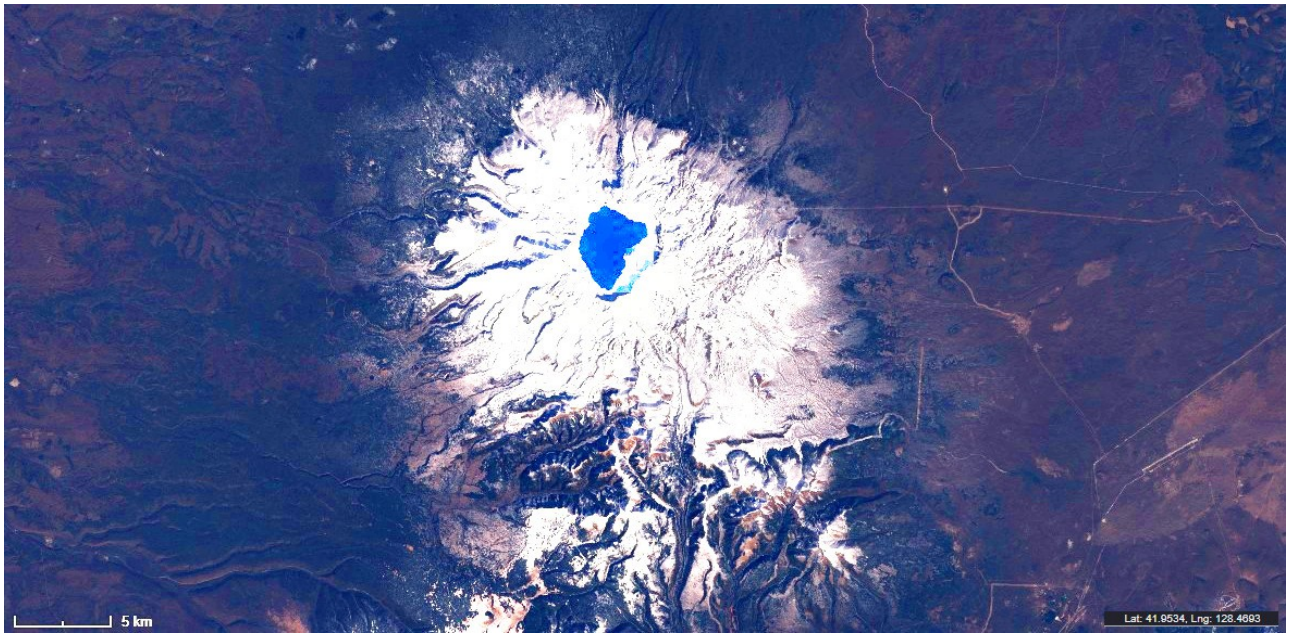
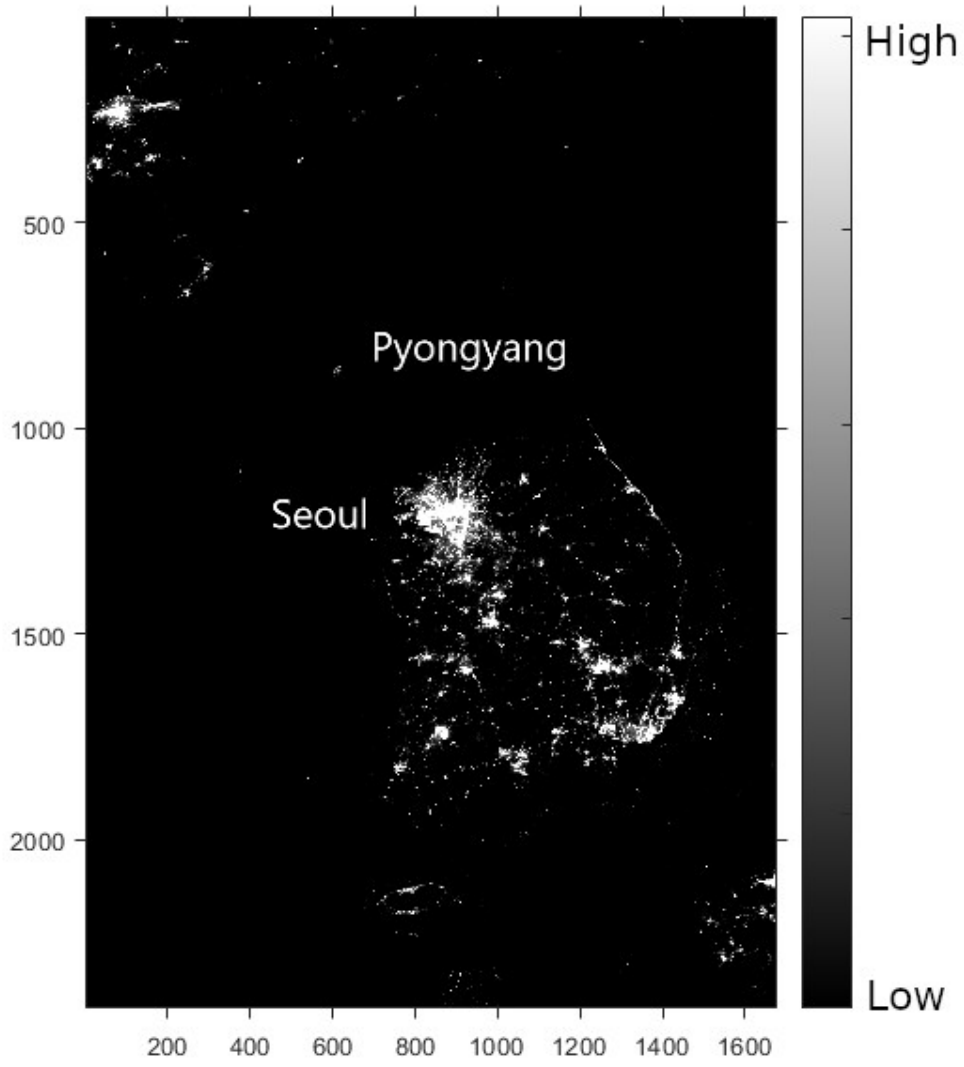


Fig. 2 Mount Paektu



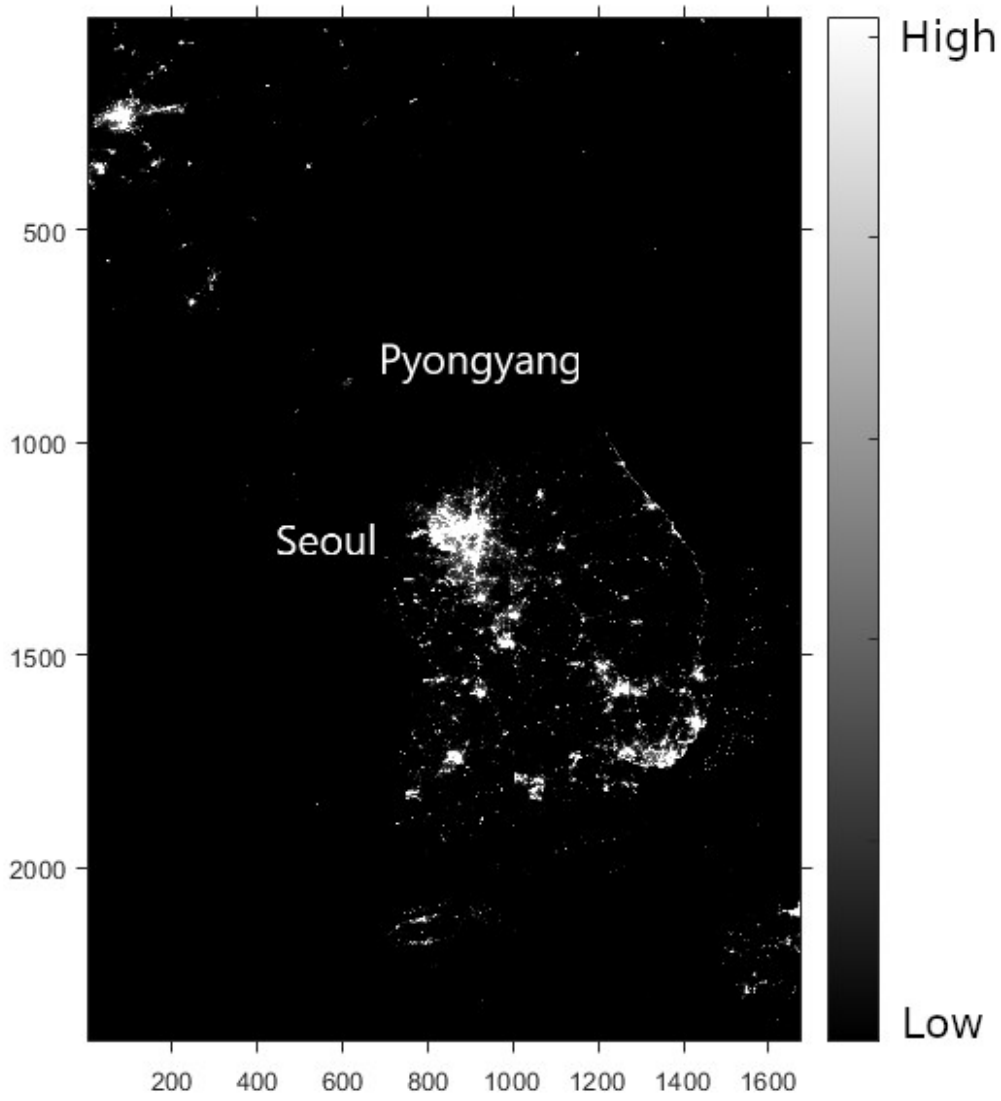
Source: Landsat 8, 16 October 2018.

Fig 3 The Night Lights of North Korea 2012



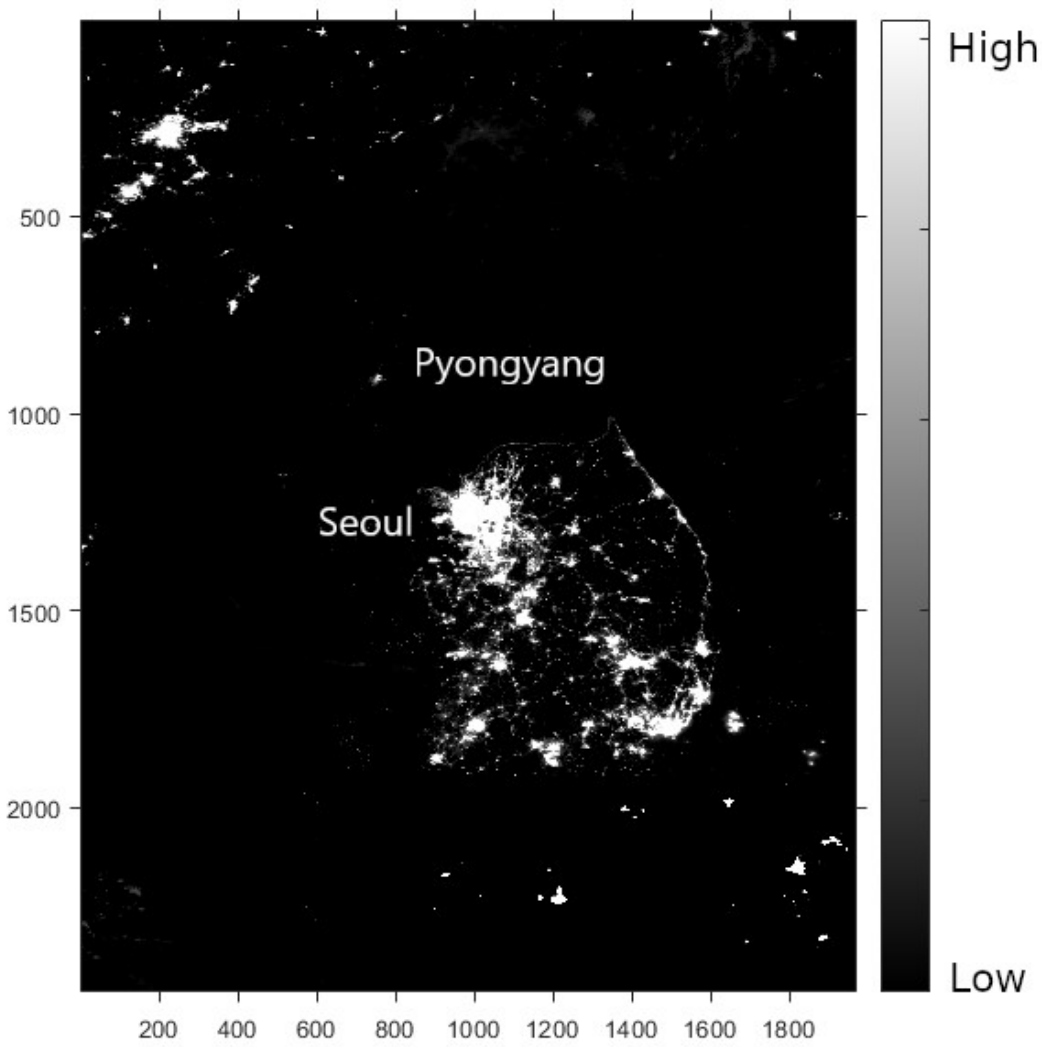
Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig 4 The Night Lights of North Korea 2016



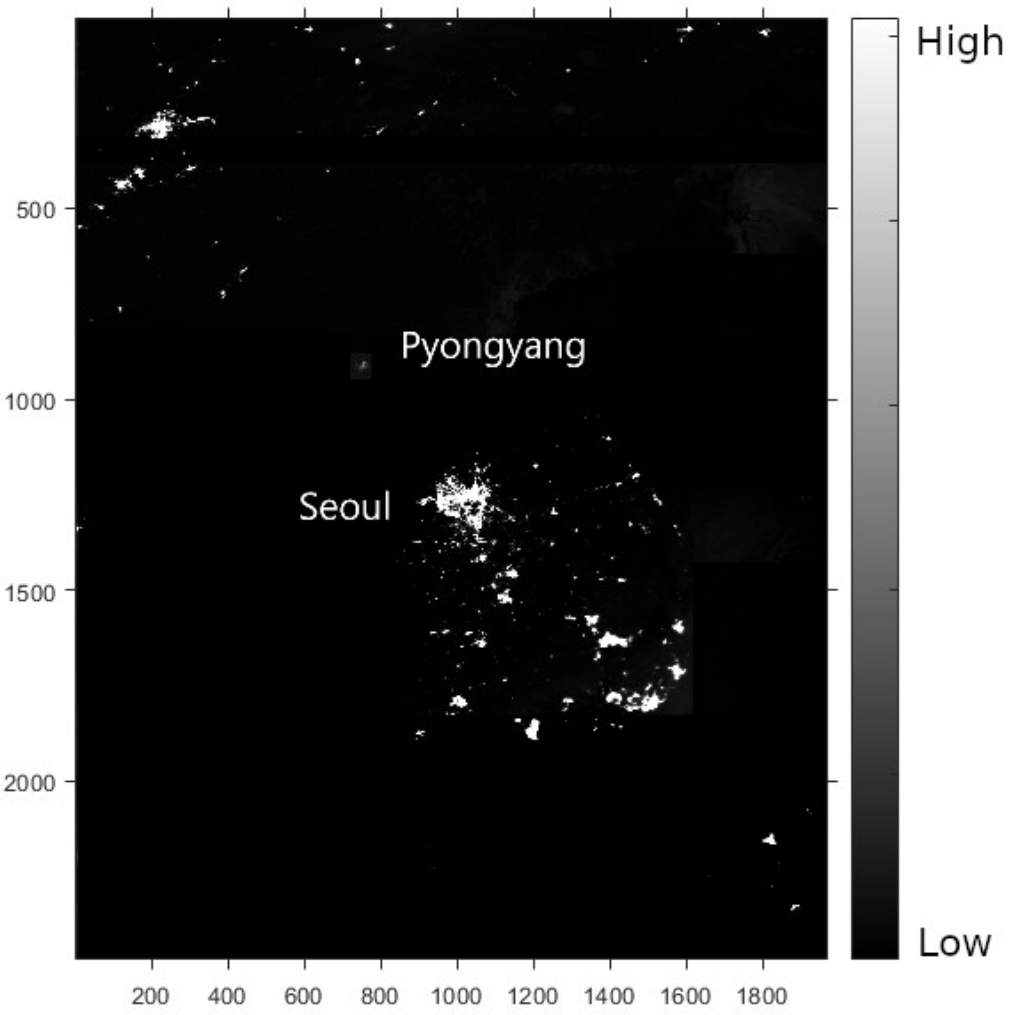
Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig 5 The Night Lights of North Korea March 2017



Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig 6 The Night Lights of North Korea March 2018



Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig 7 The Night Lights of *Pyongyang 2012*

NOTE: Fig. 7a, Fig. 8a, Fig. 9a, Fig. 10a display the changes in color luminosity and the single value of this luminosity plotted in a 3-D environment.

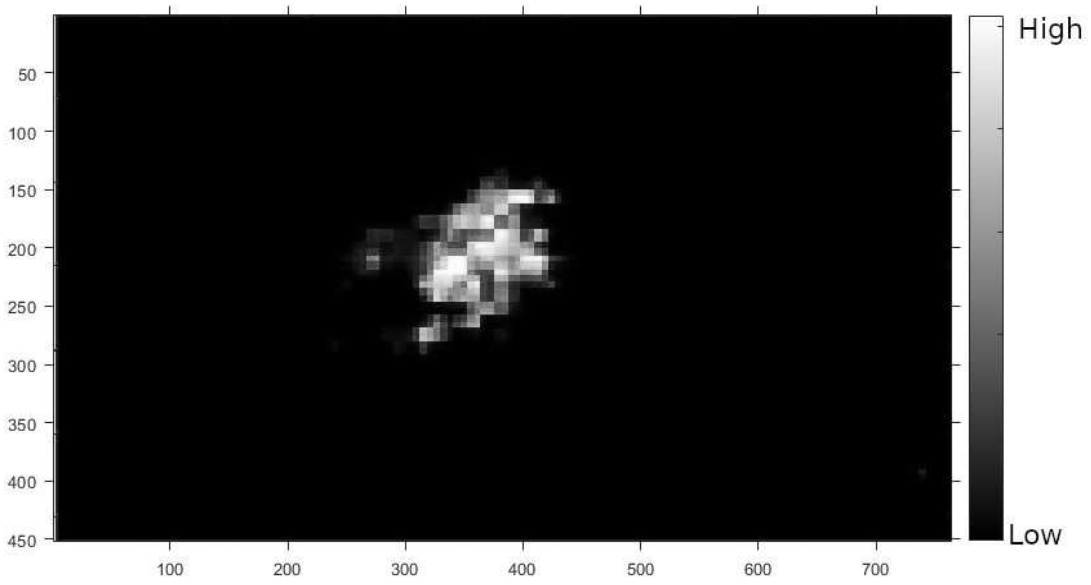
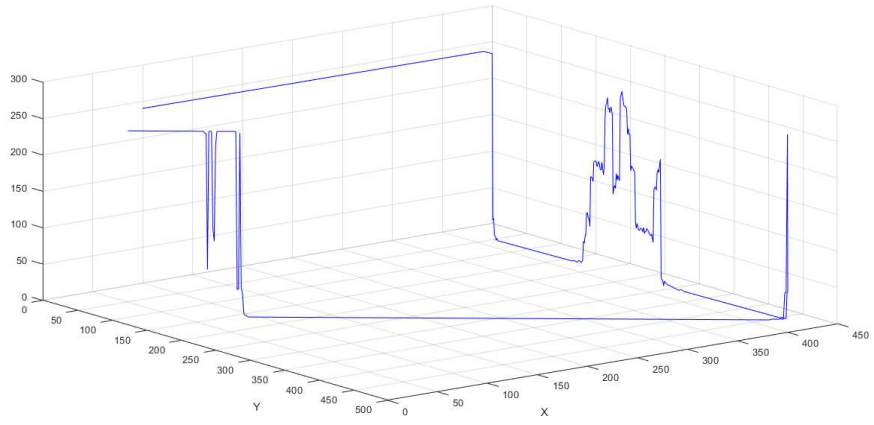
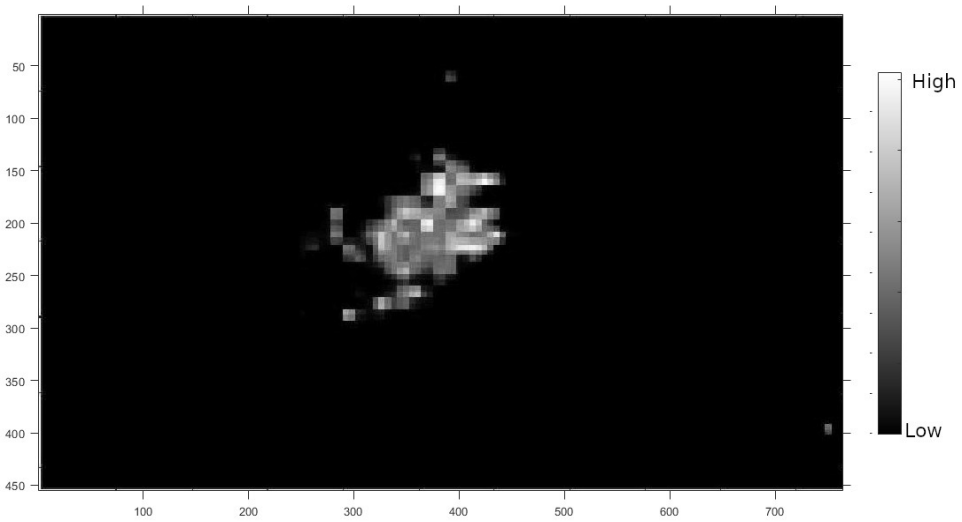


Fig 7a Color Display Graph *Pyongyang 2012*



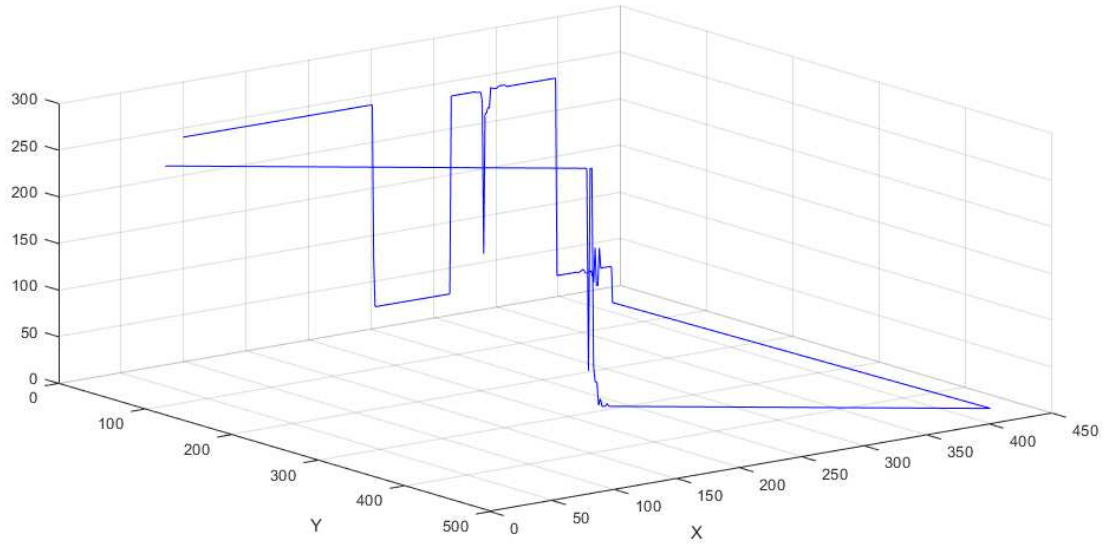
Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig. 8 The Night Lights of *Pyongyang 2016*



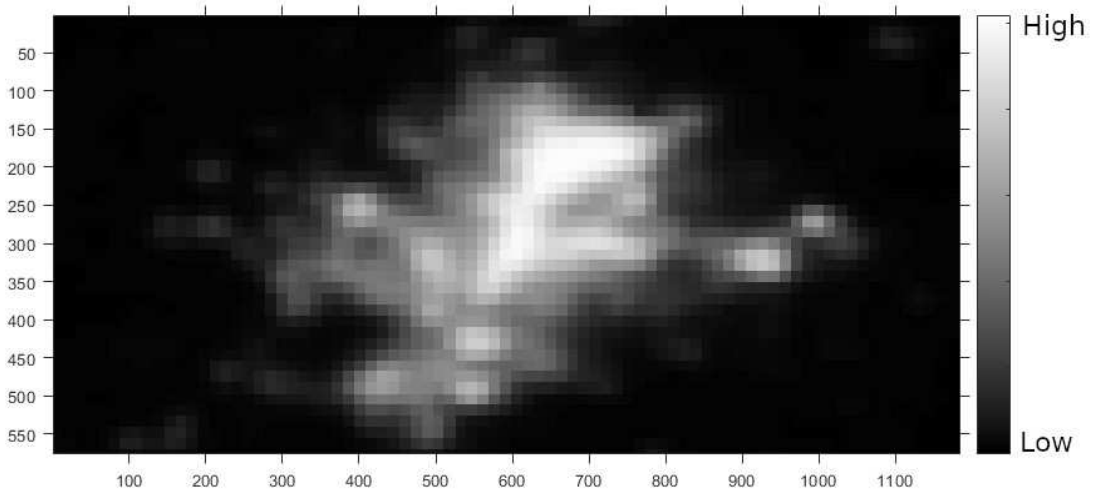
Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig 8a Color Display Graph *Pyongyang 2016*



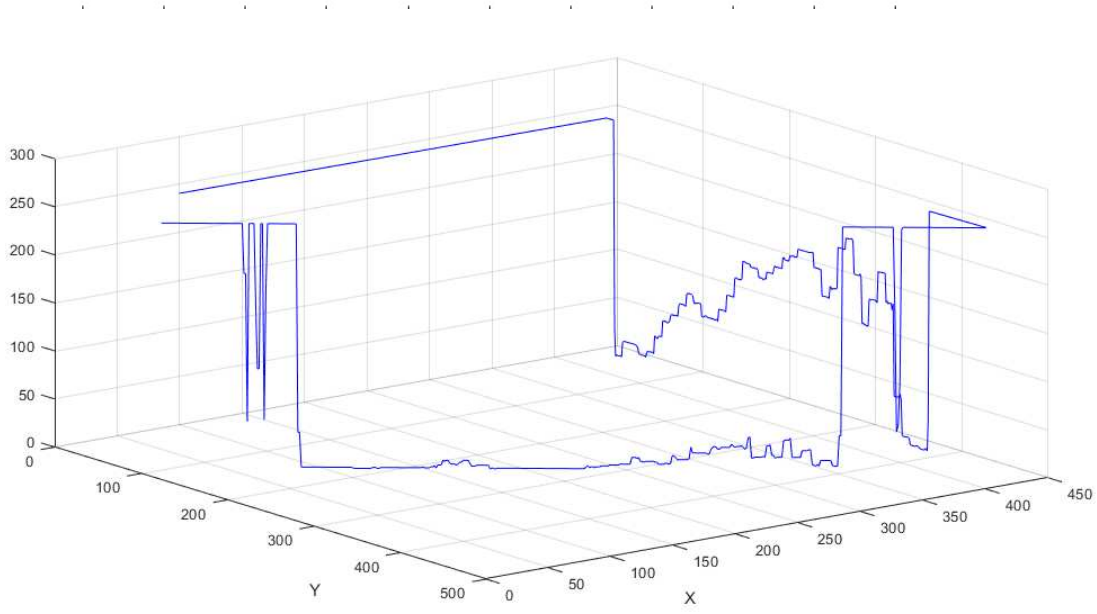
Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig. 9 The Night Lights of *Pyongyang March 2017*



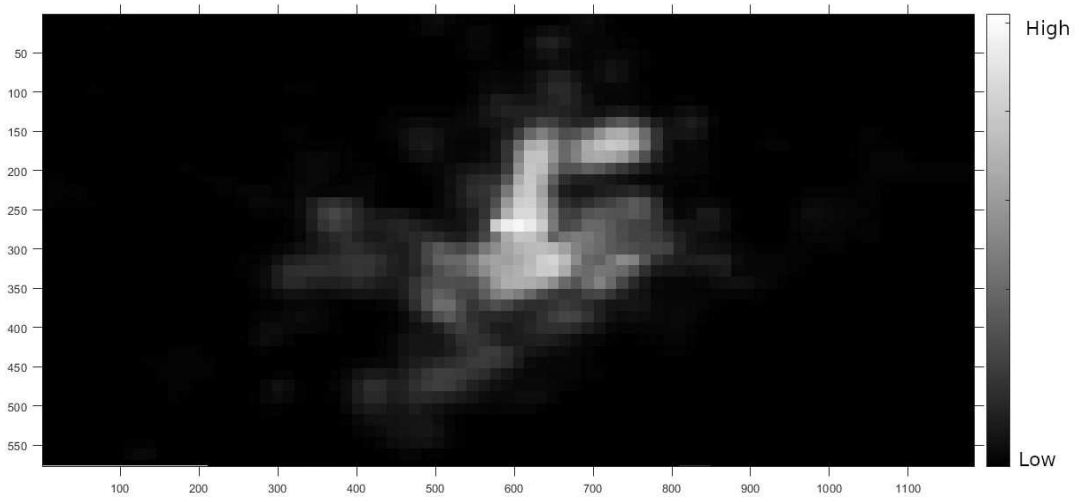
Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig 9a Color Display Graph *Pyongyang March 2017*



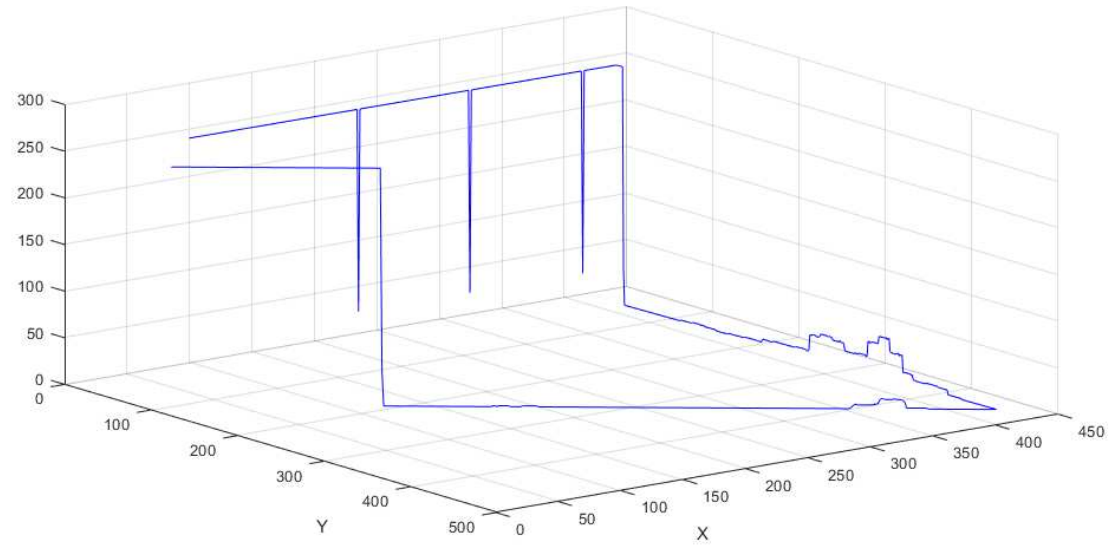
Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig. 10 The Night Lights of *Pyongyang March 2018*



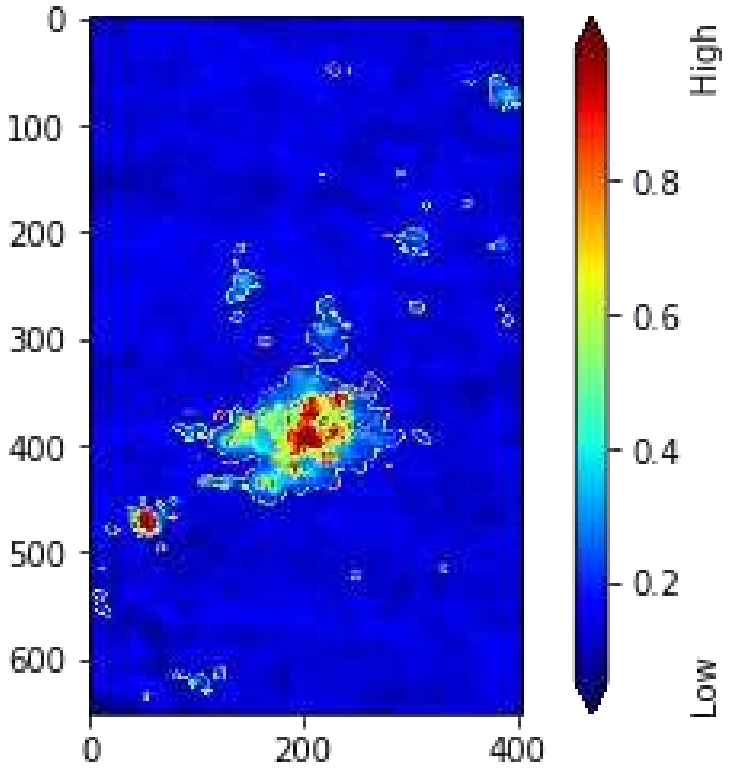
Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig 10a Color Display Graph *Pyongyang March 2018*



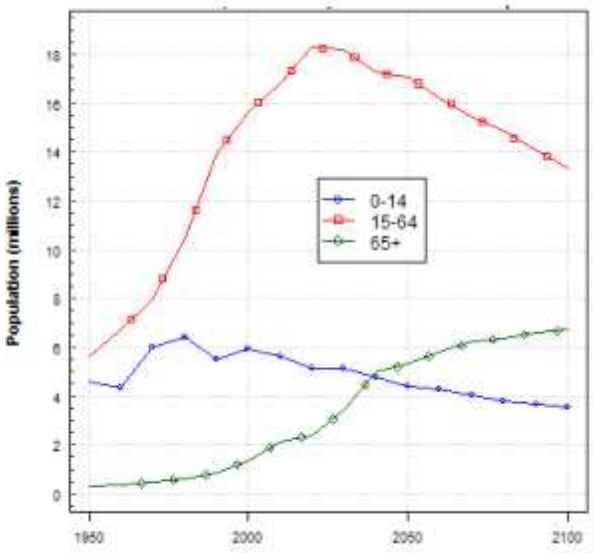
Source: SUOMI-NPP VIIRS (2018). Available at: https://jointmission.gsfc.nasa.gov/viirs.html

Fig. 11 The Lights of Pyongyang: Economic Well-Being by Zone (May 2018)



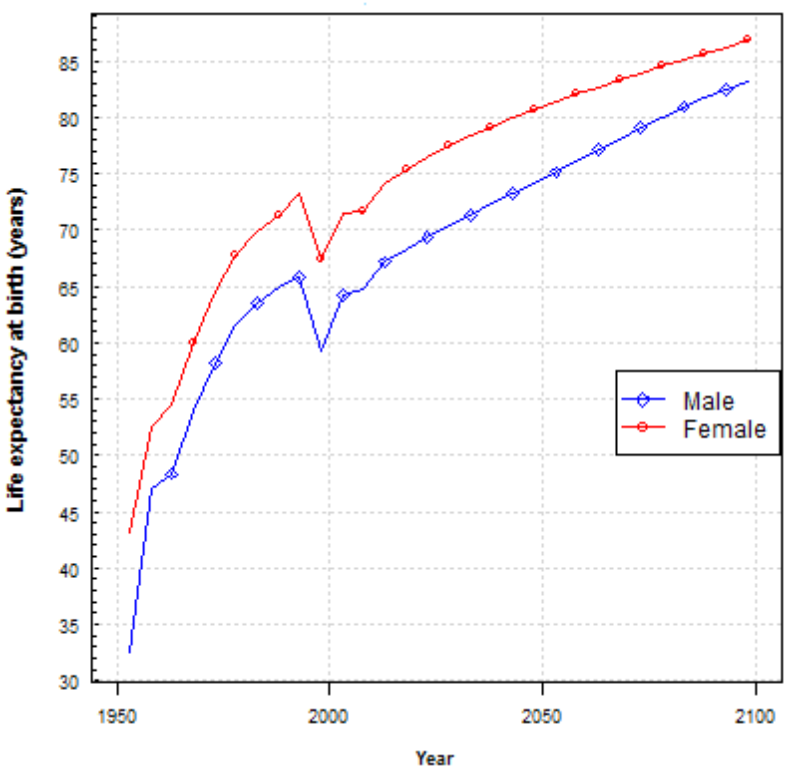
Source: ©Nasa 2018. SUOMI-NPP satellite. https://www.nasa.gov/mission_pages/NPP/main/index.html Author's calculations and visualization. False-Color Imaging. ©Alfio Cerami

Figure 12 Total Population by broad age group



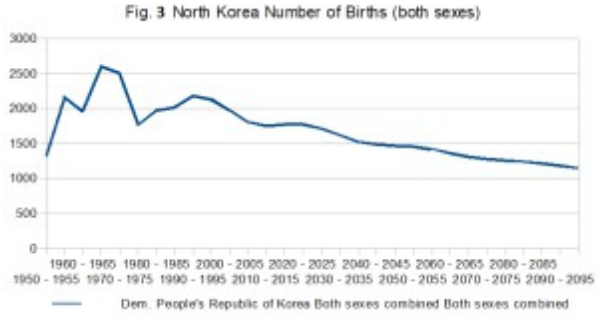
Source: *United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, custom data and figure acquired via website.*

Figure 13 Life expectancy at birth by sex



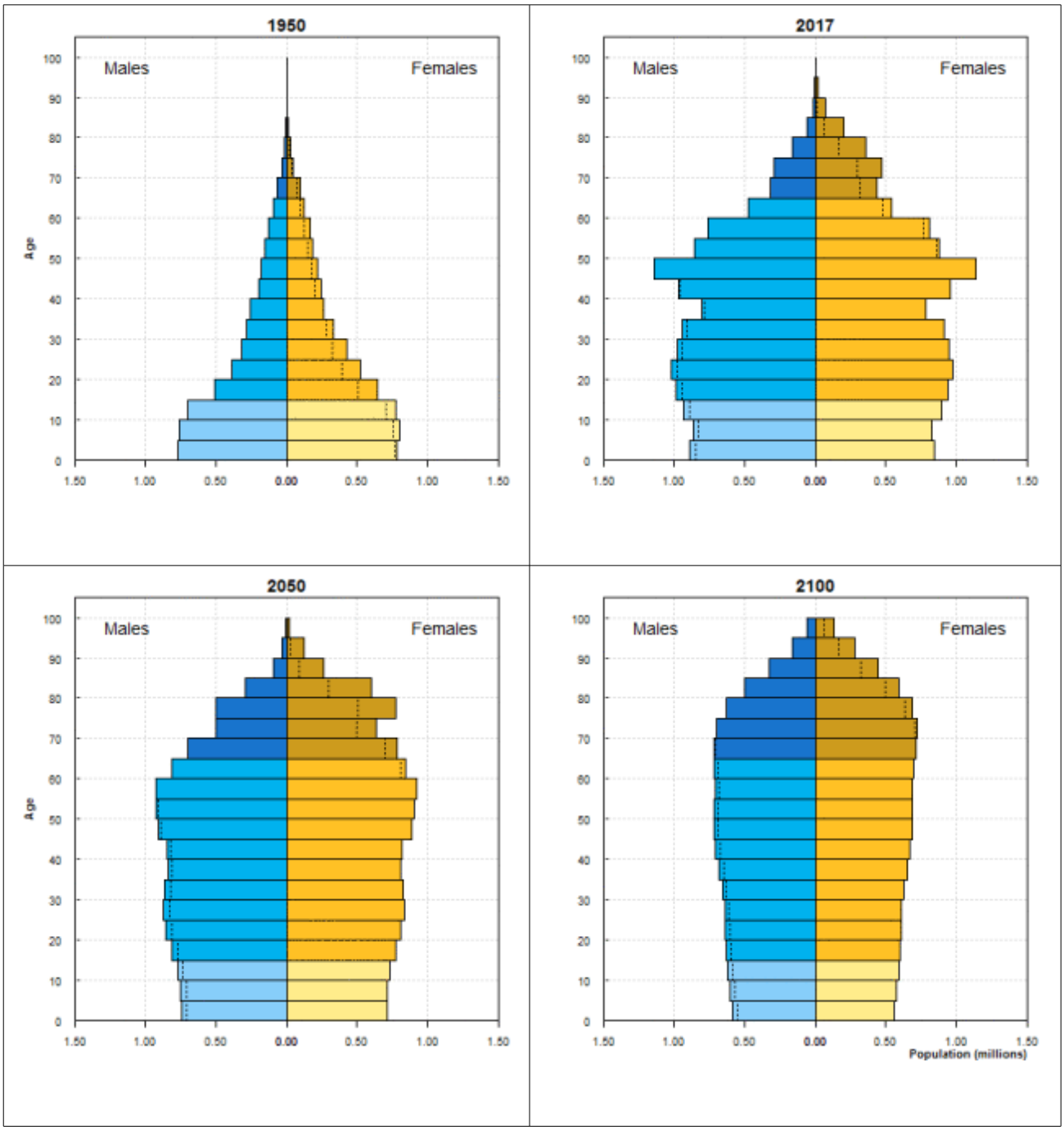
Source: *United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, custom data and figure acquired via website.*

Fig. 14 North Korea Number of Births (both sexes)



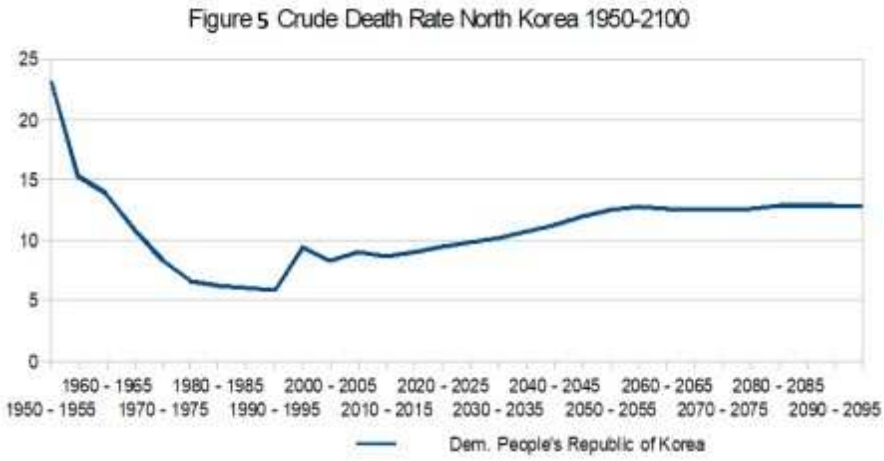
Source: *United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, custom data and figure acquired via website.*

Figure 15 Population Pyramids



Source: *United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, custom data and figure acquired via website.*

Fig. 16 Crude Death Rate North Korea 1950-2100



Source: *United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, custom data and figure acquired via website.*