

Cold chains in Hanoi and Bangkok: changing systems of provision and practice

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Introduction

It comes as no surprise to learn that habits are changing in fast growing cities like Hanoi and Bangkok; that per capita energy consumption is rising and that diets are becoming more 'Westernised' and resource intensive, especially amongst the middle class. In analysing the emergence of new forms of distinctly urban demand, this paper characterises changing relationships between systems of food provisioning and related practices of shopping, cooking and eating. It concentrates, in particular, on the pivotal roles of fridge freezers, arguing that these appliances are situated at the intersection of households and more extensive supply chains, including 'cold chains' which enable distant forms and sources of food supply and which have simultaneously become an essential part of the urban infrastructure and of variously shared interpretations of 'proper' provision. Comparing experiences from Bangkok and Hanoi allows us to identify some of the different trajectories involved in constituting and reconstituting such arrangements. More abstractly, this exercise shows how household practices, patterns of consumption, and systems of food provisioning connect and change.

Consumption, systems of provision and practice

Although it is fair to say that consumption is an outcome of practice, this is to scratch the surface of a much more complex set of relationships. As Warde explains, everyday practices such as eating, shopping, provisioning, cooking and storing food reflect and reproduce conventions of convenience and care and are, in turn, bound up with related systems and technologies of food retailing, manufacturing and provision (Warde, 2005; 2016). In so far as consumption is an outcome of practice, understanding changes in the demand for energy or for different types of food like those observed in Hanoi and Bangkok is essentially a matter of understanding how configurations of practices, infrastructures, appliances and systems of provision cohere and evolve, especially in contexts of rapid urbanisation.

In taking this approach we build on the suggestion that technologies and appliances are not only critical for the conduct of specific practices: they are also part of bundles of practice that extend across different scales and periods of time (Hui, Schatzki et al. 2017; Shove 2017). These ideas suggest that studies of domestic consumption cannot be separated from, and are in fact constitutive of, more extensive systems of provision. As developed by Fine and Leopold (1993) and Leslie and Riemer (1999) the concept of 'systems of provision' characterises connections between sites of production, distribution, retailing, design, marketing and final consumption. For example, a local system of provision might only involve movement from farm to shop to home. By contrast, a more extended system might entail movements between sites of production and processing around the world before reaching shops and homes.

Our challenge is to show how changing systems of urban food provisioning in Hanoi and Bangkok sustain and are sustained by also changing practices of shopping, cooking and eating, and how all of these depend, in one way or another, on freezers and the 'cold chain'.

The cold chain is a term used to describe an unbroken sequence of spaces and processes through which foods are maintained in a frozen or chilled state 'from farm to fork'. The cold chain depends on a network of domestic fridges and freezers, along with refrigerated transport and storage. Once in place, these infrastructures facilitate the geographical separation of food production and consumption and the distribution and circulation of foods that 'need' chilling. The fridge freezer, which is crucial to these processes, is situated at the intersection of domestic and commercial systems of provision. Analysis of what these appliances contain and how they are used consequently promises to provide distinctively revealing insight into the ways in which familiar practices are maintained or transformed in new and changing circumstances and into how new diets and/or patterns of consumption take hold within, despite or alongside changing systems of provision.

Previous research suggests that freezers¹ link households to global networks of frozen food provisioning and to discourses and ideologies of care, convenience, health, well-being and family life (Shove and Southerton 2000, Hand and Shove 2007). In addition and as Goodman et al. explain, freezers have a special role within food systems that reflect and are defined by the problem of supplying major conurbations (Goodman et al., 2012). They are also implicated in dietary trends including the consumption of imported food or food which is out of season. Fridge freezers consequently contribute to the production and configuration of what are becoming increasingly distant and distinctly resource intensive systems of food provisioning. But as we explain below this is not their only possible role. Fridge freezers are also used to sustain much more local systems of provision, helping to preserve 'traditional' diets and sources of supply and to bypass, if not subvert, the commercial cold chains that they also enable.

Investigating fridge freezers

In this article we analyse the contents of a selection of fridge freezers and the practices of those who use them, doing so as a means of better understanding the dynamics and the ironies of fridge freezer dependence. In detail, we compare uses of fridge freezers in Bangkok (Thailand) and Hanoi (Vietnam) as part of a broader project examining trends in domestic energy demand. Bangkok and Hanoi are instructive sites in terms of changing patterns of both food and energy consumption. The number of domestic refrigerators in use is expected to rise from 10.8 to 18 million in Thailand and from 11 million to 21.8 million in Vietnam between 2016 and 2030 (Green Cooling Initiative, 2016). In addition, Bangkok and Hanoi are experiencing rapid population growth accompanied by related changes in food supply (Dixon et al. 2007; Wertheim-Heck, 2015), and in both cities there is evidence that aspects of a more 'Western' diet (for instance, dairy products, ready-meals etc.) are gaining ground.

In detail, our research shows how the double-door fridge freezer – which is the most common format for new fridge freezers in both countries – links households to changing

forms of food supply. We discovered that diets were altered in ways that generated new demands for keeping food cool and that meanings of freshness and quality were renegotiated sometimes in opposition but always in relation to the affordances of commercial cold chains. This is not a uniform process. In describing how fridge freezers figured in multiple social practices and in the making of dependencies and needs within the home and beyond we detect the ongoing co-evolution and hybridisation of concepts like those of 'tradition' and 'modernity' and the intertwining of global and local arrangements. The paper begins with an overview of when and how fridge freezers have become 'normal' home appliances, and of related trends in food provisioning and consumption. We then consider how fridge freezers figure in changing food systems such as those that are developing in Bangkok and Hanoi. Drawing on household interviews in both cities we go on to review first-hand accounts of fridge freezers in use, and of how practices of shopping and cooking are shaped by freezer-related forms of storage and provisioning and associated themes of food quality and safety. In the last part of the paper we highlight tensions and ironies in how fridge freezers are embedded in urban life and how their role evolves.

What are fridge freezers for?

There is no one answer to this question. Instead responses reflect differences in how households and appliances are positioned within historical and cultural trajectories of provisioning and practice (Shove et al., 2015). It is consequently impossible to provide a single history of the fridge freezer in use. Instead and as studies of domestic appliances in the USA, UK and India indicate, fridges and freezers have 'arrived' and been integrated in different countries and food systems at different moments in time.

In the USA, household refrigerators were initially acquired by relatively affluent households and became quieter, more reliable and less expensive through the 1920s. According to Rees, the first stages of refrigerator diffusion were marked by a clear division between homeowners and tenants who were unwilling to invest in a kitchen they might soon leave. In 1935 the US Government offered loans for 'household modernization', which could include the purchase of appliances and by 1944, 85% of American homes had a refrigerator. Stand-alone freezers came later, only becoming popular when the infrastructure for frozen food developed in the 1950s. In 1953 there were around three million home freezers (in the US), a figure which rose to 14 million by 1965. Even though the frozen food industry promoted home freezing, it was the possibility of buying ready-frozen food that prompted many households to get a freezer. As Americans became accustomed to cheap and convenient (often frozen) food, fridges and freezers quickly became indispensable (Rees, 2013).

In the UK refrigerators became available somewhat later than in the USA, with the first freezers appearing in the 1960s. At this point there was little or no commercial frozen food provision meaning that freezers were mostly used for preserving gluts of home produce and beating the seasons. From the 1970s onwards arguments about the 'need' for a freezer reflected arguments about efficiency and economy and were clearly related to the development of a frozen food industry and opportunities for people to buy in bulk. Since the 1990s and the development of an even wider range of ready-frozen foods, the freezer (now a fridge freezer) has been repositioned an instrument of convenience and coordination: it

helps households manage busy lives whilst maintaining valued standards of catering and care (Shove and Southerton, 2000).

In other countries, fridges and freezers have been adopted, as standard, in different decades, entering radically different worlds of food consumption and production, and having correspondingly diverse consequences for shopping, cooking and eating. For example, although refrigerators were introduced in India in the 1960s, it took another forty years before they were in widespread use (Wilhite, 2008). As Wilhite explains, traditional aversions to eating or re-heating leftovers and to consuming cold drinks and food had to be overcome before refrigeration 'made sense'. In effect, it took a whole new generation before refrigerators and the food practices associated with them became normal.

These examples underline the point that fridge freezers are introduced and embedded in strikingly different complexes of practice. The process of becoming normal, and of falling into use, is not simply a matter of reinventing forms of cooking and eating that already exist elsewhere (Shove and Pantzar, 2005). Instead, and as Hand and Shove (2007) also argue, the normalisation of the freezer is an ongoing, situated, achievement: not a matter of sociotechnical closure, and not simply an outcome of increasingly extensive diffusion.

At the same time, there is something of a sequential process. The viability and significance of the commercial cold chain, and the market for ready-frozen foods changes as more and more people acquire a fridge freezer and as the last link into the home is completed. These are important processes, but further steps are required to show how fridges and practices interconnect. DuPuis' (2002) account of the normalisation of milk consumption in the US provides some clues as to how an analysis of related shifts of habit, diet and consumption might proceed. As her subtle and insightful study shows, grasping the 'making' of milk as indispensable part of the American diet depends on understanding the *relation* between urban centres and rural farms, the politics of regulation, systems of packaging and distribution, education and ideology. This is not only a matter of understanding different 'levels' of influence, or of detailing ordered chains of action: instead, DuPuis' method is to represent and describe the circulation and conjunction of *interconnected flows* of materials, knowledges and discourse (Leslie and Reimer, 1999). This approach is consistent with the suggestion that fridge freezers simultaneously figure as instruments of household provisioning (e.g. Shove and Pantzar, 2005; Shove et al., 2012) and as essential features of also changing systems of provision (Friedberg, 2015).

In the rest of the paper we draw on these ideas, using them to help reveal the fridge freezer's pivotal but also ambivalent role in the food system and in daily life at times of rapid urbanisation and as differently experienced in Bangkok and Hanoi. In pointing to similarities and differences between these two cases our aim is to learn more about how fridge freezers mediate responses to the various challenges of managing diets and food supplies in these fast changing urban environments. Whilst the detail of the cases are not generalizable – different arrangements apply in other cities and at other times – our research reveals what are likely to be generic trends in urban diets and frozen food provisioning and in related, but ambivalent responses and adaptations in practice.

Fridge freezers and cold chains in Bangkok and Hanoi

Bangkok and Hanoi have expanded significantly in the last forty years and there have been major changes in transport, housing, urban planning, economic growth and systems of food provision. In general, the pattern is one in which local food supplies have been supplanted or augmented by those grown or manufactured elsewhere and distributed through supermarkets rather than small stores and markets. However, there are relevant differences of scale and in when and at what rate these two cities have developed.

In brief, Bangkok, which is in any case larger, expanded faster, and earlier than Hanoi. In 2010, Bangkok was home to 8.2 million people, some of whom had lived in an urban environment for two or more generations (Baker and Phongpaichit, 2014; National Statistical Office Thailand, 2013). Bangkok's population continues to rise and is predicted to grow from 9.3 to 11.0 million people (18.2%) in the period 2015-2025 (UN, 2014). By contrast, the population of greater Hanoi has grown from 1.4 million in 1975 to 6.6 million in 2010 (GSO, 2011). Meanwhile, the number of people living in the urban agglomeration of Hanoi itself is expected to increase from 3.6 to 5.0 million (37.5%) between 2015 and 2025 (UN, 2014). In general, as cities develop and as supply chains get longer, new challenges of food storage and preservation arise (DuPuis, 2002). But as our two cases illustrate, the nature of these challenges varies.

Bangkok's high-rise apartment buildings, shopping centres, hotels and offices define it as a modern metropolis, enabling forms of urban living that are in stark contrast to more rural ways of life (Evers and Korff, 2000). Since the late 1960s, Thai businesses have been willing and able to respond to consumers' enthusiasm for Western goods, including food, and many new products have entered the market (Baker and Phongpaichit, 2014). Following rapid industrial and urban development, eating in public has increased, and in Bangkok small-scale street vendors are considered to be part of an efficient and affordable system of food distribution that has, to some extent, displaced cooking at home (Yasmeen, 2006; Higman, 2011). At the same time, the role of street vending is changing: snacks and meals are also sold in privately owned indoor shopping centres, air-conditioned restaurants and food courts.

In Hanoi, similar processes (Westernisation of the diet, supermarkets, mass-produced and distributed food) are in evidence, but less extensive than in Bangkok. In Vietnam, as in Thailand, there also concerns about the safety of mass-produced food. Wertheim-Heck, who writes about vegetable shopping in Hanoi, explains that increasingly distanced relationships between production and consumption combined with an intensification of agriculture and cultivation 'altered the characteristics of Vietnam's food insecurity from historic food shortage to contemporary food safety concerns' (2015: 7). There are now widespread and well documented anxieties about health risks associated with natural toxins, biological pathogens, and chemical agents such as pesticides, antibiotics and preservatives.

In response, the government has sought to regulate food production (Van Hoi et al., 2009), and promote the 'modernization' of the food retail system by encouraging the development of supermarkets (Wertheim-Heck, 2015). On this point it is important to note that it was not until 2009 that Vietnam allowed foreign owned companies to operate. Not surprisingly, this shift of policy led to an expansion of international retail. Despite this opening up, and the

proliferation of supermarkets, cities in Vietnam retain strong links to (relatively) nearby sites of small scale agriculture and food production (Phuc, 2012). Many consumers still buy food from market traders they know and trust (Wertheim-Heck, 2015).

The role of fridge freezers in Bangkok/Thailand and Hanoi/Vietnam reflects and relates to these different narratives of development. In detail, fridge freezers were available in Thailand in the 1960s (as in the UK), but a study by Pongsapich and Wongsekiarttirat (1994) suggests that they were not in widespread use until the 1970s. By contrast, in 1970s Vietnam, fridge freezers were high-end luxury devices used for storing food but more importantly for making ice. They only came into use on any scale after the economic reforms of 1986 (Wertheim-Heck, 2015). Partly because of these contrasting histories, different patterns of fridge freezer ownership and use remain today.

National figures are a bit patchy, but in 2002, only 10.9% of Vietnamese households owned a refrigerator, while in 2006 in Thailand the rate of ownership was already at 86%. By 2014, 91% of Thai households had a fridge (National Statistical Office Thailand, 2015), compared to 49% of Vietnamese households in 2012 (GSO, 2012). These figures do not distinguish between fridges, freezers and fridge freezers but in both countries double-door fridge freezers are now the dominant form, at least of new appliances.²

In the next part of the paper we focus on the changing roles of fridge freezers within and as part of also evolving food systems. Our analysis is based on interviews with middle class households (26 interviews in Bangkok, Thailand and 26 interviews in Hanoi, Vietnam), all conducted in 2016. Social class is a complex concept but in Southeast Asia, what have been described as significant 'consumer' classes are emerging as more people acquire more purchasing power (Guarín and Knorrinda, 2014; Nguyen-Marshall, Drummond and Bélanger, 2011; ADB, 2010; Economist 2009). Given our interest in explaining how consumer needs develop in practice, it made sense to focus on this population. We therefore selected respondents from distinctively 'middle class' areas as defined by our research partners in Vietnam and Thailand. Interviewees were recruited through the professional and social networks of our local research assistants and included people living in privately-owned houses, town houses and condominiums. 28 of the 52 interviews were with women, 18 with men, and in 6 cases a man and a woman were both present. 14 of those with whom we spoke were aged between 25 and 38, 23 were aged between 39 and 60 and 15 were 61 or over. We have used pseudonyms to maintain anonymity

The interviews were semi-structured, lasted from 45 to 90 minutes, and most took place in respondents' homes. A Vietnamese or Thai speaking research assistant helped translate in the interview situation, but some people chose to have the interview in English. We discussed the use of household appliances with special emphasis on fridge freezers and asked about present and past routines and practices. In most cases interviewees showed us around their home, allowing us to photograph their appliances, the contents of their fridge freezer, and the room in which it was located.

It is important to be clear about the status of this material. In conducting this research our aim was not to identify factors (such as family composition or working hours) that led households to acquire a freezer or to use it in a certain way, nor did we want to quantify the

prevalence of one form of freezer-use over another, or compare uses of the freezer in different types of household (e.g. with or without children). Rather, our ambition was to establish how practices of shopping, cooking and eating hang together and change, and how the freezer and its contents figured in these dynamic processes. Photographs of the freezers' contents, combined with accounts of where items were sourced from, and of how and when they might be used allowed us to detect the webs of materials and meanings which constituted practices of shopping and cooking and which in various ways bridged between households and urban systems and chains of provision. Our analysis focuses on these points of interconnection.

Evolving forms of fridge freezer dependence

The interviews reveal different and also dynamic interpretations of the need for a fridge freezer. As detailed below, the role of the fridge freezer is shaped by a) changing forms and sources of supply and diet entwined with practices of shopping, cooking and eating and b) closely related notions of taste, quality, freshness and safety. In discussing the contents of their fridge freezers in these terms, our respondents provided first-hand accounts of how systems of urban provisioning have reconfigured household practices and the forms of consumption that follow.

What is in the fridge freezer and where does it come from?

Despite the different histories of urban development outlined above, the fridge freezers we investigated contained many of the same sorts of food. In Bangkok and Hanoi interviewees routinely stored vegetables, fruits, drinks, eggs, condiments, milk and cooked food in the fridge, and kept meat and ice in the freezer.

But in discussion, and on closer inspection, various differences emerged. For example, Mai's fridge, in Bangkok, contains packs of eggs bought from the nearby supermarket and laid by imported chicken stock. Duc's fridge, in Hanoi, also contains eggs. But in this case, there is an entire crate of unpackaged eggs 'imported' to the city from his home village by bus. As this example illustrates, the contents of fridge freezers are indicative not only of the combination of what were seen as traditional diets and new foods, but also of the sources and supply chains through which necessary ingredients and products are procured.

In Bangkok, supermarkets have had a noticeable impact on how food is supplied and how shopping and cooking figure in the socio-temporal order of urban life. According to Mrs Pam (Bangkok), her fridge freezer became indispensable as early as the mid-1970s, a time when she and her husband were both in full time work and when her extended family gave up the family farm located outside the city and until then a reliable source of home-grown food.

A few years ago, Mrs Pam, now retired and living with her family in a big concrete house, upgraded to an even larger fridge freezer. She attributed this change to the fact that her neighbourhood was becoming gentrified and that the food for sale in the local market was consequently becoming more expensive. She now travels to a more distant but cheaper supermarket, doing so when her son is free to take her there by car. Since these are

infrequent trips she likes to stock up, hence the big fridge freezer. (Interview 2.4., Bangkok, woman aged 60+, private house).

Whilst the possibility of storing cold or frozen food at home has released people like Ms Nat from the task of shopping on a daily basis, there are more demands in terms of planning ahead.

In the past, you just picked it up from the garden and cooked it. Now you need to go to the supermarket, and you need to think in advance. (Interview 1.11., Bangkok, woman aged 40-50, town house).

Ms Nat uses her fridge freezer to store the ingredients needed to cook what she thinks of as proper food. At the week-end she prepares dishes for the week ahead, making sure she has meals ready for her retired mother, and making cooking easier given her own erratic working hours.

For other people, and especially for some of the younger interviewees, the fridge freezer is an essential device in *transforming* rather than *maintaining* what they see as a traditional diet. For example, Muk and Pon are a young working couple living in a condominium in Bangkok. Unlike their parents, they don't cook at home: instead they buy ready-made meals from the local street markets, order take-aways, eat out in restaurants or re-heat frozen food at home. For breakfast they purchase egg sandwiches (freshly made each day) from the 7/11 supermarket. In their small fridge freezer they store milk and frozen foods from the 7/11. They sometimes buy fresh fruit and vegetables from the local market, which they consume as snacks (Interview 3.1., Bangkok, couple, aged 30-40, condominium).

When Muk and Pon moved into the condominium they adapted their shopping and cooking habits to take advantage of the services provided in their new surroundings (supermarkets, restaurants and take-away food outlets). By contrast, other respondents looked for ways of preserving established practices, despite living in an urban environment. In Hanoi, experiences of leaving the countryside and moving into the city tended to be more recent, and also more memorable. Those who had made this switch explained what it meant for shopping. Whilst some found it easier to buy what they wanted others said it was much more difficult.

Mr Dung, who now lives in Hanoi with his younger sister, is of the latter view. He and his sister interact regularly with the rest of their family who live 80 kilometres away. As he explains, the chance to bring food back to the city is an important part of his visits 'home'.

Relatives still live in the rural areas in a traditional way. People who live in the city live far from the hometown but whenever they return to their home villages they bring things from the local producers. They bring this [food] to the city because those items in the city are expensive and hard to find (Interview 11.18. Hanoi, man aged 30-40, condominium).

Mr Dung's fridge freezer included items that are part of a typical Vietnamese diet (usually from the village) alongside yoghurt and milk bought from the supermarket. Ms. Lien, who

lives in a condominium in Hanoi, also talks positively about the chance to combine the convenience and variety on offer in the city along with fresh, and in her view, 'good' and reliable produce from the countryside.

Every weekend I go to the countryside to buy food and vegetables to store in the fridge. I only buy fruits and small things [cookies, candies, yoghurt and snacks, milk] in the minimarket nearby here but main things like meat, fish, I buy from the countryside (Interview II.13 Hanoi, woman aged 30-40, condominium).

The contents of Ms Lien's and Mr Dung's fridge freezers and the shopping and cooking practices they reveal demonstrate the existence of parallel systems of provision, and competing, but also co-existing ideas about the nature of good quality food. For Ms Lien, as for some of the other younger people in our sample, the result is a hybrid diet the ingredients for which are sourced in very different ways and then stored together in the same fridge freezer.

The details of what is in the fridge freezer and where it comes from show how households have adapted or retained specific practices in response to the urban cold chains and food systems amidst which they now live. These responses are not simply about the availability, or otherwise, of different foods. They are also shaped by shifting ideas about quality and safety which are in turn related to changing features of urban food supply.

Taste, freshness and food quality

It is difficult to chart changing tastes or pin down what Pingali (2007) refers to as the diffusion of a 'Westernised' diet, but in Bangkok and Hanoi it is easy to detect the arrival and consumption of what our respondents referred to as 'new' foods. For example, Mr Ming described his interest in so-called 'international' food, which he buys online and has delivered to his home or office (Interview 4.2., Hanoi, man aged 40-50, condominium). More ordinarily, and in both cities, the widespread availability of fridge freezers is closely linked to the introduction of novel products, many of which need to be kept cool. In this context, the increasing popularity of milk in Southeast Asia is especially interesting, particularly because it has such a central place in the Western diet (DuPuis, 2002). In Thailand, Vietnam and most other Asian countries 'milks' made from fresh vegetable or soy have been preferred to actual dairy products (McLeod and Nguyen, 2001) but there is evidence that this is changing. Average per capita milk consumption of Thailand rose from 2 to 23 litres a year between 1984 and 2007 (Suwanabol, 2005; FAO, 2011) and in Bangkok and other cities, there are high-end milk bars and national advertising campaigns promoting milk. Fridge freezers are part of this story: they enable the distribution and consumption of dairy products and they allow people to store other ready-frozen convenience foods at home. However, their role is surely not defined by these new foodstuffs alone.

In the city environments we studied, lengthening supply chains have had an impact on respondents' interpretations of freshness, quality and safety, and on the practices through which these discourse are carried and reproduced.

Friedberg suggests that meanings of freshness have shifted such that they depend more on the technology used to preserve and retain specific qualities and less on the passage of time as such (Freidberg, 2009). This is consistent with the view that interpretations of 'fresh' in the urban setting are not the same as those applied to food 'freshly' picked from the garden. This shift of meaning and the greater reliance on 'technology' (broadly defined) has to be understood in light of other changes in where and how people live, and in how they deal with perishable food.

The suggestion that urban re-interpretations of freshness and quality emerge alongside and via new forms of food supply is supported by Mrs Lat's account of her cooking and eating practices and by what she keeps in her fridge freezer. Mrs Lat lives in Bangkok with her husband and two children and works in the city centre. Unlike her mother, who used to make all her own meals from scratch, Mrs Lat very rarely cooks and hardly ever buys food that is fresh in the sense of being raw or unprocessed. Although she sometimes prepares eggs and bread for breakfast, her family mostly relies on ready-meals bought from the supermarket (Interview I.21. Bangkok, woman aged 40-50, private house).

In Mrs Lat's family, freshness is not equated with cooking and eating meals made at home with basic ingredients. Instead, freshness is treated as a taken-for-granted quality – a feature embedded in food that is made to last, and designed to be stored (or frozen) for use at a moment's notice. In this regime the fridge freezer is a necessary part of the ready-meal scenario, and of Mrs Lat's busy urban life.

Whereas Mrs Lat trusts in the quality of the prepared foods that she buys, Mr Wat, who lives in Bangkok with his wife and two school age children, values his fridge freezer because it allows him to avoid these foods and the risks he associates with them. Mr Wat's fridge freezer is consequently stocked with meals he has made himself, cooked in batches and stored for future use. As he explains this arrangement means his family can avoid eating out and refrain from buying foods that are ready-made or highly processed (Interview I.3, Bangkok, man aged 40-50, private house).

Mr Wat was something of an exception amongst those with whom we spoke in Bangkok. By contrast, in Hanoi many respondents were deeply anxious about food quality and contamination. Major scandals like those concerning contaminated fish have been widely covered in the media (Thanh Nien News, 2016) and clearly add to a generic sense of unease. These fears help explain why Mr Dung and others make regular trips to get food supplies from sources they trust.

It is for the food security why we go home. My parents prepare the meat and the fish. They bought a pig, fed by local people, and get fish from their own pond. We take the vegetables from our own garden so all of that is considered as clean origin, safe and fresh. We bring it here and rice also we normally bring in twice a month, each time like 10kg. My mother takes it from my aunty as she has rice field. That is process to provide food for us. I guess every family whose parents live in the rural/ suburban and they live in the city, they will do all the same that way (Interview II.18. Hanoi, man aged 40-50, condominium)

It is difficult to estimate the scale of this informal economy or the extent of self/family provisioning, but it is clear that Mr Dung's reliance on rural supplies is directly related to his distrust of the urban alternative. He was not alone. Other interviewees talked about getting vegetables, chicken, eggs, and fish from relatives in the countryside either imported in person, or sent to the city by bus. For example, those quoted below describe making special efforts to get seafood fresh from the sea, to buy organic produce directly from the farmer, and even to grow their own food in the city.

[B]efore we just bought fresh food from the local market but recently there have been so many news on food security – they talk about unsafe food – and that is why we should protect ourselves. ... Of course sometimes we also have to buy from the local market but now we prefer buying from the local people and also [get food] from our garden (Interview II.1, Hanoi, woman aged 40-50, private house).

We shop for beef or pork twice a week. We go to a place which is quite far away from here to buy good quality meat. We know the farmer who raises the pigs. Three or four years ago we started to do this because pork from the local market is not clean and we got a bit scared (Interview II.14, Hanoi, woman aged 40-50, private house).

Again, having a fridge freezer made it very much easier to manage changing food systems and respond to dilemmas about quality and safety – dilemmas which are, ironically, associated with lengthening food chains themselves made possible by the domestic fridge freezer and its commercial equivalent. In such situations, forms of self or family provisioning created the need for still more frozen space. Here, Mrs Ngon, who lives in Hanoi with her husband, two children and her mother-in-law, explains why she bought a bigger fridge freezer.

We needed more space so we bought a bigger fridge freezer. Maybe 5 years ago we bought a bigger one. The new one is very convenient for us because now we have more space. Because you know now there is a lot of unsafe food so, for example, if I go to the countryside, I can buy some pork from where I know they raise the pig without chemicals put in their food. We buy 7-10 kg at once and we can store it (Interview II.1, Hanoi, woman aged 40-50, private house).

It is important to catch the subtleties of provisioning strategies and the tensions within. For example, although it is thought 'safer' to get food direct from the countryside there are some residual concerns about freezing and storing, as in the following extract. This means that for some people living in the city 'really' fresh becomes an unachievable ideal.

But now things have changed a lot, and we try to buy a lot of safe and organic food to store in the fridge. But even now there are some people who still keep their ideal that they want fresh food, and don't want to freeze food in the fridge freezer. They don't want to be like Westerners, sorry... (Interview II.1, Hanoi, woman aged 40-50, private house).

Similarly, there are grades of risk to be negotiated. Hence Mr Ming, who lives in a condominium in Hanoi, thinks that the quality of food is better and more reliable in the

supermarket. He avoids buying from street vendors because he is worried about pesticides and diseases. (Interview 4.2., Hanoi, man aged 40-50, condominium). Meanwhile, Mr Trang, comes to the opposite conclusion:

We can find everything from the supermarket but the price of it is higher than in the local market. And it is not really fresh compared to local market. ... But we shop there because it saves time. And for the normal daily food it is ok. But if we have a party ... we will go out [to the local market] to buy food. ... But normally we go to the supermarket twice a week and then we store the food in the fridge (Interview 4.5., Hanoi, man aged 30-40, condominium).

Others described making strategic choices about where and what they eat. For example:

Some people don't want to go to the very big restaurants because they think that the big restaurants store food. It is not fresh. But we go to the small ones; they sell out every day, they can get fresh food (Interview II.1, Hanoi, woman aged 40-50, private house).

Such anxieties appear to be more pronounced in Hanoi than in Bangkok, perhaps because complex and extended supply chains, including those that depend on refrigeration, are a more recent phenomenon. Whatever the reason, the fridge freezer appears to be a vital tool in managing 'safe' food provisioning in both Bangkok and Hanoi, *however that is interpreted*. It is essential for families who seek to bypass modern food chains and rely on links of their own, and for those who make use of 'modern' foods, frozen ingredients and ready-meals bought from supermarkets. As is always the case, practices are infused with judgements of quality. In the situations we describe, these judgements are in flux not randomly but in ways that are evidently linked to the somewhat different development of urban food systems in the two cities we studied.

Fridge freezers in action: urbanisation, consumption and practice

Whether we focus on the US, the UK, Vietnam or Thailand there is a clear connection between the diffusion of fridge freezers, the availability of ready-frozen food (typically mass produced, and often sold in supermarkets), and less frequent patterns of shopping. In simple terms, the proliferation of domestic fridge freezers appears to be a precondition for urban forms of provisioning-at-a-distance. Going full circle, urban systems of provision (and resistance to them) generate what seem to be unavoidable and widespread reliance on the fridge freezer. For consumers caught up in processes of rapid urbanisation, fridge freezers are 'needed' to avoid what are seen as the risks of processed food, or food from unknown sources, just as they are needed by those who consume mass produced ready meals, or who do a bit of both. This observation goes a long way towards explaining why fridge freezers, and the energy demands they generate, have become so deeply embedded in so many *different* lives.

In thinking further about how practices of shopping, cooking and eating interact and change, it is clearly important to consider personal and collective histories, and to take note of stages and forms of urbanization alongside other more global transformations in food

manufacturing and diet. The contents of fridge freezers in Bangkok and Hanoi (or in the UK and the US) are evidence of different moments in what seems to be a longer term narrative of urbanisation entailing the progressive disconnection from rural origins, foods, skills and practices. Whilst respondents' interpretations of the need for a fridge freezer were varied and often ambivalent, the widespread adoption of these appliances establishes what amounts to a common infrastructure: enabling (but not requiring) production-at-a-distance, the circulation of new foodstuffs, the outsourcing of (parts of) cooking and food preparation, and the spatial and temporal reconfiguration of shopping, cooking and eating.

The detail of what fridge freezers contain and how they are used depends on co-existing systems of provision and co-productive responses to, or within those systems. As Goodman reminds us, the significance of maintaining 'traditional' systems of provision can only be understood alongside and in relation to the emergence of extended commercial cold chains of the kind that characterise 'modern' urban life (Goodman et al., 2012). Recognising that fridge freezers in use are defined and constituted not in the abstract but always *in relation to* surrounding and also changing systems of diet and provision helps make sense of differences between the contents and the roles of the fridge freezers we examined in Bangkok and Hanoi.

In explaining how and why middle class urban households have come need a fridge freezer we have described the emergence of systems of food provisioning that are in various ways freezer-dependent. These arrangements underpin escalating energy demand (freezers need powering in homes and in supermarkets and chilled transport is essential). Whether they like it or not, the practices of those with whom we spoke are enmeshed within these systems. In addition, and in showing that such practices are multiply interlinked, we have underlined the point that changes in consumption are not simply situated within the home, nor are they defined by seemingly private habits and routines or by increases in GDP (Cold Commission 2013).

Along the way we have also explored connections between what are at first sight more diffuse concepts of taste, risk and safety. In showing how meanings of quality and anxieties about contamination inform and are in a sense reproduced via multiple practices – shopping, but also selecting, preparing and managing food – we show how these concerns are in turn anchored in organizational changes in systems of provision including those enabled by fridge freezers. Thus food scares are not 'merely' discourses: they are of necessity enacted at all scales, by households, supermarkets and local providers alike. By implication, the scope for scares of this kind is wired in to contemporary forms of food supply. In that sense it is virtually impossible to escape the grip of urbanized systems of food provisioning, not even for those who resist them.

In conclusion, we are certainly not the first to characterise eating and shopping as social practices (Halkier and Jensen 2011; Halkier, Katz-Gerro et al. 2011; Paddock 2015; Warde 2016). In adding to this line of research, our analysis makes three quite distinctive contributions. One is to provide an account of the *ongoing* reconfiguration of practices of provision (retailing, distribution) *and* consumption (sourcing, shopping, cooking), in situations of rapid urbanisation. We have consequently conceptualised consumption as an outcome of multiple, intersecting and always changing social practices. Second, we have

shown how notions of quality and discourses of risk, modernity, safety and tradition are quite precisely anchored in the details of supply and provision, including arrangements enabled by freezer technology. This suggests that far from being free floating, matters of meaning and judgements of significance and quality are materialised and grounded in what some might see as economic or technological processes. Last but definitely not least, we have provided a means of bridging between urban studies and theories of consumption and practice. In showing how practices of eating and shopping are bound up with and defining of seemingly extensive but also dynamic processes of urbanisation, Westernisation and globalisation, we have provided new insight into the constitution of what Schatzki describes as 'large' social phenomena (Schatzki 2011). Bringing these threads together, we have provided an account of how practices change and how consumer needs emerge within and as part of urban life. This approach has wider implications, arguing for more situated understandings of consumption and of the extent to which increasingly resource intensive ways of life are inextricably and perhaps unavoidably embedded in urban development.

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Data statement

Information about the data on which this article is based, and conditions for access is available at the Lancaster University data archive: <http://dx.doi.org/10.17635/lancaster/researchdata/112>.

Notes

- ¹ There are important differences between fridges and freezers. Freezers make it possible to store food for months, not days, and are essential for the production and circulation of frozen food. Fridges merely keep food cool. For the most part we write about fridge freezers – that is appliances which combine a freezer and a refrigerator: these being the most common form encountered in our research. However, some of the topics we discuss are specifically about freezing.
- ² Stand-alone freezers have a very small market share (McNeil et al., 2007; Foran et al., 2010). In the last few years, some fridge freezers (in Hanoi and Bangkok) feature multiple sections set at different temperatures to help keep a variety of different foods fresh.

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